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PLACE BONDING AND TRUST: THE CASE OF FERAL HOG MANAGEMENT SURROUNDING BIG THICKET NATIONAL PRESERVE

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ABSTRACT

The management of feral hogs surrounding the Big Thicket National Preserve (BTNP) in Texas calls for managers and stakeholders to work together to manage resource issues. Research has indicated that place bonding can be a common ground upon which managers and stakeholders develop trust in one another to form a basis for collaborative management. However, such research has not examined the different types of trust (e.g., trust in local managers and trust in an entire agency) that exist. This investigation compared several models of trust and then sought to identify the relationship between place bonding and trust. Data were collected through a mail survey of residents living near the BTNP. The results suggested that a conceptualization of trust wherein an individual's *institutional trust* in an agency contributes to their *social trust* in agency managers explained the most variance. The analysis also confirmed a place bonding—trust relationship.

Managers of natural resource areas face many issues, including increasing encroachment of human development, changing visitor demographics, and the control of non-native species. In particular, in southeastern Texas (as well as much of the southern United States) management of feral hog populations has been an area of concern (Mapston 2004; Schuett et al. 2007). Issues with feral hogs stem from the beginnings of European exploration of the North American continent. Legend suggests that the first hogs to become feral escaped from Hernando de Soto's expedition in the first half of the sixteenth century (Mapston 2004). These hogs, along with others from subsequent European settlement, expanded their territory to cover most of the southern United States.

Today feral hogs feed on and harm crops, damage landscaping, increase erosion through rooting, and compete with native species for food and habitat. Several methods have been used to control feral hog populations, including the use of fencing to exclude hogs from sensitive areas and organized culling efforts by

wildlife management agencies. Private land owners have often relied on hunting and trapping to eliminate hogs from their property. Hunting and trapping feral hogs has also become a popular recreational activity. However, due to their ability to adapt, a lack of natural predators, and a high reproductive rate, feral hog populations have not seen a decline in spite of these efforts. Additionally, management of feral hogs is difficult because they often range in and out of protected areas causing problems for wildlife management agencies and nearby property owners. Following successful examples of other wildlife management dilemmas, managers of these areas have begun to work with local residents to seek collaborative solutions to manage the feral hog populations.

Over the past quarter of a century, land management agencies have undergone a well-documented paradigm shift regarding citizen involvement in management activities (Cortner and Moote 1999; Williams and Stewart 1998). Specifically, managers have begun to embrace stakeholder involvement and public collaborative efforts rather than relying upon traditional agency-driven decisions. Although this style of decision making empowers the public, collaborative efforts can become cumbersome by bringing a myriad of values and attitudes into the discussion (Lee 1993; Winter, Palucki, and Burkhardt 1999).

There have been several suggestions about how to incorporate various stakeholders' thoughts and feelings into resource management decisions. For example, the concept of place bonding has helped to improve our understanding of the subjective and symbolic meanings people associate with natural settings (Kyle et al. 2004; Williams and Vaske 2003). Researchers (Payton, Fulton, and Anderson 2005; Williams and Stewart 1998) have suggested that understanding the meanings stakeholders ascribe to specific resources serves as a starting point in discussions that can lead to solutions for resource management issues. From these discussions, areas of consensus and conflict can more easily be identified. Importantly, through open discussion, the opportunity to foster trust between stakeholders and managers of protected areas is magnified (Shindler and Toman 2003). Several authors have suggested that collaborative management is most productive within an environment of mutual trust (Payton et al. 2005; Yaffee 1994). Specifically, Payton et al. concluded that greater levels of trust led to higher participation in volunteer conservation activities in the Sherburne National Wildlife Refuge.

Given that trust and place meaning are useful concepts for understanding the decision-making process, it is important that natural resource scholars and managers understand the relationship between the concepts. Thus, the purpose of this investigation was to explore the relationship between the meanings that

residents surrounding the Big Thicket National Preserve (BTNP) associated with the preserve and their trust in both the management agency, the National Park Service (NPS), as a whole and the local unit's (i.e., BTNP) ability to manage the "problem" of feral hogs.

LITERATURE REVIEW

The meanings people ascribe to special places and the bonds they feel toward those places has received considerable attention in resource management literature over the past 20 years. Similarly, trust has been amply studied. Both lines of research have been devoted to defining the concepts and identifying outcomes related to their absence or presence.

Place Meanings and Place Bonding

For some time, scholarly and literary authors have written about places that are special to themselves and others. Thoreau, London, and Abbey have all highlighted the importance humans ascribe to natural settings. The meanings that people ascribe to a place represent their symbolic and evaluative beliefs concerning the setting that reflect the value and significance of the place to the individual (Stedman 2002). Meanings are often assigned to important attributes in a setting, which include both the physical characteristics of the setting and the social interaction experienced there (Eisenhauer, Krannich, and Blahna 2000; Kyle and Chick 2007). Because place meanings are an amalgamation of social, psychological, and cultural interpretations, they have a dynamic nature that is difficult to evaluate. One way resource management researchers have sought to quantitatively explore the array and salience of the meanings people ascribe to the physical world is through the concept of place bonding (Hammitt, Backlund, and Bixler 2006).

Place bonding has been defined as the "person place bond that evolves from specifiable conditions of place and characteristics of people" (Shumaker and Taylor 1983:221). Place bonding and the related place attachment have been conceived of as involving the beliefs, attitudes, and identities that people hold regarding specific settings (Stedman 2003). The literature has indicated that being attached to a place implies a strong emotional tie between the person and place that can vary from temporary sensory delight to long-lasting rooted attachment (Tuan 1974). Furthermore, several authors have indicated that we develop bonds to certain settings because we attribute meanings to those settings that reflect our social and cultural experiences (Eisenhauer et al. 2000; Kyle and Chick 2007).

To understand the nuances of the place bonding, Hammitt and colleagues (2006) considered it in terms of five dimensions: 1) place familiarity, 2) place belongingness, 3) place identity, 4) place dependence, and 5) place rootedness. *Place familiarity* refers to place-related cognitions stemming from a sense of familiarity and "typicality" (Nasar 2000). Familiarity is characterized by memories of pleasant experiences and goal achievement in a setting. The second dimension is *place belongingness*, or attachment to a place through social bonding. This form of bonding causes individuals to feel they have connected with, and hold 'membership' within, an environment (Mesch and Manor 1998). It is also often facilitated by place interactions that occur with family and close friends. In *place identity*, this dimension refers to phenomena within which the setting reflects the self. Proshansky (1978) went as far as to call *place identity* a sub-dimension of self-identity. The fourth dimension, *place dependence*, is characterized by the functional elements of specific settings, in that the value of an environment is reflected in the physical attributes that support specific goals and desired activities (Stokols and Shumaker 1981). Hammitt et al.'s final dimension is termed *place rootedness*. Rootedness is the feeling of being at home with little desire for another place. It is characterized by an individual's elevated sense of security in a place and by a sense of possession over that place.

Trust

Besides understanding relationships between places and people through the lens of place bonding, it is also useful to gain a comprehension of trust as it relates to the management of natural resource areas. One lesson learned from the spotted owl controversy in the Pacific Northwest, which occurred during the 1980s and 90s, was that trust is important for collaborative management to be effective (Yaffee 1994). Greater trust between stakeholders and land management agencies facilitated communication and support for agency actions. Subsequently, several studies have identified an association between trust and natural resource policy acceptance (Shindler and Toman 2003; Winter et al. 1999). However, little work has attempted to understand how different domains of trust are related to stakeholders' thoughts and feelings about an issue or setting or how these "trusts" influence a person's judgments about natural resource policies (Winter, Vogt, and McCaffrey 2004).

In natural resource management, trust is the belief that managers will not harm the resource and will look after the stakeholders' interests (Newton 2007). It is "encapsulated interest" (Hardin 1998:12) and involves shared interests (Warren

1999). As summarized by Mishler and Rose (2005), an individual can hold multiple trusts in an agency concerning a given issue. Two prominent types of trust in the literature are *interpersonal* and *institutional trust. Interpersonal trust* occurs when a stakeholder interacts with an individual(s). A more complex form of *interpersonal trust*, *social trust*, is "the process by which individuals assign to other persons, groups, agencies, or institutions the responsibility to work on certain tasks" (Earle and Cvetkovich 1995:3). Furthermore, Earle and Cvetkovich, in their history of *social trust*, stated that in modern societies *interpersonal trust* and *social trust* often operate together. Overall trust in an agency to manage resources can be labeled *institutional trust*; for example a stakeholder's trust based on general perceptions of NPS land management practices (Mishler and Rose 2005). Davenport et al. (2007) reported in their examination of trust at the Midewin National Tallgrass Prairie that, for many people, *social* and *institutional* trusts complement one another. However, several respondents indicated that they trusted the local Forest Service staff, but not necessarily the U.S. Forest Service. Lastly, it is important to note that the trust stakeholders ascribe to an agency may or may not be specific to a single issue, resource, or community (Winter et al. 1999). For instance, people can trust the NPS to manage all NPS lands or people can trust the NPS managers at the BTNP to manage feral hogs in and around the preserve.

According to Barber (1983), trust develops when a stakeholder believes that an agency will act ethically and according to their needs and wants. Both *social* and *institutional* trusts are based on the individual's perceptions of competence, objectivity, fairness, consistency, and caring. Because resource management decisions are often very complex, stakeholders may not have the time or knowledge to evaluate whether the managers are acting in accordance with their needs and in the interest of the resource. As a proxy, stakeholders typically quantify *social trust* in terms of shared values, direction, goals, views, and thoughts between themselves and agency managers (Earle and Cvetkovich 1995). Given that *social trust* often occurs at the local level, it frequently forms around specific management concerns (e.g., feral hog management). Winter et al. (1999) found empirical support for this conceptualization of *social trust* among stakeholders interested in fees charged on National Forest lands. Further research indicated that increased trust, based on shared values between stakeholders and the overall management agency, is predictive of the public's acceptance of management decisions (Winter and Cvetkovich 2003). *Institutional trust* does not focus on individual relationships or individual management problems, but is based on the stakeholder's perceptions of

the management agency as whole (e.g., the NPS as a federal land management agency).

Although research has shown that both *social trust* and *institutional trust* relate to natural resource management, the relationship between the two remains controversial. The debate may stem from the competing theories of trust (Mishler and Rose 2005). The social psychological approach conceptualizes trust as based on experience; it is a bottom-up approach (i.e., trust develops at the individual or local level and is transferred to the larger organization). Putnam (1993) and Brehm and Rahn (1997), on the other hand, used different social capital models to conceive of their views of trust. Putnam argued that *interpersonal trust* (and by extension *social trust*) leads to *institutional trust*. Brehm and Rahn (1997) suggested that the relationship is reciprocal and both types of trust influence each other. However, societal theories imply a top-down approach to trust. Mishler and Rose concluded that *institutional trust* influences *interpersonal trust*. Others suggest that no relationship exists between the domains of trust (Newton 1999).

Place Bonding and Trust

As cited above, several authors have suggested that knowledge of a stakeholder's place bonding with a given resource and their trust in managers are, individually, important concepts useful in understanding the collaborative decision-making process. However, few studies have empirically explored the relationship between an individual's attachment to a recreation resource area and the trust they have in management of the area. One exception was Payton et al.'s (2005) examination of visitors' attachment to the Sherburne National Wildlife Refuge (NWR) and the civic action they exhibited. Based on the extant literature (e.g., Brandenburg and Caroll 1995; Williams and Stewart 1998) the authors hypothesized that places, through shared meaning, foster perceived similarities between stakeholders and managers that encourage mutual acceptance. In turn, this acceptance fosters trust. Payton et al. concluded that attachment to the NWR facilitated the development of trust. Specifically, they found that stronger place identification with the resource was associated with increased trust in staff and others at the Sherburne NWR. However, the researchers confined their examination to the reciprocal model of trust; the visitors' attachment to the NWR predicted their *interpersonal trust* and *institutional trust* and the two trusts co-varied with one another. Payton et al. also limited their analysis to a two-dimensional conceptualization of place bonding. Furthermore, the authors did not examine respondents' trust in the Fish and Wildlife Service regarding a specific resource

management issue. Rather, their purpose was to examine trust related to general management of the entire refuge as it predicted civic involvement in the refuge.

Study Objectives

Although Payton et al. (2005) suggested the existence of a relationship between attachment to a place and trust, research has not fully explored the relationship between place bonding and trust in agency staff to manage a specific local resource and/or resource management issue. Moreover, we are not aware of any research that has compared the differing models relating *institutional* and *social trust* in relation to place bonding or in a natural resource management context. Hence, this investigation sought to build upon earlier research by evaluating the relationship between differing models of trust and a multidimensional conceptualization of place bonding. We anticipated that testing each model of trust along with a more complex conceptualization of place bonding would provide a greater understanding of the relationship between the constructs. The objectives of this investigation were twofold. First, we compared the differing models proposed in the literature that relate *social* and *institutional trust*. Second, we extended previous research concerning place bonding and trust by exploring the relationship between the two concepts using a multidimensional conceptualization of place bonding.

METHODS

Study Area and Population

Data for this investigation were collected during the fall of 2007 from residents who lived near the BTNP in southeastern Texas. We mailed 1,500 surveys to a random sample of residents living in the six counties adjacent to the preserve. The U.S. Census Bureau identified three of these counties (i.e., Jasper, Polk, and Tyler) as rural and the remaining (i.e., Hardin, Jefferson, and Orange) as non-rural. The list of addresses was obtained from a commercial firm to ensure that the addresses were residential and the names were valid. We used a modified Dillman (2000) approach, whereby the initial mailing to each person in the sample included a survey, cover letter, and self-addressed/stamped envelope. Approximately two weeks later, we sent a post card reminder to each addressee. A second complete survey and, subsequently, a post card reminder were sent to non-respondents.

Survey Instrument

The items used in this analysis measured five dimensions of place bonding and two types of trust. The place bonding scale consisted of 22 place bonding items (see

Table 1) adapted from Hammitt et al. (2006). These items were measured using a five-point agreement scale (1=strongly disagree; 3=neutral; 5=strongly agree). Following previous work (e.g., Winter and Cvetkovich 2003; Winter, Palucki, and Burkhardt 1999), the scales measuring trust were adapted from Earle and Cvetkovich (1995) (see Table 2). We assessed respondents' *institutional trust* in the NPS (i.e., trust in the overall NPS as a federal land management agency responsible for the BTNP) using five items on a four-point agreement scale (1=strongly disagree; 2=disagree; 3=agree; 4=strongly agree). *Social trust* in the NPS to manage feral hogs on the BTNP was gauged using four items ranging along a seven-point scale where higher values indicated greater trust in the agency to manage the resource.

TABLE 1. FACTOR LOADINGS, STANDARD ERRORS, AND RELIABILITIES OF THE PLACE BONDING SCALE.

DIMENSION-ITEMS	λ	*SE*
PF: Place familiarity *(α=0.82; m=2.43; SD=0.84)*[a]		
I know BTNP like the back of my hand.	0.77	0.05
I have many memories of the BTNP.	0.81	0.06
I could draw a rough map of the BTNP.	0.78	0.05
PB: Place belonginness *(α=0.80; m=2.95; SD=0.82)*[a]		
I feel like I belong at BTNP.	0.56	0.05
I feel connected to BTNP.	0.94	0.05
When I visit the BTNP I feel a part of it.	0.79	0.05
PI: Place identity *(α=0.89; m=2.70; SD=0.90)*[a]		
I am very attached to BTNP.	0.84	0.05
I identify strongly with the BTNP.	0.80	0.05
I feel like BTNP is part of me.	0.90	0.05
PD: Place dependence *(α=0.84; m=2.39; SD=0.84)*[a]		
There are no substitutes for the BTNP.	0.64	0.06
For activities I enjoy most, the BTNP is more important than other places.	0.91	0.05
I get more pleasure visiting the BTNP than visiting other wildland places.	0.87	0.05
PR: Place rootedness *(α=0.83; m=2.03; SD=0.73)*[a]		
I rarely recreate outdoors at places other than BTNP.	0.74	0.05
BTNP is the only place I desire for the activities I enjoy most.	0.88	0.05
I consider only the BTNP when I visit wildland places.	0.90	0.05

NOTE: [a]Means based on a 5-point agreement scale: 1=strongly disagree; 3=Neutral; 5=strongly agree.

TABLE 2. FACTOR LOADINGS, STANDARD ERRORS, AND RELIABILITIES OF THE RESPONDENTS' INSTITUTIONAL TRUST IN THE NPS.

DIMENSION-ITEMS	λ	*SE*
Institutional Trust *(α=0.96; m=3.46; SD=1.01)*[a]		
INT_1 The NPS shares similar values as me.	0.91	0.03
INT_2 The NPS shares similar opinions as me.	0.96	0.03
INT_3 The NPS thinks in a similar way as me.	0.88	0.03
INT_4 The NPS takes similar actions as I would.	0.88	0.04
INT_5 The NPS shares similar goals as me.	0.92	0.03

NOTE: [a]Mean based on a 4-point agreement scale: 1=strongly disagree; 2=disagree; 3=agree; 4=strongly agree.

Data Analysis

To better understand the relationship between place bonding and trust in feral hog management in the BTNP, we conducted confirmatory factor analyses (CFA) and covariance structure analysis (LISREL 8.80). We began by screening the data for violations of the assumptions of the statistical tests (e.g., normality and multicollinearity). Then we used CFA to verify that the dimensions and indicator variables used in the scales conformed to what has been found in previous research.

The results of the CFA for the *place bonding*, *social trust*, and *institutional trust* scales are reported in Tables 1, 2, and 3. The results of the CFA indicated that these data fit the model well (χ^2=799.17, *RMSEA*=.10, *NNFI*=.95, *CFI*=.96). The factor loadings (i.e., greater than .60) and coefficients of construct reliability estimates (i.e., Cronbach's alpha greater than .80) were above acceptable levels indicating that the scales were appropriate and reliable. Concerning the place bonding scale, the means (ranging between 2.03 and 2.95 for each dimension) for each dimension signify that, as a group, the respondents were only marginally bonded to the BTNP (see Table 1). Regarding the respondents' *social trust* in the NPS to manage the feral hog problem at the BTNP, the respondents indicated they had a moderate level of trust in the NPS (*M*=4.31; *SD*=1.33) on the seven-point scale. *Institutional trust* scores were more moderate (*M=3.46* on the 4-point scale; SD=1.01).

After confirming that the scales performed as expected, we used the results of the place bonding CFA to compute five new variables representing each dimension of place bonding. That is, we computed the variable representing each dimension by calculating the mean of the items from the place bonding scale that loaded onto the factor representing each dimension. Thus, for place bonding, five new variables were created (i.e., *place familiarity*, *place belongingness*, *place identity*, *place dependence*,

TABLE 3. FACTOR LOADINGS, STANDARD ERRORS, AND RELIABILITIES OF THE RESPONDENTS' SOCIAL TRUST IN THE NPS AT BTNP TO MANAGE FERAL HOGS.

DIMENSION-ITEMS	λ	*SE*
Social Trust *(α=0.92; m=4.31; SD=1.33)*[a]		
IP_1 To what extent do you believe the NPS shares your values with regard to the management of feral hogs on the BTNP?	0.83	0.07
IP_2 To the extent that you understand them, do you share the NPS's goals for managing feral hogs on the BTNP?	0.95	0.07
IP_3 To what extent does the NPS support your views about the management of feral hogs on the BTNP?	0.94	0.07
IP_4 How much confidence do you have in the NPS to effectively manage feral hogs on the BTNP?	0.70	0.09

NOTE: [a]Mean based on a 7-point scale where higher values indicate grater trust in the agency to manage the resource.

and *place rootedness*). This parceling method was used to more effectively analyze the indirect effect of place bonding on the trust dimensions in the subsequent covariance structure analysis.

Since the literature on trust indicated that the relationship between *social trust* and *institutional trust* is contested, we developed four models of the place bonding—trust relationship based on the different conceptualizations of trust (Brehm and Rahn 1997; Mishler and Rose 2005; Newton 1999; Putnam 1993). In all four models, the five manifest variables representing each place bonding dimension loaded onto a single factor (place bonding). Also in each model, four observed variables loaded on the *social trust* factor and five observed variables loaded onto the *institutional trust* factor. Hence, all four were first-order factor models. The models differed about how the place bonding factor regressed onto each of the trust factors (see Figure 1): (Model A) place bonding regressed onto *social trust*, *social trust* regressed onto *institutional trust* (Putnam 1993); (Model B) place bonding regressed onto *institutional trust*, *institutional trust* regressed onto *social trust* (Mishler and Rose 2005); (Model C) place bonding regressed onto both *institutional trust* and *social trust*, *institutional trust* and *social trust* regressed onto each other (Brehm and Rahm 1997); and (Model D) place bonding regressed onto both *institutional trust* and *social trust* (Newton 1999).

To determine which of the place bonding—trust models best fit the data, we determined model superiority based on several goodness-of-fit indices (Byrne 1998)

and evaluation of the model solutions (e.g., squared multiple correlations) (Perez 1996). Assessment of model fit was based on Steiger and Lind's (1980) Root Mean Square Error of Approximation (RMSEA), Bentler and Bonnett's (1980) Non-Normed Fit Index (NNFI) and their Normed Fit Index, and Bentler's (1990) Comparative Fit Index (CFI). Acceptable values for each of these indices are as follows: RMSEA, values equal to or less than .10 for newly developed models; NNFI and NFI, values equal to or greater than .95 indicate good fit; and CFI, values greater than .90 are adequate. Lastly, the Akaike Information Criterion (AIC) was used to compare models because it accounts for parsimony and overparameterization of the model; the lowest AIC reflects the best-fitting model (Akaike 1987). After determining which model fit the data the best, we calculated the direct and indirect effects of place bonding on trust.

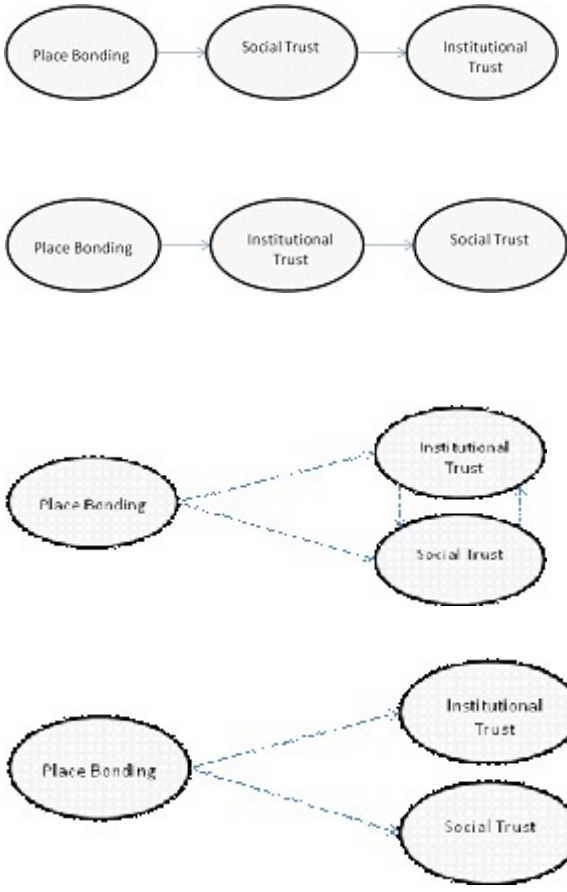

FIGURE 1. HYPOTHESIZED MODELS DERIVED FROM THE LITERATURE ON TRUST.

RESULTS

Sample Characteristics

Two hundred and twelve individuals returned completed surveys, thus achieving a 14.1 percent response rate. Respondents' ages ranged between 23 and 96, with a mean and median age of 49 (*SD*=13) years. Most indicated that they were Caucasian (*n*=189, 89 percent) and over three-quarters were male (*n*=96; 77 percent). Compared with U.S. Census Bureau statistics for the geographical area sampled, our respondents were older (population median 36 years old) and less racially diverse (population: 76 percent white). Thirty-nine percent of respondents (*n*=83) had earned a college or graduate degree, while only 4 percent (*n*=5) had not graduated from high school. Twenty-five percent (*n*=30) of the sample had not attended any college. Respondents' household incomes were well dispersed with about half earning more than $60,000 a year. Furthermore, 20 percent (*n*=41) identified themselves as feral hog hunters and have been hunting for mean of 15 (SD=12) years. One hundred and twenty-four respondents (62 percent) had visited the BTNP; 44 percent (*n*=53) had done so in the 12 months preceding the survey. Most (*n*=161, 79 percent) indicated that they had at least minimal concern about feral hog management.

We were unable to conduct a non-response bias check because we did not have access to an alternate contact method for the sample. Although this response rate is low, remembering that the survey was mailed to the general population with most of the questions in the survey instrument focusing on feral hog management is important. Thus, many people may not have responded to the survey because they were not interested in the issue and/or the BTNP. Similar effects of topic salience have been reported by several researchers (Dillman and Carley-Baxter 2000). Hence, we recognize that caution should be taken in generalizing the results to the population of all residents surrounding the BTNP. However, given that the purpose of this analysis was to test relationships between the constructs of interest, a more important consideration is whether or not the sample is large enough to accommodate the statistical associations made regarding these relationships. Using the sample size, the desired alpha value (.05), and the degrees of freedom for the most complex model in our analysis; we calculated the statistical power to be .85, which was above the commonly accepted criterion of .80 (Preacher and Coffman 2006). Hence, we can be relatively confident that the statistical tests used detected valid statistically significant relationships between the constructs.

Model Comparison

Following the CFA, we began testing the competing models using covariance structure analysis. As noted, the *a priori* specification of the factor structure in each model was derived from the competing conceptualizations of trust put forth in the literature. Initially, in each model, we assumed that covariance among exogenous concepts was freely estimated and that the uniqueness associated with each measured variable was uncorrelated. However, the preliminary analysis indicated that model fit would be improved for all models by allowing covariance among two sets of error terms. Hence, we respecified the models to allow for a covariance in error between two *institutional trust* variables; INT_4 and INT_5 (see Table 2). Our decision to allow the covariance between these variables was based on the likelihood that the common source of error stemmed from questionnaire format, similarity in item wording, and level of measurement (Byrne, Shavelson, and Muthen 1989). Also, we allowed the error terms of the *place dependence* and *place rootedness* variables to correlate. These modifications were applied across all four models to accurately compare each model's fit with that of the others.

The goodness-of-fit indices elicited from the analysis of each model are reported in Table 4. Model D, with larger chi-square (166.92), RMSEA (.092), and AIC (213.15) statistics, apparently does not fit the data in comparison to the other models. The distinction between the remaining models is less straightforward. Model A, Model B, and Model C produced identical fit indices (χ^2=148.84, *RMSEA*=.083, *NFI*=.96, *NNFI*=.98, *CFI*=.98, *AIC*=198.81) indicating a need for further analysis of the data and consideration of the literature. Hence, we considered the estimates of the model solution to determine the model that best fit the data. Table 5 contains the squared multiple correlations (R^2) values for each of the dependent latent variables (i.e., *institutional trust* and *social trust*). Since Model A's R^2 value for *social trust* is greater than the theoretical maximum of 1.0, this suggests that either the model is not appropriate or the data do not fit the assumptions for covariance structural analysis. As previously stated, we had tested the data for the appropriate assumptions (e.g., normality, multi-colinearity, etc.) and did not identify any concerns with the data. Hence, as (Perez 1996) indicated, the R^2 above 1.0 suggests that Model A is not appropriate and was therefore rejected. Model B and Model C exhibited similar R^2 values for *social trust* (.42 and .41, respectively), but Model B explains a greater amount of the variance for *institutional trust* (.71 versus .29). Hence, we retained Model B for the remainder of the analysis.

TABLE 4. GOODNESS-OF-FIT INDICES OF COMPETING MODELS.

MODEL	X^2	*df*	*RMSEA*	*NFI*	*NNFI*	*CFI*	*AIC*
Model comparison							
Model A. ..	148.84	72	.083	.96	.98	.98	198.81
Model B....	148.84	72	.083	.96	.98	.98	198.81
Model C. ..	148.84	72	.083	.96	.98	.98	198.81
Model D. ..	166.92	73	.092	.96	.97	.98	213.15

TABLE 5. SQUARED MULTIPLE CORRELATIONS FOR THE LATENT TRUST VARIABLES.

MODEL	*INSTITUTIONAL TRUST*	*SOCIAL TRUST*
Model A.	.29	1.41
Model B.....	.71	.42
Model C.	.29	.41

Place Bonding—Trust Relationship

Figure 2 depicts the results for the relationships tested in Model B. As indicated, place bonding was a positive and significant predictor of *institutional trust* (β=.64; t=6.56; $p\leq$.001) and accounted for 71 percent of its variance. In turn, *institutional trust* was a positive and significant predictor of *social trust* (β=.84; t=7.04; $p\leq$=.001) and explained 42 percent of its variance.

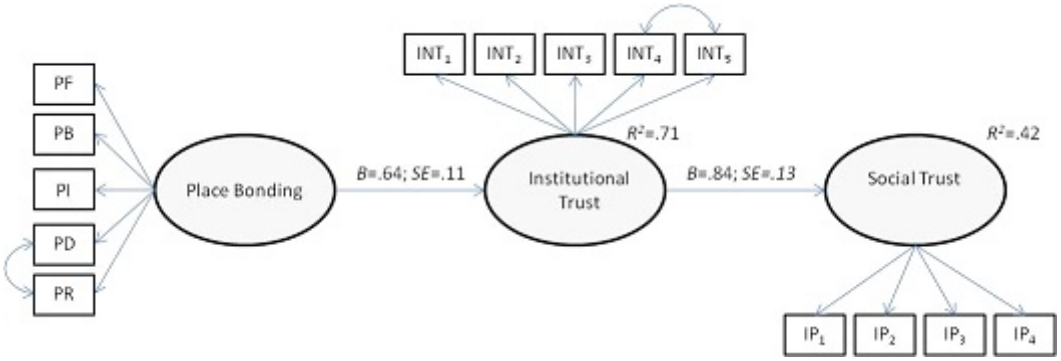

FIGURE 2. FINAL PLACE BONDING—TRUST MODEL (model χ^2=148.84, *RMSEA*=.083, *NFI*=.96, *NNFI*=.98, *CFI*=.98, *AIC*=198.81; $p\leq$.001 for both *B*).

We also calculated the total indirect effects in the model (Table 6). By way of *institutional trust*, place bonding significantly positively affected *social trust* (.54;

t=6.46; p<.001). Each dimension of place bonding was also positively related to each dimension of trust. Regarding *institutional trust*, *place belongingness* (effect .60; t=13.65; p<.001) and *place identity* (effect .58; t=12.78; p<.001) had the strongest total indirect effects. These were followed by *place familiarity* (effect .54; t=11.31; p<.001), *place dependence* (effect .46; t=8.93; p<.001), and *place rootedness* (effect .41; t=7.80; p<.001). We observed a similar pattern for the total indirect effects of the place bonding dimensions on *social trust*. In sum, these results indicate that the more bonded a respondent was to a place within the BTNP, the greater their *social trust* was in the NPS to manage feral hogs on the BTNP. This increase in *social trust* led respondents to have a greater *institutional trust* in the NPS overall.

TABLE 6. SUMMARY OF TOTAL INDIRECT EFFECTS.

PATH	TOTAL INDIRECT EFFECT	*SE*	*t**
Place bonding → Institutional trust → Social trust.	.54	.100	6.46
Place familiarity → Place bonding → Institutional trust.	.54	.052	11.31
Place belongingness → Place bonding → Institutional trust.	.60	.053	13.65
Place identity → Place bonding → Institutional trust.	.58	.063	12.78
Place dependence → Place bonding → Institutional trust.	.46	.068	8.93
Place rootedness → Place bonding → Institutional trust.	.41	.064	7.80
Place familiarity → Place bonding → Institutional trust → Social trust.	.45	.052	11.31
Place belongingness → Place bonding → Institutional trust → Social trust.	.50	.053	13.65
Place identity → Place bonding → Institutional trust → Social trust.	.49	.063	12.78
Place dependence → Place bonding → Institutional trust → Social trust.	.38	.068	8.93
Place rootedness → Place bonding → Institutional trust → Social trust.	.35	.064	7.80

NOTE: *All t values are significant at the p<.001 level.

DISCUSSION

The purpose of this study was to explore the relationship between residents' level of place bonding with the BTNP and their trust in the NPS and its ability to manage feral hogs on the BTNP. The results indicated that, for residents who live near the BTNP, place bonding is positively related to trust in the NPS as an institution. In turn, a resident's trust in the NPS as an agency influences their trust in the local NPS staff to manage feral hogs on the BTNP. These findings inform the literature on trust and the place bonding—trust relationship. As noted in our literature review, trust is a complex topic and our measures only operationalize part of the concept. Hence, the discussion below relies on previous literature to provide context and mitigate possible gaps between our measurement items and the multiple facets of trust. It is also important to note that this discussion is based on Earle and Cvetkovich's (1995) suppositions that *social trust* and *interpersonal trust* often operate together and that both can be forged under similar conditions. Thus, referencing the *interpersonal trust* literature is appropriate.

Social and Institutional Trust

The first implication stemming from the results concerns the relationship between *social* and *institutional trust.* As Mishler and Rose (2005) summarized, the literature on trust contains several competing theories on how this relationship is structured. Our data supported Mishler and Rose's conceptualization of trust, whereby *institutional trust* influences *social trust.* This suggests that, for the BTNP, trust has developed from the top down. That is, the trust that stakeholders develop in an agency, as an institution, serves as a basis for their trust in the local level of the agency to manage a specific resource issue. If we accept Earle and Cvetkovich's (1995) view that trust is based on common values, goals, and views, then an explanation for the relationships found may lie in the subjective nature of the elements salient in the development of trust. That is, these subjective concepts may often be repetitively communicated through an agency's mass media or through national events to which the agency is linked. For example, many NPS pamphlets, public service announcements, and interpretive information include a description of the mission of the NPS. Through these sources, the public comes to understand the values and goals of the agency. Stakeholders bring these preconceived notions with them when they attend meetings, interact with agency staff, and address a specific resource issue. Hence, the trust they develop in the local management is partially based on the perceptions the individual already holds toward the agency.

Furthermore, similar to Earle and Cvetkovich's argument that people are limited in the information they can obtain and process about an agency, it may be easier for stakeholders to acquire and consider the antecedents of trust regarding an agency overall rather than all the details of every specific local issue. Future research concerning trust in resource management agencies should consider this top-down conceptualization and the implications it holds for other variables of interest. It should be noted that the other models, if tested alone, would have been statistically significant. Hence, these results do not discredit any one model of trust, but rather contribute to the literature that supports the top-down model because, for these data, this model explained the most variance for each type of trust.

Place Bonding and Trust

Although the literature has suggested that common values, direction, and goals are important to developing *social* and *institutional trust*, few empirical studies have indicated what forms the basis for the common ground needed for trust. In land and wildlife management, researchers have suggested that place can serve as a starting point for dialogue to reach this common ground (Cheng and Kruger 2008; Williams and Stewart 1998). Our results support this assertion. We found, concerning trust in a resource management agency, that place bonding positively influenced *institutional trust* in the NPS, which in turn was positively related to *social trust* in the BTNP staff to manage the feral hog problem.

To understand the logical support for this finding, considering our results regarding the total indirect effects of each of the place bonding dimensions on the two dimensions of trust in light of the place bonding literature is useful. Our results indicated that *place belongingness* and *place identity* affected trust the greatest. *Place belongingness* involves a feeling of connection with the setting (Mesch and Manor 1998); hence people who have a higher level of *place belongingness* may feel that their connection to the environment affords them the ability to speak for the place. Hence, they may be likely to engage in conversations with others regarding management agencies and management of local issues. This allows these stakeholders to consider their trust in the agency as a whole and in local management. Also, *place belongingness* may lead to increased *social trust* by way of *institutional trust* because of its focus on social bonding. The social interaction that is necessary to feel socially bonded to a place may involve not only friends and family (Kyle and Chick 2007), but also increased interaction with agency staff. Furthermore, if we embrace Proshansky's (1978) notion that *place identity* is a sub-dimension of self-identity, it follows that people bond with settings that reflect

and/or confirm their values. The more often these values are also held by an agency and its managers, the more likely it is that stakeholders will perceive a higher level of *institutional* and *social trust.*

We also observed that *place familiarity* indirectly affected trust. From past research we understand *place familiarity* to involve the ability to retain environmental images of a setting and the attainment of goals in the setting (Nasar 2000). Hence, it is possible that as people become more familiar with the place, they are better able to discuss that place with others and understand the consequences of management actions. This allows them to better evaluate the goals of an agency and the actions of its managers. In turn, they can base their *institutional trust* and subsequent *social trust* on these evaluations. We also found that *place dependence* and *place rootedness* were related to *institutional* and *social trust. Place dependence* is characterized by how well the physical attributes of a place support specific goals and desired activities (Stokols and Shumaker 1981). Thus, people may set goals for the management of the setting that are compatible with their own goals for the place (e.g., feral hog hunters may have the goal of managing the BTNP in a way that allows them to continue their activity). If they perceive that the agency goals coincide with their own, they continue to develop *institutional trust* in the agency and, in turn, social trust in local managers.

Lastly, the final dimension, *place rootedness*, is often reflected by the stakeholders' sense of possession over the place (Hammit et al. 2006). This feeling of ownership might intensify their resolve to have their values, goals, views, and thoughts reflected in the management of the resource. Therefore, those who are rooted may develop trust when they feel that agency recognizes their "ownership" by seeking their input.

Although the above discussion may seem to suggest that place bonding can only be related to trust when all parties perceive a place in a similar way, this may not always be the case. We concur with Cheng and Kruger (2008), who indicated that when people recognize their shared attachment to the resource, they can use this "bond to expand common ground and narrow conflict" (p. 191). As managers and stakeholders build an understanding of others' views, they may adjust their own viewpoint. As the ideas and thoughts of the stakeholders and agency managers converge, perceptions of trust increase. Hence, this analysis indicated that one way that managers can facilitate collaborative management of feral hogs is by fostering trust between residents and management agencies through place. The specifics of how this can be accomplished are beyond the scope of this study and more research is needed to identify effective ways to foster the development of place bonds and

trust. Nonetheless, Williams and Stewart (1998) suggested that managers can probably start discussions about the feral hog problem (or any resource dilemma) through the lens of place bonding. That is, conversations about how a place reflects identity, the sense of ownership stakeholders feel, the local knowledge individuals possess, the maintenance of certain attributes for specific activity needs, and the ability to enjoy the setting with friends and family are useful starting points for all involved. This information can be used to develop themes of common and divergent ideas that can be used to highlight similarities and suggest areas of compromise among competing interests (for an example of this process see Cheng and Kruger 2008). At a larger organizational and site-specific level, as managers undergo the process of understanding place bonding (and convey this understanding to stakeholders) they can create trusting relationships with their constituents.

AUTHOR BIOGRAPHIES

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