Society and Natural Resources, 23:1075–1092
Copyright © 2010 Taylor & Francis Group, LLC
ISSN: 0894-1920 print/1521-0723 online
DOI: 10.1080/08941920902724974

Routledge
Taylor & Francis Group

The Influence of Home and Community Attachment on Firewise Behavior

GERARD T. KYLE

Human Dimensions of Natural Resources Laboratory, Texas AgriLife Research, Texas A&M University, College Station, Texas, USA

GENE L. THEODORI

Department of Sociology, Sam Houston State University, Huntsville, Texas, USA

JAMES D. ABSHER

Pacific Southwest Research Station, USDA Forest Service, Riverside, California, USA

JINHEE JUN

Human Dimensions of Natural Resources Laboratory, Texas AgriLife Research, Texas A&M University, College Station, Texas, USA

Downloaded By: [Theodori, Gene] At: 16:54 27 September 2010

The purpose of this investigation was to examine the influence of residents' attachment to their homes and community on their willingness to adopt Firewise recommendations. Our sample was drawn from a population residing in the wildland–urban interface where the threat of wildfire is acute. The Firewise recommendations concerned 13 activities affecting home design, construction and maintenance, landscaping, and community engagement. Consistent with the tenets offered by the elaboration likelihood model of persuasion and empirical evidence stemming from the place and community attachment literatures, we hypothesized that those most attached to their homes and community would be most inclined to adopt Firewise recommendations to protect these settings. For the most part, our findings were consistent with this hypothesis. We observed that the dimensions of home attachment were most strongly predictive of activities centered on and around the home, whereas community attachment was more strongly predictive of community-based activities.

Keywords community attachment, Firewise, home attachment, place attachment, wildland fire

Received 19 November 2007; accepted 19 September 2008.

Special thanks to Darrell Fannin of the Department of Recreation, Park and Tourism Sciences at Texas A&M for his assistance with sample selection and GIS.

Address correspondence to Gerard T. Kyle, Human Dimensions of Natural Resources Laboratory, Texas AgriLife Research, Texas A&M University, College Station, TX 77843, USA. E-mail: gerard@tamu.edu

The wildland–urban interface (WUI) is generally considered the area where urban development meets private and public wildlands (Theobold and Romme 2007). Since the 1970s, human migration into the WUI has raised concerns among a variety of stakeholders. Central among these concerns is the issue of wildland fire. In light of several catastrophic wildfires, considerable effort has been directed toward programs and initiatives aimed at reducing the impact of wildland fire on life and property among WUI communities. One initiative that has received considerable national attention is the Firewise Communities program. This program is the product of a multi-agency effort aimed at fostering "community responsibility in the design of a safe community . . . and individual responsibility for safer home construction and design, landscaping, and maintenance" (Firewise Communities 2006, para. 1). While this program has been effective in educating some residents and encouraging communities to give more thought to design and construction, there still remain many who are not fully aware of the extent of threat posed by wildland fire. With the WUI being increasingly populated by urban migrants who have had little exposure to wildlands and less understanding of the threats associated with living in these settings, an understanding of factors that contribute to their propensity to engage in Firewise behaviors would be of value to a variety of stakeholders (Brenkert-Smith et al. 2006).

In this investigation, we explored the influence of several factors that shape WUI residents' propensity to engage in activities that minimize the threat of wildland fire to their homes and community. Of these factors, of central concern were the effects of residents' attachment to their homes and community. In the context of natural resource management, empirical work has shown that an understanding of humans' bond to the landscape of various scales can provide insight on their behavior within the setting and attitudes toward the management of the setting (Kyle et al. 2006; Vaske and Kobrin 2001; Vorkinn and Riese 2001; Walker and Chapman 2003. Given this work, we suggest that an understanding of residents' attachment to their homes and community would also provide insight on their attitudes and behaviors related to these settings. In the case of home and community protection activities directed toward mitigating the threat of wildland fire, we hypothesized that residents expressing the strongest attachment to these settings will be most inclined to engage in activities that mitigate threat.

Downloaded By: [Theodori, Gene] At: 16:54 27 September 2010

Past Work

Our review of past work begins with a discussion of wildland fire within the WUI and residents' propensity to adopt actions to protect their homes and community. We then discuss the utility of home and community attachment for addressing resource-related issues and conclude with an overview of the theoretical framework guiding our conceptualization and analyses.

Wildfire and the Wildland–Urban Interface

The population growth in the WUI that has occurred over the past 30 years is likely to continue well into the future (Stein et al. 2007). While diverse impacts stemming from this growth have been cited in the literature (e.g., destruction of fish and wildlife habitat, diminishing recreation opportunities, introduction of invasive species), issues surrounding wildland fire have become increasingly salient in light

of several large and catastrophic events. Unfortunately, solutions to the "wildland fire problem" are complex and require the engagement of multiple stakeholders (Carroll et al. 2007).

While federal and local agencies are often viewed as best equipped to conduct fire prevention and protection activities, it is becoming increasingly apparent that residents of the WUI can also play an active role in protecting themselves from the threat of wildfire. This understanding underlies the development of the Firewise Communities education program—a multi-agency effort drawing from public land management and firefighting agency sectors. The focus of this program encompasses two elements: (a) home design and construction, and (b) landscaping that includes the creation and maintenance of a defensible space around the home (Firewise Communities 2006). Firewise home design and construction incorporate the use of materials that are fire-resistant (e.g., metal, concrete) and design elements that limit potential combustion (e.g., window size, protecting external vents). Alternately, for Firewise landscaping activities, the goal is fuel reduction. This includes the maintenance of a well-irrigated area surrounding the house perimeter, the use of low-growing plants, and the use of trees that are distanced from one another, green, and do not overhang the house.

Research has shown that a homeowner's decision to adopt Firewise construction and landscaping is influenced by a number of factors. These include residents' perceptions of the risk of wildfire threatening their homes (Miller et al. 1999), the potential outcomes associated with the adoption of construction and landscaping guidelines (Bright and Carroll 2004), and the subjective norms underlying the adoption of home protection activities (Bright and Burtz 2006; Vogt et al. 2005). While this work has deepened our understanding of people's attitudes and behaviors related to the Firewise program, the relative infancy of the program and associated research begs the question, "Are there other factors that could also account for variation in humans' attitudes and behaviors?" Work that has utilized place attachment-related concepts offers additional insight.

Downloaded By: [Theodori, Gene] At: 16:54 27 September 2010

Humans' Attachment to Home and Community

There is a growing literature documenting the utility of various place attachment-related concepts for understanding humans' relationship with the physical environment. Because humans' relationship with place has relevance for a number of disciplines and fields, an equally diverse range of concepts has emerged in the respective literatures. While there is much overlap among these concepts, there are also subtle distinctions that are borne out of each field's epistemological and ontological traditions. In the context of our investigation, the two attachment constructs we utilized—place attachment[1] and community attachment—also reflect the disciplinary biases that has girded their conceptual development. For the concept of place attachment, much of the seminal work is ground in environmental psychology and has disproportionately focused on humans' relationship with home environments (Manzo 2003). The focus of this literature has been on the attributes of the setting, human cognitions of these attributes, and the individual level meanings that are ascribed to these attributes (Cooper Marcus 1995; Guiliani and Feldman 1993; Hull et al. 1994; Korpela 1989; Proshansky et al. 1983). Definitions of place attachment that have appeared in the literature generally make reference to settings of varying scale (e.g., home, neighborhood, continent) that are given meaning through

experience, emotional sentiment, and cognition. These definitions also contrast "place" against "space." In this sense, space is considered an inanimate surface defined solely by its geometry (Tuan 1977). Place, on the other hand, becomes an object of meaning and sentiment forged through experience often in the company of others. Thus, just as there are many houses that line any given street, for the individuals who reside along these streets, there is typically only one home.

Alternately, community attachment emerged from sociologists' work examining the effects of urbanization on the social structure and function of communities (Beggs et al. 1996; Janowitz and Kasarda 1974; Goudy 1990). In contrast to the place attachment literature, conceptualizations of community attachment more strongly emphasize social connections that bind individuals to place and less on the physical characteristics of the landscape. While definitions of community feature a territorial element, emphasis is placed upon the interaction among the actors and associations that define community (Theodori 2000). In this context, community often transcends political jurisdictions such as neighborhood, city, or municipality. Thus, where physical territories such as the places where we reside, work, and recreate and their associated meanings are the focus of place attachment research, place becomes the stage hosting social interaction in the context of community attachment research.

In spite of these conceptual distinctions, both constructs have potential for providing insight on how people's ties to a spatial or social context can inform a variety of attitudes and behaviors. In the context of work on community attachment, in spite of the construct's stated promise (e.g., Beggs et al. 1996), "few investigators have examined empirically the link between community attachment . . . and actions at the community level" (Theodori 2000, p. 50). One notable exception was conducted by Theodori (2004). Using data collected from a general population study in west Texas, he observed that community attachment was a significant predictor of residents' participation in public meetings relating to town or school affairs, working with others to address community issues, and their participation in community improvement activities.

In contrast to work examining attitudinal or behavioral outcomes associated with community attachment, an extensive literature exists documenting the relationship between place attachment and other attitudinal and behavioral variables. While this work has paid less attention to outcomes associated with home attachment, these studies do reveal that people's attachment to various settings has implications for how they view and respond to the setting. For example, Vorkinn and Riese (2001) measured residents' attachment to their municipality and five areas within a small rural community in Norway. They were interested in understanding how residents' attachment to these areas would impact their attitudes toward a proposed hydropower development that would "cause major environmental impacts within certain areas of the community" (250). Their findings illustrated that as residents' attachment to the municipality and regions within the community increased, so too did their opposition to the proposed hydropower development. Vaske and Kobrin (2001) also observed a positive association between environmentally responsible behavior (ERB) and their respondents' attachment to natural areas within their community in Colorado. Their operationalization of ERB consisted of seven indicators that touched on issues such as participating in community cleanup activities, recycling, and water conservation. Last, Payton, Fulton, and Anderson (2005) examined the relationship between visitors' attachment to a National Wildlife Refuge and their civic action related to the refuge. Civic action was measured using

Downloaded By: [Theodori, Gene] At: 16:54 27 September 2010

indicators of their participation in refuge-focused activities such as organizing events, helping with maintenance, or volunteering at refuge events. Their findings were congruent with previous research illustrating a positive association between visitors' attachment to the setting and their behaviors that serve to protect the resource. While this is far from an exhaustive review, it does illustrate that increasing attachment to specific locales evokes attitudes and behaviors that, in the eyes of the attached, serve to protect the setting.

Conceptual Framework and Summary

The criterion variables of interest in this investigation were respondents' current utilization of Firewise protection activities along with their intentions to do so in the future. It is our hypothesis that those most attached to their homes and community will demonstrate the strongest proclivity toward both ends. This hypothesis is derived from the place and community attachment literature just reviewed and the tenets of Petty and Cacioppo's (1986) elaboration likelihood model (ELM) of persuasion. In the context of ELM, the theory posits that information is not always processed in a thoughtful manner. The degree of processing or elaboration is determined by the individual's motivation and/or ability to comprehend and interpret message content.

In the context of our investigation, while we did not explicitly measure the extent of respondents' motivation to process Firewise information, past empirical work using the ELM framework has used the concept of "place" to manipulate respondents' perceptions of personal relevance related to information presented in product advertisements (see Petty and Cacioppo 1981; Petty et al. 1983). In these experiments, personal relevance was manipulated by indicating in message treatments that the release of a new product would occur (a) within the subject's own community, or (b) at a distant locale. Subjects provided the treatment that indicated the product release would occur locally displayed significantly higher levels of elaboration compared to the group provided the message indicating the product release would occur at a distant community. Consistent with this work, our measures of home and community attachment also provide some measure of personal relevance and subsequent motivation to elaborate.

In sum, there is evidence illustrating that people's attachment to settings of various scale is associated with generally positive sentiments about these environments. When these settings are threatened, the literature indicates that those most attached are also the most inclined to act to protect the setting. In the context of this investigation, involving residents of the WUI, threat is manifested in the presence of wildland fire. Potential actions that residents can adopt to mitigate threat are outlined in the Firewise Communities program. Residents' motivation to process Firewise information and adopt Firewise design, construction, and landscaping practices is contingent on several factors. In this investigation, our primary interest lies in understanding the effect of attachment to home and community on decisions to implement Firewise practices.

Method

Data Collection

Data for this investigation were taken from a larger study of the public's perceptions of wildfire management within the WUI near Cleveland National Forest (NF) in

Downloaded By: [Theodori, Gene] At: 16:54 27 September 2010

southern California. The Cleveland NF lies within 50 miles of downtown San Diego and the suburban area extends to the national forest borders. We began by selecting census tracts intersecting with a half-mile buffer surrounding the NF. Names and addresses of residents were then drawn from census blocks. We aimed to get a mix of residents that varied in terms of the recency in which their community had experienced a wildland fire event and their proximity to the wildland–urban interface. The buffer was identified using ArcGIS software. Names and addresses of residents within the identified census blocks were provided by a commercial research company ($n = 2{,}162$). A modified Dillman (2000) procedure was used with four contacts: (a) initial introductory letter explaining the purpose of the investigation and drawing respondents' attention to the survey instrument that would be arriving within the coming weeks; (b) cover letter, survey instrument, and return postage-paid envelope; (c) a postcard reminder; and (d) a second cover letter, survey instrument, and return postage-paid envelope sent to nonrespondents. In total, 724 respondents returned their survey instruments. This sampling procedure yielded a 33% response rate.

As reflected in Table 1, the sample was comprised of mostly white (93.34%) older ($M = 60.30$ years) men (61.19%). They were generally well educated ($M = 15.37$ years) with annual household incomes in excess of $60,000 (72.24%).

Downloaded By: [Theodori, Gene] At: 16:54 27 September 2010

Measures

Our conceptualization and measurement of home attachment draw from work falling under the rubric of "place attachment" (Low and Altman 1992; Kyle et al. 2004).

Table 1. Sample characteristics

Indicator	*n* (%)	*M*	*SD*
Gender, *n* (%)			
Male	443 (61.19)		
Female	273 (37.71)		
Age (years)		60.30	13.51
Education (years)		15.37	2.64
Income, *n* (%)			
Under $20,000	24 (3.31)		
$20,000–$59,999	177 (24.45)		
$60,000–$99,999	186 (25.69)		
$100,000–$139,999	136 (18.78)		
$140,000–179,000	62 (8.56)		
$180,000 or more	139 (19.20)		
Race/ethnicity			
Hispanic	19 (2.69)		
White	659 (93.34)		
Asian American	3 (.42)		
Black or African American	2 (.28)		
Native Hawaiian or other Pacific Islander	2 (.28)		
American Indian or Alaskan Native	21 (2.97)		

Downloaded By: [Theodori, Gene] At: 16:54 27 September 2010

Studies of place attachment have examined spatial contexts of varying scales, ranging from objects (e.g., cars) to continents (see Low and Altman 1992, for review). The concept of place attachment also subsumes a variety of other place-related concepts (e.g., place dependence, place identity) that have been used to describe people's relationship with the physical environment. Consistent with this work, we use the concept of "home attachment" as an umbrella term encapsulating other evaluative concepts describing people's attachment to specific settings. Multidimensional conceptualizations like ours are prevalent in the literature (Jorgensen and Stedman 2001; Kyle et al. 2004; Williams et al. 1992; Williams and Vaske 2003). These conceptualizations better capture the subtleties of humans' bond with the environment. Accordingly, our measure included items adapted from the Jorgensen and Stedman (2001) and Kyle et al. (2005) place attachment scales. Jorgensen and Stedman's scale was designed to measure three dimensions of their respondents' attachment to their residences in Wisconsin: (a) *place identity*, which consists of "an individual's cognitions, beliefs, perceptions or thoughts that the self is invested in a particular setting" (238) (e.g., "Everything about my home is a reflection of me"); (b) *affective attachment*,[2] which was defined in "terms of an individual's affective or emotional connection to a spatial setting" (238) (e.g., "I feel happiest at home"); and (c) *place dependence*, which is considered in of "the perceived behavioral advantage of a spatial setting relative to other settings" (238) (e.g., "My home is the best place for the things that I like to do"). We also added a fourth dimension, titled *social bonding,* based on the Kyle et al. (2005) work indicating that bonds to spatial environments can also be the product of the social ties that bind individuals to place (e.g., "I associate special people in my life with my home"). All items were measured along a 5-point scale of 1 = "strongly disagree" through 5 = "strongly agree."

The scale's psychometric properties were shown to be adequate, displaying good internal consistency (Cronbach's alpha ranging between .75 and .91) and generally good factor loadings.[3] The results of confirmatory factor analysis (CFA) illustrated that the four-factor solution was also a good fit to these data ($\chi^2 = 98.83$, df = 48, RMSEA = .039, NFI = .991, IFI = .994, CFI = .996).[4]

Community attachment was measured using nine items adapted from Theodori's (2004) community attachment scale (e.g., "Overall, I am attached to this community"). These items comprise a single dimension of *community attachment.* All items were measured along a 5-point scale of 1 = "strongly disagree" through 5 = "strongly agree." The scale's psychometric properties were also adequate, displaying good internal consistency (Cronbach's alpha of .91) and solid factor loadings. The results of CFA also illustrated the single-factor solution was a good fit to these data ($\chi^2 = 101.67$, df = 25, RMSEA = .068, NFI = .986, IFI = .989, CFI = .989). For the dimensions of home and community attachment, summative indices were constructed using the items loading on each factor. These indices were used in our subsequent model testing.

Finally, 13 items were used to examine respondents' engagement in home and community protection activities (see Table 2). These items were adapted from Absher and Vaske (2006) and reflect a variety of activities homeowners can undertake to protect their homes from wildland fire and assist with their community's preparedness. Respondents were first requested to indicate whether or not they presently undertook the specific activity ("yes"/"no"). They were then requested to indicate the likelihood of undertaking this activity in the future along a 5-point scale of 1 = "not at all likely" through 5 = "extremely likely." These items were grouped into four conceptual

Downloaded By: [Theodori, Gene] At: 16:54 27 September 2010

Table 2. Home and community protection activities—Current implementation and intention to implement

	Yes[a]		Current action						Future intention[b]	
Items, home protection activities	*n*	(%)	α	λ	δ/ε	*t*	*M*	*SD*	*M*	*SD*
Home			.63				2.40	.72	4.13	.82
a. Clean roof surfaces/gutters and surrounding vegetation to avoid accumulation of needles, leaves, and dead plants	677	(93.77)		.62	.61	—			4.30	.80
b. Stack firewood/lumber at least 30 feet from house	558	(77.29)		.64	.49	11.35			4.03	1.11
c. Use nonflammable building materials such as tile, slate, brick, heavy timber, or stone	577	(79.92)		.57	.68	10.68			4.12	1.03
Property			.79				2.08	1.31	3.38	1.07
d. Plant fire-resistant plants	478	(66.20)		.66	.56	—			3.71	1.14
e. Plant trees and shrubs at least 15 feet apart	356	(49.31)		.79	.38	15.47			3.42	1.23
f. Prune the branches of all trees within 85 feet of your house to a height of 10 feet above the ground	301	(41.69)		.62	.62	13.21			3.26	1.34
g. Reduce the density of trees within 100 feet of your home	441	(61.08)		.67	.56	14.08			3.39	1.36

Downloaded By: [Theodori, Gene] At: 16:54 27 September 2010

Community			.77				.90	1.00	2.41	.93
h. Attend community-based meetings related to wildland fire	155	(21.47)		.80	.36	—			2.68	1.20
i. Obtain additional information from a land management, community group, or firefighting agency on how to prepare for wildland fire	349	(48.34)		.77	.41	17.45			3.16	1.23
j. Volunteer within the community to help clear and remove combustible material (e.g., brush, litter)	94	(13.02)		.53	.71	12.92			2.16	1.13
k. Help organize community education programs related to wildland fire	39	(5.40)		.51	.74	12.42			1.84	1.01
General planning			.55				1.30	.71	3.57	1.14
l. Prepare an evacuation plan in case of wildland fire	556	(77.01)		.65	.57	—			3.85	1.11
m. Plan recreational activities that involve fire (e.g., campfires, fireworks) around weather service reports	431	(59.70)		.60	.64	9.8			3.35	1.41

[a]Responses were coded 1 = "yes" and 0 = "no." Because our dependent variables were of ordinal scale, the model was tested using the polyserial correlation matrix and accompanying asymptotic covariance matrix. Parameter estimation was based on the weighted least squares (WLS) estimation procedure. Goodness-of-fit: $\chi^2 = 205.635$, df = 57, $p = .0$, RMSEA = .059 (90% CI = .051–.069), NFI = .959, IFI = .970, CFI = .970.

[b]Likelihood of engaging in home protection activities was measured on 5-point scale: 1 = "not at all likely" through 5 = "extremely likely."

domains: (a) items "a" through "c" referred to activities germane to respondents' home, (b) items "d" through "g" referred to activities residents could undertake around their properties, (c) items "h" through "k" were more strongly focused on activities that were community-centered, and (d) items "l" and "m" reflected activities residents could undertake in preparation for wildland fire. The results of CFA illustrated the grouping of items into these domains was satisfactory as evidenced in the fit of the model to these data ($\chi^2 = 205.635$, df = 57, RMSEA = .059, NFI = .959, IFI = .970, CFI = .970), the moderate factor loadings, and adequate reliability estimates. Using these conceptual domains, summative indices were computed to create new variables based on respondents' reported current actions and future intentions. This resulted in eight new variables that were included in our model testing.

Overall, of the 13 home and community wildfire protection activities, most respondents indicated performing tasks specific to their homes and properties (see Table 2). Of these activities, cleaning roof surfaces and gutters of flammable debris (93.77%) was the most popular, followed by the use of nonflammable building materials (79.92%) and the stacking of firewood away from the house (77.29%). As noted earlier, respondents were less inclined to engage in community-based activities such as volunteering (13.02%) and organizing community education programs (5.40%). Respondents' propensity to engage in these activities in the future mirrored their current behaviors.

Downloaded By: [Theodori, Gene] At: 16:54 27 September 2010

Model Testing

To examine the effect of home and community attachment on respondents' propensity to adopt Firewise directives, two path models were tested in LISREL (version 8.70). The first model included respondents' current behavior as the primary criterion variable and the second included their future intentions as the primary criterion variable. The dimensions of home and community attachment were modeled as predictors of these criterion variables. Additionally, owing to the extensive literature illustrating that bonds to landscapes, homes, and community deepen over time (Bonaiuto et al. 1999; Brown et al. 2003; Low and Altman 1992), we also included indicators of tenure to home and community. These were modeled as antecedents to home and community attachment in addition to direct effects on the Firewise dimensions indicators.

Findings

Respondents' Homes and Community

Most respondents indicated that the address to which the survey was sent was their primary residence (97.51%) in which most had lived for approximately 10 years (median = 10 years) (see Table 3). Also, as determined by our sampling procedure, a priori, most respondents lived within a mile of a wildland area (61.92%). Of those respondents who indicated owning their residence (94.64%), many indicated having little involvement in the initial design of the dwelling ($M = 2.50$, $SD = 1.81$) or choice of construction materials ($M = 2.42$, $SD = 1.00$).[5]

Respondents' engagement within their communities was also somewhat low. In spite of them indicating that they were satisfied with their community ($M = 1.57$, $SD = .76$), interested in knowing what was occurring within their community

Table 3. Respondents' homes and community

Characteristics of respondents' homes	*n* (%)	*M*	*SD*	Median
Primary residence	706 (97.51)			
Length of residence	10 (9.89)	12.68	9.89	10
Type of residence				
A mobile home or trailer	26 (3.74)			
A one-family house—detached from any other house	643 (92.39)			
A building with apartments	3 (.43)			
A one-family house attached to one or more houses	24 (3.45)			
Proximity to a wildland area				
Live within a wildland area	81 (11.55)			
Adjacent to wildland area	133 (18.97)			
Between 100 and 300 yards	91 (12.98)			
More than 300 yards but less than a mile	129 (18.40)			
Between 1 and 3 miles	190 (27.10)			
More than 3 miles	77 (10.98)			
Home ownership (''own'')	671 (94.64)			
Involvement in home design[a]				
Design		2.50	1.81	
Choice of construction materials		2.42	1.00	
Involvement in home modification[a]—*M* (*SD*)				
Design		3.11	1.86	
Choice of construction materials		3.12	1.84	
Characteristics of respondents' communities				
Length of residence—median (*SD*)		15.83	12.11	13
Community satisfaction[b]		1.57	.76	
Interest in knowing what goes on in community[c]		1.64	.72	
Level of community involvement[d]		2.54	.81	
Influence in community decision making[e]		2.91	.83	

[a]Measured along a scale of 1 = ''no involvement'' through 5 = ''made all decisions.''
[b]Measured along a scale of 1 = ''very satisfied'' through 5 = ''very dissatisfied.''
[c]Measured along a scale of 1 = ''very interested'' through 5 = ''very disinterested.''
[d]Measured along a scale of 1 = ''extremely active'' through 4 = ''not very active at all.''
[e]Measured along a scale of 1 = ''a lot'' through 4 = ''none at all.''

($M = 1.64$, $SD = .72$), and having lived within the community for over a decade (median = 13 years), their perceived influence in community decision making ($M = 2.91$, $SD = .83$) and reported involvement ($M = 2.54$, $SD = .81$) were each low.

Prediction of Current Home and Community Protection Behaviors

In contrast to previous work examining factors underlying the bonds people share with places of varying scale (Bonaiuto et al. 1999; Brown et al. 2003; Vorkinn and

Downloaded By: [Theodori, Gene] At: 16:54 27 September 2010

Riese 2001), we observed that home and community tenure had no significant effect on respondents' attachment to their homes or community.

For respondents' current home-based Firewise efforts, which involved the cleaning of roofs/gutters, stacking firewood away from the house, and use of nonflammable building products in home construction, *affective attachment* (B = .046, $p < .05$) was the only significant predictor (see Table 4). As respondents' emotional attachment to their home's increased, so too did their propensity to implement these actions. *Affective attachment* accounted for less than 1% (0.6%) of the variance.

For respondents' current behaviors related to Firewise actions on their properties (e.g., planting fire-resistant plants, planting trees 15 ft apart from one another and away from the home, and thinning), all significant predictors had a positive effect. The tenure of respondents' residence within their community (i.e., *community tenure*) was positively associated with their implementation of property-based activities (B = .011, $p < .01$) as were three dimensions of home attachment: *place identity* (B = .177, $p < .01$), *place dependence* (B = .142, $p < .05$), and *social bonding* (B = .140, $p < .01$). Combined, these predictors accounted for 5.6% of the variance in property-based activities.

Community-based activities (e.g., attend meeting, volunteer) were positively influenced by *community attachment* (B = .548, $p < .001$) alone. Intuitively, it should be expected that attachment to the community would also be associated with respondents' efforts to protect the community from wildland fire. *Community attachment* accounted for 8.3% of the variance in community-based activities.

Finally, general planning activities (e.g., evacuation, recreation) were positively influenced by *home tenure* (B = .006, $p < .05$), *social bonding* (B = .059, $p < .05$), and *community attachment* (B = .137, $p < .01$). Combined, these predictors accounted for 2.9% of the variance. Respondents' propensity to engage in these activities increased in congruence with their length of tenure in their homes, the social ties to their homes, and attachment to their community.

Table 4. Prediction of home and community protection activities—Current implementation

Firewise activity	Predictors	B	*SE*	*t*	R^2
Home	Affective attachment	.046	.022	2.066*	.006
Property	Community tenure	.011	.004	2.927**	.030
	Place identity	.177	.063	2.802**	
	Place dependence	.142	.062	2.297*	
	Social bonding	.140	.054	2.584**	
Community	Community attachment	.548	.066	8.310***	.083
General planning	Home tenure	.006	.003	2.417*	
	Social bonding	.059	.024	2.447*	.029
	Community attachment	.137	.050	2.758**	

Note. Significance indicated by $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$. Because our dependent variables were of ordinal scale, the model was tested using the polyserial correlation matrix and accompanying asymptotic covariance matrix. Parameter estimation was based on the weighted least squares (WLS) estimation procedure. Goodness-of-fit: $\chi^2 = 25.797$, df = 29, $p = .607$, RMSEA = .0, NFI = .988, IFI = 1.0, CFI = 1.0.

Downloaded By: [Theodori, Gene] At: 16:54 27 September 2010

Table 5. Prediction of home and community protection activities—Future implementation

Firewise intentions	Predictors	B	*SE*	*t*	R^2
Home	Community tenure	.006	.002	2.413*	.050
	Place identity	.113	.041	2.755**	
	Affective attachment	.124	.039	3.191**	
	Place dependence	.099	.049	1.995*	
	Community attachment	.157	.053	2.977**	
Property	Community tenure	.014	.003	4.605***	.063
	Place identity	.245	.051	4.847***	
	Affective attachment	.141	.050	2.816**	
	Place dependence	.144	.064	2.251*	
Community	Community tenure	.007	.002	2.926**	.108
	Place dependence	.082	.040	2.086*	
	Community attachment	.514	.060	8.643***	
General Planning	Social bonding	.081	.039	2.070*	.024
	Community attachment	.255	.079	3.221**	

Note. Significance indicated by $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$. Goodness-of-fit: $\chi^2 = 26.679$, df = 23, $p = .266$, RMSEA = .0, NFI = .990, IFI = .999, CFI = .999.

Downloaded By: [Theodori, Gene] At: 16:54 27 September 2010

Prediction of Future Home and Community Protection Behaviors

Overall, the home and community attachment variables were generally stronger predictors of Firewise activities that referenced the same spatial scale in the item wording (see Table 5). First, for the home-based activities, *community tenure* (B = .006, $p < .05$), *place identity* (B = .113, $p < .01$), *affective attachment* (B = .124, $p < .01$), *place dependence* (B = .099, $p < .05$), and *community attachment* (B = .157, $p < .01$) were all positive and significant predictors. Combined, these variables accounted for 5% of the variance in respondents' intention to utilize home-based techniques.

For respondents' intentions to implement actions around their properties, *community tenure* (B = .014, $p < .001$), *place identity* (B = .245, $p < .001$), *affective attachment* (B = .141, $p < .01$), and *place dependence* (B = .144, $p < .05$) were all positive predictors, accounting for 6.3% of the variance in property-based intentions (see Table 5).

Similarly, intention to employ community-based techniques was also positively influenced by *community tenure* (B = .007, $p < .01$), *place dependence* (B = .082, $p < .05$) and *community attachment* (B = .514, $p < .001$). Combined, these variables accounted for 10.8% of the variance in our indicators of community action.

Last, *social bonding* (B = .081, $p < .05$) and *community attachment* (B = .255, $p < .01$) each had a positive and significant effect on general planning activities and accounted for 5.9% of its variance.

Discussion

The purpose of this investigation was to examine the extent to which residents' attachment to their homes and community influenced their propensity to implement

Firewise recommendations aimed at mitigating the threat of wildfire. Our sample was drawn from a population residing in the WUI just outside of San Diego where the threat of wildfire is acute. The Firewise recommendations that we examined related to 13 activities affecting home design, construction and maintenance, landscaping, community engagement, and general preparedness. In addition to our review of empirical work related to place and community attachment, we also drew from the tenets of the ELM of persuasion (Petty and Cacioppo 1986) to test the hypothesis that those most attached to their homes and community would be most inclined to implement recommendations offered by the Firewise Communities program. The conceptual logic underlying our hypothesis suggests that attachment, to both home and community, elevates the perceived personal relevance of the Firewise directives and motivation to both consume Firewise information and employ suggested techniques. For the most part, our findings were consistent with our hypothesis; that is, those most attached to their homes and community were more likely to report current use of the Firewise techniques and expressed greater likelihood of future use. Consistent with their spatial reference, we observed that the dimensions of home attachment were most strongly predictive of activities centered on and around the home. Alternately, community attachment was more strongly predictive of community-based activities. The significant effect of home and community attachment on our indicators of Firewise involvement adds to a growing literature demonstrating the ability of both constructs to account for a variety of attitudes and behavior related to the physical environment. In the context of work using place attachment, this research has shown that those most attached to the referenced setting are generally the most likely to protect the resource (e.g., Payton et al. 2005; Vorkinn and Riese 2001). Alternately, for community attachment, work has shown the construct to be associated with several positive community-based outcomes (e.g., Clark and Stein 2003; Theodori 2004).

It should be noted that our use of ELM was adopted as a guiding framework only, not a strict empirical test of its tenets. We did not measure the extent of elaboration and, subsequently, the extent to which Firewise messages were processed. Our use of a spatial reference to measure personal relevance does, however, have a tradition of application in the persuasion literature (Petty and Cacioppo 1981; Petty et al. 1983). Other work conducted within the context of residents' attitudes and behaviors related to wildfire mitigation has incorporated additional elements noted by Petty and Cacioppo (1981) that impact the degree of message processing. For example, Bright et al. (2006) examined the effect of source credibility and message clarity on the degree to which their respondents processed information related to selected Firewise activities. Their findings indicated that message clarity was the most significant factor impacting message processing. Alternately, source credibility was the strongest predictor of the likelihood that a person's Firewise behavior would change as a result of encountering the information. Another factor relevant to ELM and the adoption of Firewise practices is the issue of perceived risk from the threat of wildfire. For perceived risk—a factor that inflates perceived personal relevance and central processing within ELM—the evidence is less clear, owing to factors that drive residents' perception of risk: for example, past experience with wildland fire (Beebe and Omi 1993), perceived control over wildfire events (Winter and Fried 2000), and concern over the aesthetics of Firewise-related activities (Brenkert-Smith et al. 2006; Monroe and Nelson 2004). This work has illustrated that while residents are sometimes aware of the risk, they do not always take action.

Downloaded By: [Theodori, Gene] At: 16:54 27 September 2010

Combined, this work illustrates that there are many factors associated with understanding residents' comprehension, processing, and subsequent behavior related to Firewise directives. While Petty and Cacioppo's (1981; 1986) ELM of persuasion provides a concise theoretical framework for modeling variables' effects on home/community protection attitudes and behavior, the paucity of empirical evidence available does not permit agencies to act with confidence. The variance accounted for in our models, while modest, provides some validation of this issue. Given the variation in findings across the literature, it would appear that subtleties in context (e.g., profile of local Firewise program, fire/land management agency commitment to public education, fire frequency/severity) may also be an important factor that is omitted in standardized scales such as those employed in our investigation.

The issue of how best to communicate with residents of the WUI remains problematic for agencies charged with the task of helping residents minimize threat. As evidenced in other work (Bright et al. 2006; Brenkert-Smith et al. 2006; Monroe and Nelson 2004), message reception, processing, and directive adoption are confounded by a variety of factors. Our findings suggest that an understanding of the ties that residents share with their homes and community is a useful addition to more expansive models illustrating the impact of Firewise messages on behavior. The practical implications of these findings imply that attached residents are most likely to process fire education-related materials and take action. Consequently, these residents could be targeted by agencies and recruited to assist within their neighborhoods and communities to both implement the activities and coordinate neighborhood Firewise programs. While not reported in these analyses, age was also a positive correlate of home and community attachment. Given that this information is readily available to community and land management agencies through local tax rolls, identification of attached residents should not be that challenging and would assist with recruiting potential neighborhood and community leaders. These individuals/groups could be the targets of education initiatives like Firewise. As momentum in the form of compliance grows, the likelihood of these actions becoming normative within WUI neighborhoods will also increase.

Downloaded By: [Theodori, Gene] At: 16:54 27 September 2010

Notes

1. Work falling under the rubric of place attachment has examined human's attachment to settings that vary scale (e.g., homes, campuses, cities, continents) and character (e.g., built environments, natural settings).
2. Jorgensen and Stedman used the label "place attachment" to refer to individuals' emotional or affective attachment to place. Consistent with Low and Altman (1992), we use the more specific label "affective attachment" owing to our use of "place attachment" as a more encompassing concept.
3. All items loaded well with the exception of "As far as I'm concerned, there are better places to be than at home." This was the only reverse-coded item used in this scale. Its poor performance is likely a product of the opposing wording. We retained the item to stabilize the dimension's empirical identification.
4. The goodness-of-fit indices we used to empirically assess fit were the root mean square error of approximation (RMSEA; Steiger and Lind 1980), the normed fit index (NFI; Bentler and Bonnett 1980), the comparative fit index (CFI; Bentler 1990), and the incremental fit index (IFI; Bollen 1989). Generally accepted values for each of these fit indices are: (a) RMSEA values falling between .06 and .08 indicate acceptable fit, with .10 considered the upper limit (Byrne 2000); (b) NFI values greater than .90 (Kenny 2003); and (c) IFI and CFI values greater than .95 (Hu and Bentler 1998).
5. Measured along a 5-point scale of 1 = "no involvement" to 5 = "made all decisions."

References

Absher, J. D., and J. J. Vaske. 2006. An analysis of homeowner and agency wildland fire mitigation strategies. In *Proceedings of the 2005 Northeastern Recreation Research Symposium*, ed. J. G. Peden and R. M. Schuster, 231–236. NE-GTR-341. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station.

Beebe, G. S., and P. N. Omi. 1993. Wildland burning: The perceptions of risk. *J. For.* 91(9):19–24.

Beggs, J. J., J. S. Hurlbert, and V. A. Haines. 1996. Community attachment in a rural setting: A refinement and empirical test of the systemic model. *Rural Sociol.* 61:407–426.

Bentler, P. M. 1990. Comparative fit indices in structural models. *Psychol. Bull.* 107:238–246.

Bentler, S. E., and D. G. Bonnett. 1980. Significance tests and goodness of fit analysis of covariance structures. *Psychol. Bull.* 88:588–606.

Bollen, K. A. 1989. *Structural equations with latent variables*. New York: Wiley.

Bonaiuto, M., A. Aiello, M. Perugini, M. Bonnes, and A. P. Ercolani. 1999. Multidimensional perception of residential environment quality and neighborhood attachment in the urban environment. *Journal of Environmental Psychology* 19:331–352.

Brenkert-Smith, H., P. A. Champ, and N. Flores. 2006. Insights into wildfire mitigation decisions among wildland–urban interface residents. *Society Nat. Resources* 19:759–768.

Bright, A. D., and R. T. Burtz. 2006. Firewise activities of full-time versus seasonal residents in the wildland–urban interface. *J. For.* 104(6):307–315.

Bright, A. D., and J. Carroll. 2004. *An assessment of public perceptions of fuel reduction activities on National Forests*. Fort Collins, CO: Department of Natural Resource Recreation and Tourism, Colorado State University. Unpublished report.

Bright, A. D., A. W. Don Carlos, J. J. Vaske, and J. D. Absher. 2006. Source credibility and the effectiveness of Firewise information. In *Proceedings of the 2005 Northeastern Recreation Research Symposium*, ed. J. G. Peden and R. M. Schuster, 551–556. NE-GTR-341. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station.

Brown, B., D. D. Perkins, and G. Brown. 2003. Place attachment in a revitalizing neighbourhood: Individual and block levels of analysis. *J. Environ. Psychol.* 23:259–271.

Byrne, B. M. 2000. *Structural equation modelling with AMOS: Basic concepts, applications, and programming*. Mahwah, NJ: Lawrence Erlbaum Associates.

Carroll, M. S., K. A. Blatner, P. J. Cohn, and T. Morgan. 2007. Managing fire danger in the forests of the U.S. inland Northwest: A classic "wicked problem" in public land policy. *J. For.* 105(5):239–244.

Clark, J. K., and T. V. Stein. 2003. Incorporating the natural landscape within assessment of community attachment. *For. Sci.* 49:867–876.

Cooper Marcus, C. 1995. *House as a mirror of self: Exploring the deeper meaning of home*. Berkeley, CA: Conari Press.

Dillman, D. A. 2000. *Mail and Internet surveys: The tailored design method*. New York: Wiley.

Firewise Communities. 2006. About Firewise. Retrieved 1 November 2007 from http://www.Firewise.org/index.php

Guiliani, V., and R. M. Feldman. 1993. Place attachment in a developmental and cultural context. *J. Environ. Psychol.* 13:1–8.

Goudy, W. J. 1990. Community attachment in a rural region. *Rural Sociol.* 55:178–198.

Hu, L., and P. M. Bentler. 1998. Fit indices in covariance structure modelling: Sensitivity to underparamterized model misspecification. *Psychol. Methods* 3:424–453.

Hull, R. B., M. Lam, and G. Vigo. 1994. Place identity: Symbols of self in the urban fabric. *Landscape Urban Plan.* 28:109–120.

Janowitz, M., and K. D. Kasarda. 1974. The social construction of local communities. In *Sociological theory and survey research*, ed. T. Leggatt, 207–236. Beverly Hills, CA: Sage.

Downloaded By: [Theodori, Gene] At: 16:54 27 September 2010

Jorgensen, B. S., and R. C. Stedman. 2001. Sense of place as an attitude: Lakeshore owners' attitudes toward their properties. *J. Environ. Psychol.* 21:233–248.

Kenny, D. A. 2003. Measuring goodness of fit. In *Structural equation modelling*. http://users.rcn.com/dakenny/fit.htm (accessed 1 May 2004).

Korpela, K. M. 1989. Place-identity as a product of environmental self-regulation. *J. Environ. Psychol.* 9:241–256.

Kyle, G. T., A. J. Mowen, and M. Tarrant. 2004. Linking place preferences with place meaning: An examination of the relationship between place motivation and place attachment. *J. Environ. Psychol.* 24:439–454.

Kyle, G. T., A. J. Mowen, J. D. Absher, and M. E. Havitz. 2006. Commitment to public leisure service providers: A conceptual and psychometric analysis. *J. Leisure Res.* 38:78–103.

Kyle, G. T., A. R. Graefe, and R. Manning. 2005. Testing the dimensionality of place attachment in recreational settings. *Environ. Behav.* 37:153–177.

Low, S. M., and I. Altman. 1992. Place attachment. In *Place attachment*, ed. I. Altman and S. M. Low, 1–12. New York: Plenum Press.

Manzo, L. C. 2003. Beyond house and haven: Toward a revisioning of emotional relationships with places. *J. Environ. Psychol.* 23:47–61.

Miller, C. P., P. B. Landres, and P. B Alaback. 1999. Evaluating risks and benefits of wildland fire at landscape levels. In *Proceedings of the Joint Fire Science Conference and Workshop*, ed. L. Neuenschwander and K. Ryan, vol. I, 78–87. http://jfsp.nifc.gov/conferenceproc/HR-02Milleretal.pdf (accessed 1 November 2007).

Monroe, M. C., and K. C. Nelson. 2004. The value of assessing public perceptions: Wildland fire and defensible space. *Appl. Environ. Educ. Commun.* 3:109–117.

Payton, M. E., D. C. Fulton, and D. H. Anderson. 2005. Influence of place attachment and trust on civic action: A study at Sherburne National Wildlife Refuge. *Society Nat. Resources* 18:511–528.

Petty, R. E., and J. T. Cacioppo. 1981. *Attitudes and persuasion: Classic and contemporary approaches*. Dubuque, IA: Wm. C. Brown.

Petty, R. E., and J. T. Cacioppo. 1986. The elaboration likelihood model. In *Advances in experimental social psychology*, ed. L. Berkowitz, 124–206. New York: Academic Press.

Petty, R. E., J. T. Cacioppo, and D. Schumann. 1983. Personal involvement as a determinant of argument-based persuasion. *J. Personality Social Psychol.* 41:847–855.

Proshansky, H. M., A. K. Fabian, and R. Kaminoff. 1983. Place identity: Physical world socialization of the self. *J. Environ. Psychol.* 3:57–83.

Steiger, J. H., and J. C. Lind. 1980. *Statistically based tests for the number of common factors*. Paper presented at the Psychometric Society Annual Meeting, 28–30 May, Iowa City, Iowa.

Stein, S. M., R. J. Alig, E. M. White, S. J. Comas, M. Carr, M. Eley, K. Elverum, M. O'Donnell, D. M. Theobold, K. Cordell, J. Haber, and T. W. Beauvais. 2007. *National forests on the edge: Development pressures on America's National Forests and Grasslands*. PNW-GTR-728. Pacific Northwest Research Station. Portland, OR: U.S. Department of Agriculture, Forest Service.

Theobold, D. M., and W. H. Romme. 2007. Expansion of the U.S. wildland–urban interface. *Landscape Urban Plan.* 83(4):340–354.

Theodori, G. L. 2000. Levels of analysis and conceptual clarification in community attachment and satisfaction research: Connection to community development. *J. Commun. Dev. Soc.* 31(1):35–58.

Theodori, G. L. 2004. Community attachment, satisfaction, and action. *J. Commun. Dev. Soc.* 35(2):73–86.

Tuan, Y. F. 1977. *Space and place: The perspective of experience*. Minneapolis: University of Minnesota Press.

Vaske, J. J., and K. C. Kobrin. 2001. Place attachment and environmentally responsible behavior. *J. Environ. Educ.* 32(4):16–21.

Downloaded By: [Theodori, Gene] At: 16:54 27 September 2010

Vogt, C. A., G. Winter, and J. S. Fried. 2005. Predicting homeowners' approval of fuel management at the wildland–urban interface using the theory of reasoned action. *Society Nat. Resources* 18:337–354.

Vorkinn, M., and H. Riese. 2001. Environmental concern in a local context: The significance of place attachment. *Environ. Behav.* 33:249–263.

Walker, G. J., and R. Chapman. 2003. Thinking like a park: The effects of sense of place, perspective-taking, and empathy on pro-environmental intentions. *J. Park Recreation Admin.* 21(5):239–244.

Williams, D. R., M. E. Patterson, J. W. Roggenbuck, and A. E. Watson. 1992. Beyond the commodity metaphor: Examining emotional and symbolic attachment to place. *Leisure Sci.* 14:29–46.

Williams, D. R., and J. J. Vaske. 2003. The measurement of place attachment: Validity and generalizability of a psychometric approach. *For. Sci.* 49:830–840.

Winter, G. J., and J. S. Fried. 2000. Homeowner perspectives on fire hazard, responsibility, and management strategies at the wildland–urban interface. *Society Nat. Resources* 13:33–50.

Downloaded By: [Theodori, Gene] At: 16:54 27 September 2010