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An exploration of place meanings among residents in central Wisconsin

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Abstract

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A mail survey of all residents in the surface and ground watersheds of an 11 lake area in central Wisconsin was conducted in 2012 to assess the behaviors, attitudes, awareness of issues, and attachment to lakes to incorporate social information into lake management. Place attachment is a complex concept composed of many dimensions to describe an individual's relationship to a place. This study tested the dimensional structure, validity, and transferability of a previously developed place meanings scale. The factors were then further tested to see if any differences existed among type of ownership (lakefront property owners versus non-lakefront property owners), involvement in lake groups, and seasonal residency in the level of meanings assigned to the lakes. Significant differences were found among type of ownership, involvement in lake groups, and seasonal residency on several place meaning domains. The dimensional scale structure revealed through this study differed somewhat from the original place meanings scale being tested, although the overall consistency on a new population has provided evidence for the transferability of place meanings scales in similar settings. Implications for management include the need to develop targeted outreach plans based on what is valued by residents instead of relying only on lake-by-lake segmentation.

Key words: central Wisconsin, mail survey, place meanings, social indicators, social science, watershed management

Social science researchers often face the challenge of measuring abstract, intangible concepts derived from multiple, evolving theories they are interested in studying (DeVellis 2012). Most of the variables of interest to social and behavioral scientists such as beliefs, values, needs, emotions, and attitudes are not directly observable (DeVellis 2012). To better understand and measure these elusive constructs derived from psychological and social phenomena, psychometrics or psychometric scaling has evolved as a means to quantify these concepts and their relationships to each other. Because these variables are not directly observable and vary among individuals, groups, and communities, we use measurement scales composed of tested, reliable scale items to reveal the magnitude of the underlying construct that we are trying to test, often on a large scale and across a population.

Place attachment

The relationship that develops between people and a specific place or setting has commonly been described as “place attachment.” This complex concept encompasses a variety of types of bonds that differ in their origins and purposes (Low and Altman 1992). Earlier works in place-based research through the geography and sociology disciplines looked at individuals' connections to home, neighborhoods, communities, and cities (Proshansky 1978, Low and Altman 1992, Williams et al. 1992), where the meanings people assign to places occur through repeated experiences and the process of living in them (Stedman 2003). As the concept of “place attachment” and the importance of the human–environment relationship began to become more prevalent in environmental psychology and natural resources research, however, many of the studies focused on the bonds that existed and strengthened between visitors and outdoor recreation areas. While the visitor's relationship to a recreation area can help to identify key attributes necessary to support their recreational needs and inform resource management (Williams

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and Roggenbuck 1989), the relationship between the local residents and the resource may be more complex or fundamentally different (Davenport and Anderson 2005).

In recent studies, place attachment scales have simplified the human–environment relationship by concentrating on the 2-dimensional model of place attachment: place identity and place dependence (Davenport and Anderson 2005). While this 2-dimensional model has been useful in examining place attachment, it fails to recognize if other dimensions exist. Place attachment scales, while useful in identifying the extent of attachment, neglect to identify the factors that foster the attachment (Wynveen et al. 2011). Wynveen et al. (2011) also suggested that people do not directly identify with a place, but rather the meanings or values they ascribe to it. The lack of incorporation of place meanings to the traditional place attachment scales denies researchers the opportunity to better understand the multidimensionality of place attachment and the nature of the human–place bond.

Few studies have looked at the attachments to place among residents. Examples of studies focused on residential settings have looked at place attachment as an indicator of environmental concern or attitudes among Norway residents to a proposed development of hydropower infrastructure (Vorkinn and Riese 2001), and potential predictor variables of place attachment among lakeshore property owners in northern Wisconsin (Stedman 2002).

Place meanings

Place meaning differs from place attachment in that meanings reflect the value and significance of the place to the individual, whereas place attachment represents the intensity of the bond (Wynveen et al. 2011). Because of these differences, Davenport et al. (2010) developed a 6-dimensional model of place meanings including *emotional identity*, *on-site experiences*, *community character*, *income*, *nature and natural processes*, and *regional economy*. *Community character* is a community-level identity construct, while *emotional identity* was related to family memories and feeling the place is part of oneself, what Davenport et al. (2010) described as more “offsite” characteristics. *Onsite experiences* represent the dependence construct and included attributes related to participation in activities dependent on the place as well as having symbolic meanings. *Nature and natural processes* represent the role of the resource in ecological services, and *income* and *regional economy* represent personal and regional economic dependence on the place.

According to Brehm et al. (2013), “place meanings are crucial foundations of place attachment, and . . . each is nec-

essary to understand the range of place-related behaviors” (p. 523). Understanding place meanings assigned by the tested population requires qualitative data collection methods such as in-person interviews, oral histories, and analyzing open-ended survey questions (Davenport and Anderson 2005, Wynveen et al. 2011, Brehm et al. 2013). These methods are labor, time, and cost intensive, and while the importance of place meanings in addition to understanding place attachment is clear, researchers may not have the ability or capacity to collect both. Unfortunately, due to the strong influence of context in place-based research, findings tend not to be generalizable across settings; however, the findings may provide insights about the meanings held in other similar settings based on key characteristics (Brehm et al. 2013).

This study builds on the current understanding of place attachment research by not only utilizing a resident population, but also testing the validity and transferability of a previously developed place meanings scale. The increase in the diversity of studies gives us the increased ability to test new, multidimensional instruments and also provides a greater understanding of the nature of the human–place bond (Kyle et al. 2005). The objectives of this study were to:

1. Use the place meanings scale developed by Davenport et al. (2010) to test its validity and confirm its dimensional structure against a resident, and potentially a non-recreating, population.
 - H1: The modified 5-dimensional place meanings scale will be confirmed in our study.
2. Test if resident characteristics and type of ownership impact place meanings.
 - a. H2: Lakefront property owners will hold higher levels of meaning for the lakes than non-lakefront property owners.
 - b. H3: Lake group members will hold higher levels of meaning for surrounding lakes than non-group members.
 - c. H4: Year-round residents will hold higher levels of meaning for surrounding lakes than seasonal residents.

Study site

Marathon County is located in the central part of the state of Wisconsin and is the largest of the 72 counties. According to the US Census Bureau 2012 estimate, 134,735 people now reside in Marathon County, an increase of 6.5% since 2000. The majority of the population is concentrated within the Wausau Metropolitan Area including the City of Schofield

and the Village of Rothschild. Although these urban areas anticipate moderate growth over the next few decades, population is expected to decline in the northwest part of the county.

Marathon County has expansive river, stream, and lake systems as well as forested land and farmland that contribute not only to the historical and economic foundation of the county, but also targeted efforts of resource management and protection. The county is divided by the Wisconsin River, where changes in soil quality, land use, and population demographics are remarkably different between the western and eastern portions of the county. The eastern portion has retained a more wooded character and is less desirable for farmland, and it has a number of small lakes that residents and visitors enjoy for their recreational and aesthetic opportunities. In recent years, large-scale lake protection efforts have been implemented in adjacent counties to help address water quality issues including, but not limited to, aquatic invasive species, shoreline development, nutrient management, and wildlife habitat. These lake protection efforts include a multi-year assessment of the project lakes that result in lake management plans to help guide land use and management decisions. The eastern Marathon County lakes project, in partnership with the eastern Marathon County citizens and communities, the Marathon County government, and the University of Wisconsin Stevens Point, was initiated to gather data to inform management decisions and policies and to develop strategies that focus resources on the improvement and protection of the lakes.

Eleven lakes were included in the eastern Marathon County lakes project to undergo complete biological, ecological, and social assessments to develop comprehensive lake management plans. The study lakes are Bass, Big Bass, Lost, Mayflower, Mission, Mud, Norrie, Wadley, Lily, Rice, and Pike (Fig. 1). These lakes fall into 1 of 2 distinct river basins: the Wisconsin River Basin and the Wolf River Basin, where the surface water is primarily groundwater fed with surface runoff inputs often originating nearby. The social assessment of the communities surrounding the lakes aimed to determine resident attitudes, attachment to the lakes, awareness of issues relating to the lakes, barriers to and capacity for change, and behaviors that impact the quality of the lakes. The information collected through the social assessment was used to develop target outreach plans.

Materials and methods

A mail survey was administered in spring 2012 to all 685 households located within the surface and groundwater watersheds containing the 11 project lakes. To increase re-

sponse rates, the survey was administered using the Dillman et al. (2009) tailored design method. Following the initial letter and option to complete the survey using the online survey tool Survey Monkey, a hard copy of the survey was sent, followed by a reminder postcard, and finally a second copy of the survey, for a total of 4 waves.

Questionnaire

The mail survey questionnaire was primarily developed using the Social Indicator Planning and Evaluation System (SIPES). The SIPES handbook is designed as a step-by-step system to using social indicators to help communities and watershed managers plan, implement, and evaluate projects relating to nonpoint source and water quality projects (Genskow and Prokopy 2011).

In addition to the social indicator questions, the modified place meanings scale developed by Davenport et al. (2010) was included (Table 1). The original Davenport et al. (2010) scale is composed of 6 domains and their associated scale items; *community character*, *emotional identity*, *nature and natural processes*, *onsite experiences*, *income*, and *regional economy*. The *regional economy* domain, as well as the statements “I feel like this place is a part of me” from the *emotional identity* domain and “This place is important in protecting air quality” from the *nature and natural processes* domain, were omitted from the questionnaire. The domain and statements were removed because they were either not relevant to the study, project area, or communities, or too closely resembled another statement. In the original study, the regional economy domain had a low Cronbach’s alpha (α) of only 0.59. Additionally, space limitations on the survey and needs of county partners who would be using the data for lake management plan development needed to be considered, necessitating a decision in terms of the utility of the information for planning and the theoretical exploration discussion in this paper. Statements were modified replacing “Giant City State Park” with “these lakes” to make the statements applicable to the study. Residents were asked to indicate the extent to which they agreed or disagreed with each statement on a 5-point Likert scale from 1 (“Strongly Disagree”) to 5 (“Strongly Agree”). A “Don’t Know” option was given. In addition to the place items, questions about seasonal residency and property size were also asked.

Statistical analysis

All returned questionnaires were entered into the online survey tool Survey Monkey and then imported into the Statistical Package for Social Sciences program (SPSS) for analysis. Exploratory factor analysis (EFA) conducted by

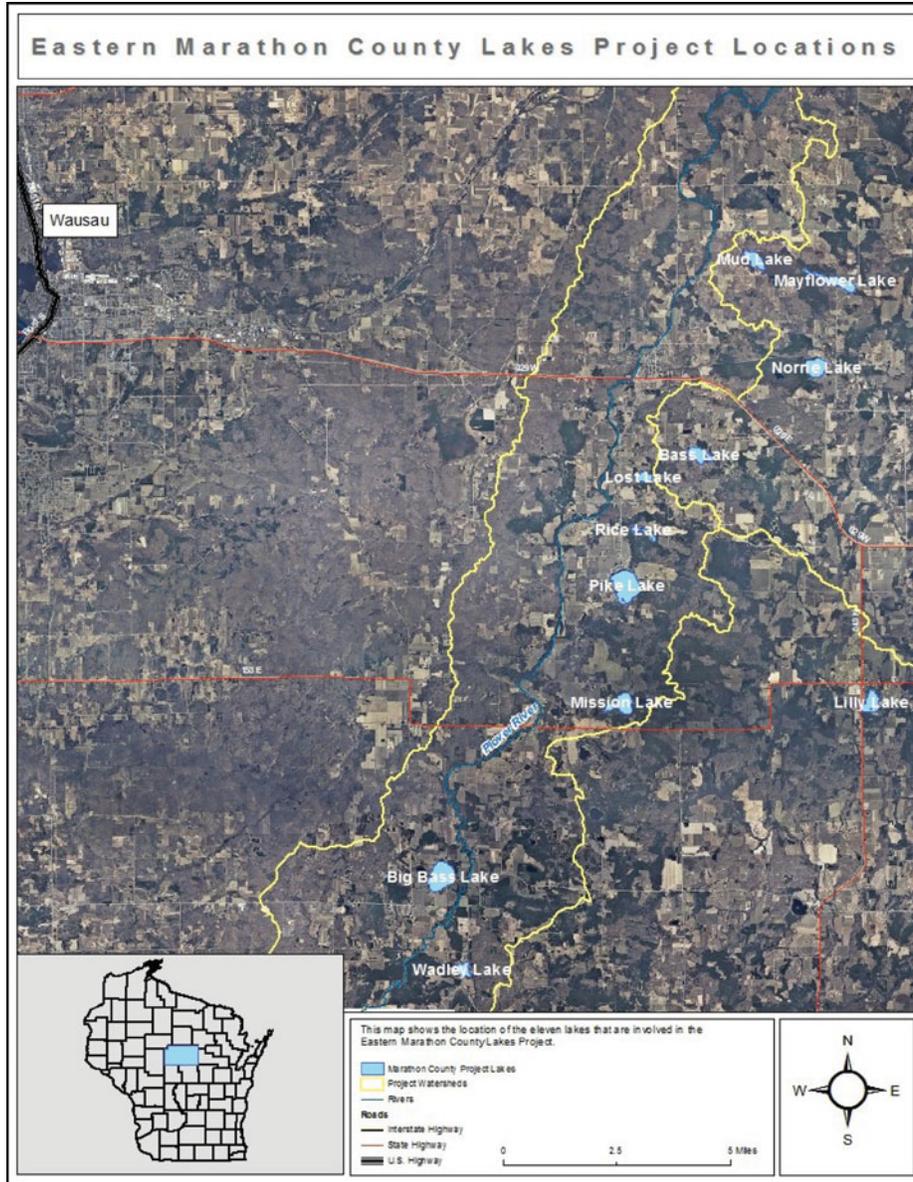


Figure 1. Eastern Marathon County lakes project area.

Davenport et al. (2010) revealed the original 6-dimensional structure of the place meanings scale. Using SPSS, EFA using the principal component extraction method and varimax rotation with Kaiser normalization included all scale items to determine whether our sample could confirm the modified 5-dimensional structure. Following Davenport et al. (2010) factors with an eigenvalue >1.0 that also explained 4% or more of total variance were retained. (Reise et al. 2000). Scale reliability for retained factors was conducted using Cronbach's α , and a mean composite score for each factor was calculated. The full set of responses was used for the reliability and factor analysis.

Spearman's rho was used to determine correlations among tested variables. Unlike Pearson's coefficient, Spearman's rho is used on ordinal data (Urdan 2010). The intent was to develop a multiple linear regression model, but the correlation results led us to revise our methods. Instead, we incorporated independent sample *t*-tests because we still wanted to understand if there were differences among the groups we surveyed for the purposes of the lake management outreach plans being developed. The *t*-tests were used to determine if differences existed between lakefront property owners and non-lakefront property owners, lake group members and non-lake group members, and year-round versus seasonal

Place meanings in central Wisconsin

Table 1. Place meanings scale items.

Place Meaning Scale Domains/Items
Community Character
These lakes are a special place for my family
These lakes contribute to the character of my community
These lakes represent a way of life in my community
These lakes have helped put my community on the map
My community's history is strongly tied to these lakes
My community's economy depends on these lakes
Emotional Identity
Many important family memories are tied to these lakes
Few people know these lakes like I do
I have spent more time on these lakes than most people
These lakes are like home to me
These lakes link the generations of my family together
I really miss these lakes when I am away from them too long
Nature and Natural Processes
These lakes are important in protecting water quality
These lakes are important in protecting the landscape from development
These lakes are important in providing habitat for wildlife
Onsite Experiences
I would prefer to spend more time here if I could
I feel that I can really be myself at these lakes
These lakes are the best places to do the things I enjoy
I feel a sense of pride in my heritage when I am here
When I am here others see me the way I want them to see me
Income
My income or livelihood depends on these lakes
My family's income or livelihood depends on these lakes

residents among the place meanings. Non-lakefront property owners included respondents who identified themselves as agricultural producers or those who identified themselves as neither lakefront property owners nor agricultural producers.

Results

Resident characteristics

Of the 674 deliverable questionnaires, 296 (44%) of the residents completed the survey. Of those respondents that answered the question, 140 (53%) own lakeshore property, 9% (n = 24) of identified themselves as agricultural producers, and 37.8% (n = 100) were neither lakeshore owners nor agricultural producers. Of the respondents, 71% (n = 189) were year-round residents, whereas 21% (n = 56) resided in Marathon County < 3 months of the year or were "absentee" landowners. The survey respondents tended to be year-round residents (~71%), male (~74%), older than 60 (~47%), educated beyond a high school degree (~65%), and own < 5 acres (~60%) (Table 2).

Table 2. Demographics of survey respondents.

Age (n = 255)	
Under 30	0.8%
30–39	6.9%
40–49	15.9%
50–59	29.0%
60 or older	47.4%
Gender (n = 261)	
Male	73.9%
Female	27.2%
Education (n = 263)	
Less than high school degree	4.6%
High school degree or equivalent (GED)	30.4%
Some college but no degree	23.2%
Associate degree	13.7%
Bachelor degree	16.0%
Graduate degree	8.7%
Doctoral degree	3.4%
Resident Type (n = 264)	
Lakefront property owner	53%
Agricultural producer	9.1%
Resident of Marathon county, who is neither of the above	37.8%
Resident Length (n = 265)	
Year Round Resident	71.3%
Less than 3 months out of the year	21.1%
3–6 months out of the year	6.8%
More than 6 months but less than 12 months	0.8%
Approximate Size of Property (n = 266)	
1/4 acre or less	9.0%
More than a 1/4 acre but less than 1 acre	24.8%
1 acre to less than 5 acre	26.3%
More than 5 acre	39.8%
Lake Group Involvement (n = 114)	
Member of lake organization	67.3%
Attends meetings or functions	52.2%

Lakefront property owners tended to have smaller parcels of land (<1 ac) while non-lakefront property owners had larger parcels (25% had 1–5 ac and 62% had >5 ac; Table 3); 55% of lakefront property owners were year-round residents while 83% of non-lakefront property owners were year-round residents (Table 3). Of the 81% (n = 113) of lakefront property owners who answered the question relating to their involvement in a lake group, 67% indicated they were members of their lake group, and 52% attended regular meetings or events (Table 2).

In comparison with the Davenport et al. (2010) study, our respondents held more graduate degrees (5% vs. 12.1%) and had fewer female respondents (56% vs. 27.2%; Table 2). Because men comprise the majority of our sample, results should be interpreted with caution as applicable across contexts. Our cover letter asked that the decision maker in the

Table 3. Characteristics of lakefront and non-lakefront respondents.

Size of Property	Lakefront	Non-lakefront
1/4 acre or less	20	4
More than 1/4 acre but less than 1 acre	54	12
1 to 5 acres	35	30
More than 5 acres	23	74
<i>Total</i>	<i>132</i>	<i>120</i>
Type of Owner	Lakefront	Non-lakefront
Seasonal	63	21
Year-round	77	103
<i>Total</i>	<i>140</i>	<i>124</i>
Participation in Lake Activities	Lakefront	Non-lakefront
Family events	94	62
Motorized activities	86	49
Non-motorized activities	107	70
Fishing, hunting, trapping	112	94

house with the most recent birthday complete the questionnaire to attempt to minimize bias, but men are likely over-represented.

Respondents were asked to indicate lake activities they enjoy. The most common experiences noted were fishing, hunting, or trapping, followed by non-motorized activities, family events, and motorized activities (Table 3). For each activity except fishing, hunting, or trapping, lakefront owners participated in the activity more often than non-lakefront owners.

All 22 scale items were included in the reliability and exploratory factor analyses to see if the same factors, domains, or dimensional structure emerged using this new population. Cronbach’s α was used to test the internal consistency of the full scale. On a scale of 0 to 1, a Cronbach’s α >0.70 is considered acceptable (Urdan 2010). Cronbach’s α for the full scale was 0.94 and did not increase if any of the statements were deleted, indicating excellent reliability. The EFA was conducted using the principal component extraction method and varimax rotation with Kaiser normalization, allowing SPSS to decide how many factors to extract based on eigenvalues >1. The results of this EFA produced a 4-factor solution, different from the modified 5-factor scale. The domains of *income* and *community character* were clear; however, several statements found within the domains of *onsite experiences*, *emotional identity*, and *nature and natural processes* cross-loaded between the remaining 2 factors, complicating interpretation. The statements originally loading on the *onsite experiences* domain in Davenport et al. (2010) load more heavily on the *emotional identity* domain in our study. In ad-

dition, 2 statements from the *onsite experiences* domain were removed from the final factors because they did not load heavily on a single factor. Finally, one statement included in the *community character* domain in the original study was more closely related to *emotional identity* in our study. While the reduction from 5 dimensions to 4 is important, the remaining scale items, with one exception (“These lakes are a special place for my family”) were closely related, as found in the original study. Cronbach’s α was calculated for each of the 4 factors retained (Table 4). The total variance explained by the 4 factor solution was 66.7%.

The *income* domain had the highest internal consistency (0.99), followed by *emotional identity* (0.92), *community character* (0.85), and *nature and natural processes* (0.73). All had acceptable internal consistency for our sample.

Impacts of resident characteristics and type of ownership on place meanings

Three objectives were outlined for this study to determine if different characteristics of the residents themselves or type of ownership had any effect on the level of place meanings they assigned to the lakes.

Independent samples *t*-tests were used to test for differences between lakefront and non-lakefront property owners. Like Davenport et al. (2010) found, the *nature and natural processes* domain was the highest and *income* the lowest ranked among our respondents (both lakefront and non-lakefront). A significant difference between lakefront and non-lakefront owners was found on the *emotional identity* ($t(237) = 0.00, P <0.001$) and *nature and natural processes* ($t(235) = 0.03, P <0.05$) domains, with lakefront owners having higher mean scores on both (Table 5). No differences were found with regard to *community character* or *income*.

An independent samples *t*-test was conducted for place meanings between lakefront property owners who are members of their lake group and those who are not. There were significant differences between members and non-members on the *community character* ($t(106) = 0.73, P <0.01$) and *emotional identity* ($t(99) = 2.07, P <0.01$) domains where members assigned a higher meaning than non-members on these 2 domains (see Table 5).

Finally, an independent samples *t*-test was conducted to examine differences between residents who live on their eastern Marathon County property year-round vs. seasonally, and the only significant difference was on the *emotional identity* ($t(240) = 2.54, P <0.01$) domain, where seasonal residents had a slightly higher place meaning than year-round residents (Table 5).

Place meanings in central Wisconsin

Table 4. Survey items, Davenport et al. domain, reliability, and variance explained.

Item ¹	Davenport et al. Domain ²	Emotional Identity	Community Character	Natural Process	Income	Mean	SD	α , % variance explained
These lakes are a special place for my family	CC	0.662	0.274	0.251	-0.115	4.28	1.05	0.924, 44.87%
Many important family memories are tied to these lakes	EI	0.719	0.223	0.229	-0.016	3.83	1.30	
Few people know these lakes like I do	EI	0.695	0.310	-0.024	0.191	2.55	1.38	
I have spent more time on these lakes than most people	EI	0.762	0.233	0.077	0.224	2.62	1.38	
These lakes are like home to me	EI	0.740	0.300	0.241	0.094	3.27	1.35	
These lakes link the generations of my family together	EI	0.765	0.265	0.110	0.135	2.97	1.50	
I really miss these lakes when I am away from them too long	EI	0.718	0.284	0.200	0.148	3.20	1.34	
I would prefer to spend more time here if I could	OE	0.583	-0.035	0.356	0.227	3.83	1.25	
I feel that I can really be myself at these lakes	OE	0.660	0.048	0.450	0.120	3.72	1.10	
I feel a sense of pride in my heritage when I am here	OE	0.673	0.148	0.410	0.106	3.38	1.23	
When I am here others see me the way I want them to see me	OE	0.472	0.031	0.547	0.197	—	—	Items removed
These lakes are the best places to do the things I enjoy	OE	0.563	0.209	0.555	0.162	—	—	
These lakes contribute to the character of my community	CC	0.335	0.645	0.395	-0.019	4.32	0.96	0.854, 8.4%
These lakes represent a way of life in my community	CC	0.258	0.674	0.312	0.088	3.96	1.22	
These lakes have helped put my community on the map	CC	0.160	0.780	0.087	0.206	3.20	1.47	
My community's history is strongly tied to these lakes	CC	0.254	0.757	0.208	0.104	3.55	1.48	
My community's economy depends on these lakes	CC	0.208	0.772	0.041	0.137	3.00	1.49	
These lakes are important in protecting water quality	N/NP	0.242	0.202	0.753	0.010	4.10	1.05	
These lakes are important in protecting the landscape from development	N/NP	0.084	0.182	0.691	0.150	3.80	1.22	
These lakes are important in providing habitat for wildlife	N/NP	0.195	0.192	0.697	-0.001	4.30	0.96	0.73, 7.11%
My income or livelihood depends on these lakes	I	0.210	0.211	0.135	0.920	1.82	1.02	
My family's income or livelihood depends on these lakes	I	0.185	0.194	0.119	0.934	1.81	1.01	

¹5-point scale from 1 (strongly disagree) to 5 (strongly agree)

² EI = Emotional Identity, CC = Community Character, OE = Onsite Experiences, N/NP = Nature, and Natural Processes, I = Income
 Bold numbers refer to the factor in which the statement most heavily loaded on.

Table 5. Results of independent samples *t*-tests.

Place Meaning	Full Mean	SD	Lakefront Mean	Non-Lakefront Mean	<i>t</i> (df = 241)	Group member		<i>t</i>	Year-round resident Mean	Seasonal resident Mean	<i>T</i>
						Non-member Mean	Member Mean				
Community Character	3.43	1.16	3.47	3.38	0.538 (df = 241)	3.59	3.42	0.733** (df = 106)	3.44	3.40	0.184 (df = 244)
Emotional Identity	3.36	1.01	3.64	3.09	0.000*** (df = 237)	3.85	3.48	2.07** (df = 99)	3.27	3.63	2.54** (df = 240)
Nature and Natural Processes	3.86	0.96	4.0	3.73	0.03* (df = 245)	4.06	4.00	0.302 (df = 106)	3.82	3.94	0.83 (df = 247)
Income	1.81	1.00	1.83	1.78	0.69 (df = 246)	1.03	0.96	0.508 (df = 107)	1.01	1.03	0.029 (df = 248)

*** $P < 0.001$, ** $P < 0.01$, and * $P < 0.05$.

Discussion

Place meanings domains analysis

Replicating the original dimensional structure of new scales on a separate and adequate sample contributes to the generalizability of the scale (DeVellis 2012). We hypothesized that the modified 5-dimensional place meanings structure would be confirmed in our study, but this was not fully supported in our research. While the 5-factor solution had an eigenvalue of 0.975 and explained 4.43% of the variance, it fell short of the eigenvalue cutoff of 1. One of the 5 original domains, *onsite experiences*, was not supported at all in our research. Those items included “I would prefer to spend more time here if I could,” “I feel that I can really be myself at these lakes,” and “I feel a sense of pride in my heritage when I am here.” In our research, these items loaded on the *emotional identity* domain, and further inspection of these items reveal how similar the original *onsite experiences* statements are to the *emotional identity* statements, particularly when considering them in context of a lake where one owns property as opposed to visiting a state park where the scale was originally constructed. This conclusion is supported by the *t*-test results, which show lakefront property owners scoring higher than non-lakefront property owners on the *emotional identity* domain. In addition, the statement, “These lakes are a special place for my family,” could be interpreted in a variety of ways. Being a special place could be viewed as a dependence, especially if family activities and events are held at the lakes, and if those activities or events involve other families in the community, it could easily be seen as contributing to the character of the community. Although the original study found this statement to best fit within the *community character* domain, for this population it best described their *emotional identity*.

Impacts of lakefront property ownership, group membership, and year-round residency

We hypothesized that owning lakefront property, being a member of a lake group, and living in the watershed year-round would be positively associated with place meaning scores. Our results indicate that all groups examined with the independent samples *t*-tests were significantly different from each other with regard to the *emotional identity* domain, with group members having higher values than non-members, lakefront owners having higher values than other residents, and (contrary to our hypothesis) seasonal residents having higher values than year-round residents. This result supports current research that challenges the notion that those who have only one residence or are year-round residents are more attached to that place than those that have multiple residences (Stedman 2006).

Other significant differences on the place domains included lake group members having higher values with regard to *community character* than non-group members, and lakefront owners having higher values with regard to nature and natural processes than non-lakefront owners. According to Jorgensen and Stedman (2006), “lakes have an important influence on the way that lakefront property owners integrate their properties into their self-concepts,” and those that more strongly identified with their lakefront properties were those whose lifestyles were more closely tied to the lakes (p. 325). Our findings are consistent with Jorgensen and Stedman (2006), who found that lakefront property owners scored higher on the place meaning domains relating to self and families than non-lakefront property owners or those who do not interact or have access to the lakes on a daily basis.

Improving this study

Similar to Davenport et al. (2010) where visitors reported low community economic dependence and even lower individual economic dependence on Giant City State Park, the residents also attributed lower scores to individual, family, and community-level income or economic dependence on the lakes. Other than a few campgrounds and restaurants, the livelihood of the residents is not dependent on the lakes because many of them are retired and moved to the area later in life or are seasonal residents. In a state of 15,000 lakes, most lakes included in this study are smaller, more secluded, and are not seen as having unique recreational opportunities that would attract distant tourists; however, visitors to the state park in Davenport et al (2010) did attribute higher regional economic dependence on the park. Perhaps if the *regional economy* domain was kept in this study, the same results might be true for the residents and the lakes. The exclusion of the *regional economy* domain, while seeming irrelevant at the beginning, now may have neglected to incorporate landscape-level dependencies seen or felt by the residents. We recommend including the *regional economy* domain in future studies. The overall consistency of most domains using this place meanings scale on a new population has provided evidence for the transferability of place meanings scales in similar settings, although our 4-domain place meanings structure might be more applicable for areas where people own property rather than visit.

In addition, we did not collect income or ethnicity data due to concerns about intrusiveness and lack of variability in the study area, respectively. We recommend including these variables in future work in addition to striving for a more even distribution of men and women in the sample. While we tried to address the potential for oversampling one gender, our respondents were mostly men, thus necessitating a cautious interpretation of the generalizability of the results.

Implications and recommendations

The overall implication of this study for management of the 11 lakes in the county is that property and residency characteristics for lake stakeholders should be considered during planning (Prokopy et al 2009). Place meanings held highly by residents can be used by managers as a means of communicating the importance of lake resources based on what is valued by residents instead of relying only on lake-by-lake segmentation. This is particularly important for developing outreach. Outreach to change behaviors among the residents will need to consider differences in seasonal residency and lakefront ownership. Although property characteristics may not have as much impact as lakefront ownership does, behaviors for lakeshore owners can differ significantly. In the future, researchers should stratify their samples when possible based on lakeshore, rural resident, and agricultural owners to determine if non-lakeshore respondents are homogeneous, or if, as we suspect, agricultural producers are different from both other groups.

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