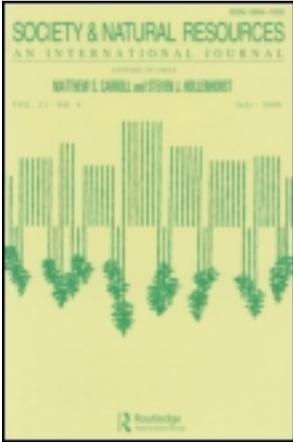


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Publisher: Routledge

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Society & Natural Resources: An International Journal

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/usnr20>

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Published online: 17 Sep 2013.

To cite this article: Damon R. Lowery & Wayde C. Morse (2013) A Qualitative Method for Collecting Spatial Data on Important Places for Recreation, Livelihoods, and Ecological Meanings: Integrating Focus Groups with Public Participation Geographic Information Systems, *Society & Natural Resources: An International Journal*, 26:12, 1422-1437, DOI: [10.1080/08941920.2013.819954](https://doi.org/10.1080/08941920.2013.819954)

To link to this article: <http://dx.doi.org/10.1080/08941920.2013.819954>

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A Qualitative Method for Collecting Spatial Data on Important Places for Recreation, Livelihoods, and Ecological Meanings: Integrating Focus Groups with Public Participation Geographic Information Systems

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The association between humans and their environments is highly interactive, with humans bound to the landscapes and landscapes subject to the actions of humans. Sense of place is a concept used to describe the relationships that exist, bonds that form, and the meanings that humans ascribe to landscapes. This article builds on previous qualitative research using public participation geographic information systems (PPGIS) to develop an alternative and efficient methodology to spatially represent place. The approach integrates participatory mapping procedures within a focus group format. Benefits of this approach include the rich text uncovered in qualitative place studies; the synergy of dialogue, efficiency in sampling, ability to elicit information from a range of groups; and the efficient use of drawn polygons as part of the qualitative PPGIS mapping procedure. This methodology can provide pertinent and spatially explicit findings useful for place based planning and management.

Keywords geographic information systems, mapping, methods, public participation, qualitative

The association between humans and their environments is highly interactive, with humans bound to the landscapes in which they live and landscapes subject to the actions of humans. Sense of place is a concept used to describe the relationships that exist, bonds that form, identification with, and the meanings that humans ascribe to landscapes (Altman and Low 1992; Relph 1976; Stedman 2003; Tuan 1977; Williams and Stewart 1998). Debates regarding landscape changes frequently emerge in the politics of natural resources, which can be “as much a contest over place meanings as it is a competition among interest groups over scarce resources” (Cheng et al. 2003, 87). Policymaking for natural resources issues is a political process, and public participation is required if those policies are to have legitimacy (Bengston et al.

Received 15 June 2011; accepted 13 September 2012.

We acknowledge the financial support for this research provided by the U.S.D.A. Forest Service grant number 09-CA-11330150-38 and the Center of Forest Sustainability at Auburn University.

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2004). A movement toward increased public participation and collaboration in planning is motivated by public outcry, changing scientific and political trends, and legal mandates (Cheng et al. 2003; Smith and McDonough 2001). Increasingly, it is important to understand these public perspectives in a spatial format (place boundaries) because much of natural resources management is done in a spatial context (Bengston et al. 2004).

Place-based planning is a process used to involve stakeholders by encouraging them to come together to collectively define place meanings and attachments and is increasingly applied and promoted as a basis for public participation and collaboration (Brown and Reed 2009; Cheng et al. 2003; Cheng and Mattor 2010; Davenport and Anderson 2005). One constraining factor to place-based planning is that place is difficult to spatially represent, due to the nature of place as a subjective and multidimensional construct grounded in part on past experiences, emotions, identities, values, and meanings and not simply a physical space with geographic or biophysical attributes (Tuan 1977; Altman and Low 1992; Stedman 2003). However, the mapping of place holds the potential to bridge the gap between theoretical place research and applied land management (Brown 2005). The goal is to “highlight spatial dynamics of human–environment relationships” that place represents (Jorgensen and Stedman 2011, 795).

The objective of this article is to introduce an alternative qualitative methodology to spatially represent place. Recently, Brown and Pullar (2012) called for “methodological plurality” and continued assessment of “the effects of different PPGIS methods on outcomes” (15). Our approach integrates participatory mapping procedures using polygons within formal focus-group methodology. The benefit of using qualitative methodologies (e.g., interviews or focus groups) is that they provide rich, comprehensive understanding of and the basis for place meanings and attachments (Manzo 2005). Benefits of focus groups include their utility for developing synergy and enhancing dialogue, efficiency at sampling group perspectives, and low cost (Kruger and Casey 2009). Benefits of the use of polygons over points for qualitative PPGIS data collection are that “spatially significant areas can be determined with fewer polygon observations and thus less participant recruitment” (Brown and Pullar 2012, 14). Additionally, the use of polygons allows participants to present their interpretation of the spatial extent of their place attachment for different meanings. Hand drawing polygons on maps is easy to implement as a group and has few limitations regarding participant technological abilities. Having participants draw polygons for each “place” as it is discussed in a focus group means that the synergy of the discussions is directly translated to mapped places with all the associated rich textual descriptions. This research integrates three elements not previously combined as a primary data collection method; the benefits of the rich text of qualitative research, the synergy and sampling efficiency of focus groups, and the additional efficiency of the use of polygons for mapping the spatial dimensions. A case study conducted within two counties in the Florida Panhandle that contain a mix of federal, state, and private lands that are facing developmental pressures is used to present the methodology (Figure 1).

Conceptual Background

An overarching concept for understanding the bonds between human and ecological systems is “sense of place” (Stedman 2003). In its simplest form, sense of place is an

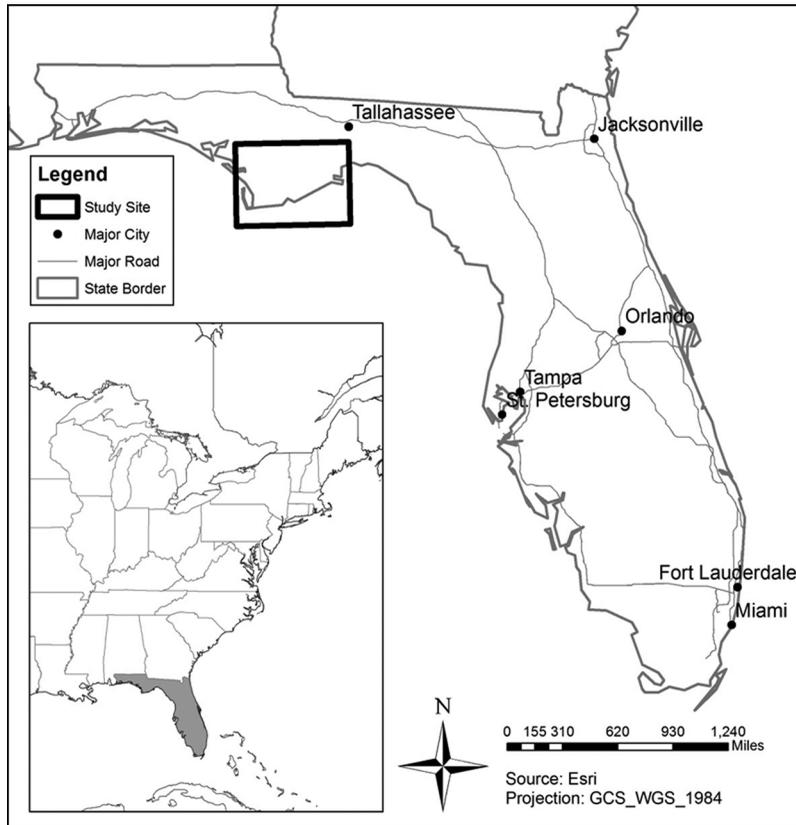


Figure 1. Locator map of Franklin and Gulf counties, Florida.

interpretation of how humans identify and connect with the places with which they interact (Williams and Stewart 1998). Sense of place, however, is a complex, multi-dimensional concept that has been described as a collection of meanings, values, attachments, bonds, feelings, symbols, perceptions, satisfactions, qualities, and characteristics that humans associate with a place (Eisenhauer et al. 2000; Greider and Garkovich 1994; Relph 1976; Rogan et al. 2005; Stedman 2002; Tuan 1977; Williams et al. 1992; Williams and Stewart 1998).

The developmental process of sense of place can be viewed as an “interactionist perspective” (Greider and Garkovich 1994) that forms through people actively living, participating, and interacting in and with places and landscapes. As people interact with their surroundings, they enjoy experiences, partake in activities, make observations, and instill value and meaning into specific places. “Place meanings reflect the value of the setting, whereas place attachment concerns the human–place bond” (Wynveen et al. 2011), and both are shaped by social influences and the physical landscape (Eisenhauer et al. 2000; Raymond et al. 2009; Williams and Stewart 1998). Massey (1994) suggests that local places should be considered in relation to other external places.

Place research has revealed that individuals instill a variety of place meanings into specific locations based on interactions with the landscape (Williams et al. 1992), such as livelihood dependence, ecological dependence, and recreational use.

Place attachment is further suggested to comprise place identity and place dependence (Williams et al. 1992), place satisfaction (Stedman 2003), and the physical environment (Eisenhauer et al. 2000; Rogan et al. 2005) among others.

Spatially Representing Sense of Place

Representing public knowledge within a spatial context is known as bottom-up or public participation geographic information systems (PPGIS) (Talen 2000). PPGIS is a useful tool for integrating place into natural resources management as an interface for multiple types of data (Carver 2003; Onsrud and Craglia 2003). This form of participatory mapping engages “the public in decision making through its goal to incorporate local knowledge, integrate and contextualize complex spatial information . . . and empower individuals and groups” (Sieber 2006, 503).

There is a need for additional research on new methods for incorporating spatial and psychological data and case studies to demonstrate practical applications (Brown and Pullar 2012; Carver 2003; Jorgensen and Stedman 2011). Two directions in PPGIS related to place have been followed, qualitative and quantitative. The quantitative mail (and Internet) studies have been led by Brown and colleagues, who have developed and refined a map-based methodology for identifying and measuring landscape values and special places (Brown 2005; Reed and Brown 2003). Participants receive a list of defined landscape values and are asked to identify places that reflect each value on a detailed map using corresponding sticker dots (Brown 2005). Coded responses are input into a GIS database and spatial analyses are done on location, grouping, density, value associations, and biophysical characteristic-value associations, among others. Research has consistently found that respondents are mapping landscape values in a purposeful and nonrandom manner (Brown, 2005; Brown and Raymond 2007; Nielsen-Pincus 2011). The methodology continues to be developed and has been applied to forest values mapping and management (Reed and Brown 2003; Brown and Reed 2009) and planning in rural landscapes (Nielsen-Pincus 2011), among many others.

A second set of studies is qualitative in nature and is often conducted with personal interviews. In these studies participants are interviewed and asked to hand draw on a map areas of importance (polygons) and asked how and why those areas are important. This rich interview information is then linked to the GIS database in a way that codes it or associates the spatial location with the text. Black and Liljebald (2006) utilized this type of method for mapping place attachments in the Bitterroot National Forest. The authors conducted 15 in-depth interviews with participants and had each participant draw areas of importance. The textual data was linked to the spatial data to create hot spot maps and hyperlinked (to text) maps.

Gunderson and Watson (2007) present similar PPGIS methods for exploring personal and community values. They employ a small number of interviews (20) with key informants and local residents with follow-up presentations at two focus groups. Focus groups were used to get feedback on how previously identified places of importance should be used in planning for hazardous fuels management (Gunderson and Watson 2007). Insights from this study include recognition of fuzzy boundaries (rough circles drawn instead of precise polygons) and the range of scales in which place meanings and attachments were expressed. Carver et al. (2009) build on this methodology and create a “fuzzy mapping” computer-based methodology that allows participants to vary the extent, shape, and intensity of mapped areas using

a standard desktop “spray can” tool. In further application, Cacciapaglia, Yung, and Patterson (2012) focus on scale implications of mapping special places and fire and fuels management actions. They conducted 29 semistructured interviews with 37 local landowners. Interestingly, their results indicated that while landowners could easily map special places, they did not consider fire management at a scale less than the landscape (Cacciapaglia et al. 2012).

McIntyre et al. (2008) take a different multiphase approach to develop spatial recreation value zones. For phase 1, focus groups were conducted to elicit textual data on the range of “forest values” associated with visiting the Dog River–Matawin Forest Management Unit in Ontario, Canada. They identified 17 values from the text that duplicated many studies on recreation benefits (McIntyre et al. 2004) and the quantitative PPGIS studies outlined earlier (Reed and Brown 2003). The authors used the names of locations from the textual analysis to locate those values in the forest “where possible” (McIntyre et al. 2008, 663). After the focus group, participants broke into small groups or pairs to conduct the phase 2 mapping exercise, where they marked special places on a map with points and labeled them with values. Phases 1 and 2 elicited 115 value points related to the multiple recreation values. In phase 3 they used a mail-back survey that collected individual mapped “destinations and associated activities from their current or recent trip” (McIntyre et al. 2008, 664). The user survey collected 1,629 recreation use data points. The authors then combined all three (individual and group) level data sets for a single analysis and used density clustering (similar to other quantitative PPGIS studies) to identify “spatial valuation zones.” The authors recognized a critical limitation to this method: “The data points in phase 3 represented ‘activity sites’ and, as such, they were more a measure of use than value,” or, as they suggest, an assigned value for recreation use (664). Furthermore, the very large number of recreation use points from the survey swamp the small number of recreation value points from the post-focus-group mapping activity in their density clustering analysis. They state, “It is recognized that such an approach loses much of the contextualized and idiosyncratic detail of the values derived from the participants’ input” (McIntyre et al. 2008, 665). As such, the “spatial valuations zones” from the clustered point analysis may be better described as “recreation use value zones,” as they no longer represent the values (17) identified in the focus groups and phase 2 mapping activity (nor the value diversity identified by Brown and colleagues). These recreation use zones were further complemented with protected-area boundaries, Recreation Opportunity Spectrum (ROS) classes, and biophysical attributes (road access and water bodies) to compliment and define new zones not identified by the point clusters.

Methods

This study provides an alternative qualitative approach to spatially represent sense of place. The approach integrates participatory mapping procedures using polygons within a focus-group format. Focus groups were used because they provide a format that provides rich text, facilitates synergy in dialogue, provides efficiency in sampling, and provides the ability to elicit information from a range of groups with different perspectives (Kruger and Casey 2009). Participatory mapping employing hand-drawn polygons was used during focus groups to easily and efficiently identify the spatial boundaries of participants’ place meanings and attachments (Gunderson and Watson 2007). Thus, places could be discussed, elaborated, contested, and

negotiated in terms both of what meanings and attachments would be attributed to a place and the spatial boundaries of that place.

Focus groups were conducted with a broad range of stakeholder groups to represent the diversity of ways they interact with the landscape and to obtain in-depth and rich understanding of the full range of place meanings and attachments and associated place boundaries (Kruger and Casey 2009). It was not designed to compare groups or generalize to a larger population. Three local key informants with different backgrounds were selected to represent different starting points for identifying stakeholder groups. Focus groups began with those that were identified by all three key informants. Individual group contacts were asked to organize a homogeneous group based on their typology of between 6 and 10 participants (Kruger and Casey 2009). Additionally, a snowball sampling technique was employed at the end of each focus group to identify additional stakeholder groups. Focus groups were conducted with at least one of every stakeholder group type identified by key informants and through snowballing. Additional focus groups were conducted until theoretical saturation, or the point where additional data were unlikely to yield new thematic or spatial insights (Kruger and Casey 2009).

In total, 19 focus groups were conducted with 122 people in the summer of 2010 (see Table 1). The final group size depended on the ability of the contact to organize the group and the availability of participants. The final range of group size and the number of polygons mapped under each meaning (recreation, livelihood, ecological) are indicated. Participants were 55% male, 94% Caucasian, with 48% finishing less than a college education while 24% had a graduate/professional degree, and 48% were over 61 while 12% were under 40 years of age. A single trained facilitator was used for all groups and a questioning guide and follow-up probes were developed. Livelihood, recreation, and ecological meanings and associated attachments were explored as three key interactions residents have with the landscape. Open-ended questions were used to facilitate discussion:

- Q: Where are the places that are particularly important to you:
... for outdoor recreation?
... for ecological or environmental reasons?
... that directly or indirectly provide you the opportunity to make a living?

Probe: What is it about these places that make them important?

All focus-group discussions were audio recorded and transcribed verbatim. A starting list of initial codes was developed based on previous research (Strauss and Corbin 1990), including the sense of place constructs of place meanings, place attachment and its subcomponents of place identity and place dependence, and place characteristics, among others (Stedman 2003; Williams et al. 1992). Each main coding category consisted of subcategories that contained additional codes for emergent subthemes describing their reasons for attachment and relationships.

The qualitative analysis program NVivo v8.0 was used to perform all coding and coding summation. Transcripts were examined by multiple project staff members to assess the reliability of the coding. Every passage that referenced a specific drawn polygon was coded with the associated unique identifier for that polygon, allowing passages to be directly linked to the geographical location described.

Table 1. Focus groups with drawn polygon numbers

| Focus group | Group size | Number of recreation polygons | Number of livelihood polygons | Number of ecological polygons | Total number of polygons |
|--|------------|-------------------------------|-------------------------------|-------------------------------|--------------------------|
| Educators | 3 | 5 | 4 | 8 | 17 |
| Franklin County marine industry workers | 3 | 4 | 12 | 6 | 22 |
| Restoration volunteers | 3 | 12 | 1 | 3 | 16 |
| Small business owners | 3 | 17 | 4 | 4 | 25 |
| New residents | 4 | 14 | 1 | 3 | 18 |
| Dog Hunter's Association | 5 | 10 | 6 | 9 | 25 |
| Gulf County long-term residents and retirees | 5 | 16 | 2 | 7 | 25 |
| Second home buyers | 5 | 9 | 0 | 6 | 15 |
| Waterfront partnership | 6 | 14 | 6 | 10 | 30 |
| Ecotourism workers | 6 | 3 | 2 | 6 | 11 |
| Gulf County marine industry workers | 6 | 10 | 4 | 9 | 23 |
| Master naturalists | 6 | 26 | 8 | 24 | 58 |
| Franklin County long-term residents and retirees | 8 | 9 | 1 | 2 | 12 |
| Gulf County Citizens Group | 8 | 21 | 3 | 20 | 44 |
| Wawahitchka long-term residents and retirees | 8 | 10 | 2 | 2 | 14 |
| Biologists and foresters | 9 | 13 | 4 | 11 | 28 |
| Carrabelle long-term residents and retirees | 9 | 5 | 0 | 3 | 8 |

(Continued)

Table 1. Continued

| Focus group | Group size | Number of recreation polygons | Number of livelihood polygons | Number of ecological polygons | Total number of polygons |
|--------------------------------|------------|-------------------------------|-------------------------------|-------------------------------|--------------------------|
| Realtors | 9 | 18 | 1 | 8 | 27 |
| Community Club Apalachicola | 12 | 16 | 3 | 8 | 27 |
| Total | 122 | 232 | 64 | 149 | 445 |
| Average | 6.2 | 12.2 | 3.4 | 7.8 | 23.4 |

Spatial Mapping Methods and Analysis

Each focus group was presented with a 36-inch by 48-inch aerial photograph of both counties, with a scale of 1 inch equal to 1.43 miles. Local towns, major highways, and all special use zones (e.g., state parks, USFS land, river management areas) were identified on the map. Participants were asked to hand draw areas (polygons) of their important places on the map.

Instructions: This map is an aerial/satellite photo of Franklin and Gulf counties. Here we are in XX town. As we begin our discussion, I would like to ask all of you to use these dry erase markers to draw on the laminated map the boundaries around your areas of importance. For example, if there is a very specific area, you might draw a border that is detailed like this . . . (*facilitator drew a semi complex polygon around a camp area and hiking trail—semi fine scale*) . . . if the area is more regional then you can draw larger boundaries (*facilitator drew a less complex polygon around a bay*). The drawings can be smaller and more specific or larger and more general. The important point is to put the boundary around the area you identify as an important place. As we talk about each area I will assign it a number so that we can identify which specific areas we are talking about on the recording. Just like for our conversation, we want each of you to share and draw on the maps.

As natural a dialogue as possible was maintained; if individuals began to dominate the facilitator politely asked to hear from others. As the discussion progressed, each person talking about a “new” place was asked to draw the area representing the place they were discussing. All participants who were interested in that place discussed why it was important to them and what social and biophysical factors contributed to making it important. Participants were permitted to discuss and negotiate the boundaries drawn around any location and their negotiation would determine the final boundary, or multiple boundaries if there was disagreement. A handful of markers were placed on each map for participants to use to draw polygons.

For clarity during analysis, each polygon was assigned a unique identifier. All polygons drawn by participants were manually digitized into ESRI ArcGIS using the previously assigned unique identifier as the Polygon ID. Each polygon was assigned specific attributes based on the content of the passages (coded themes and subthemes) associated with that polygon, which were then added as new fields

in the attribute table of the shapefile. Similar to other qualitative studies, the coded text can be searched for details on place meanings and attachments regarding specific areas identified under numbered polygons and can be queried within GIS for all polygons associated with particular codes.

Study Area

Franklin and Gulf counties are located along the Northwestern Panhandle of Florida's Gulf Coast and contain some of the last remaining undeveloped coastline (Figure 1). The area is referred to as the "forgotten coast." Public lands comprise 87% of the land in Franklin County and approximately 15% of Gulf County, and a diversity of land ownerships and uses exists throughout both counties (Franklin County 2009). Both counties contain miles of pristine coastal shoreline, numerous beaches, expansive river systems, the Apalachicola and St. Joseph bays, and many local and state parks. In both Franklin and Gulf counties livelihoods are primarily derived from natural-resource-dependent industries: seafood and beach tourism (Franklin County 2009). In the seafood industry, products regularly harvested include fish, oysters, shrimp, and crabs. Several land development companies own the majority of private lands remaining in Franklin and Gulf, and both counties are poised to undergo land use change in the future.

Results and Discussion

The spatial representations of human-landscape relationships presented here are extent and density/hot-spot maps (Figure 2A shows the raw data). The entire shaded

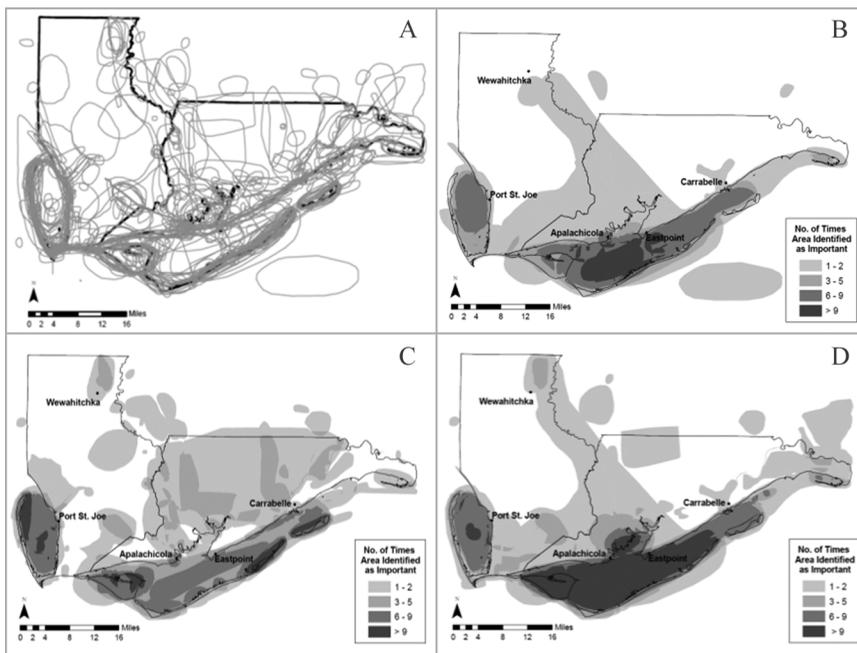


Figure 2. Maps of places identified as important in Franklin and Gulf counties, Florida, by focus-group participants: (A) raw data, (B) livelihoods, (C) recreation, and (D) ecological reasons.

areas on the maps show the extent of areas that were identified as important places (range of important places) for a given meaning. Density maps display areas that are most frequently identified in relation to a particular meaning that contributes to sense of place. Multiple maps were created to visually demonstrate where certain places of importance were geographically located (Figure 2, B–D). Density maps should not be interpreted as representative of the most important places within a landscape for the entire population. Focus groups were designed to find the range and extent of spatial and thematic attachments.

The study's thematic findings are presented here in a way that demonstrates the types of data and advantages of using this methodology and not as a complete analysis of the case. They are organized following the primary benefits of this methodology. Each quote in the following can be associated with a unique polygon. Selected passages from the focus groups are given as examples and the benefits associated with obtaining that type of information are discussed.

Comprehensive Understandings

Focus groups (like interviews) provide rich, comprehensive understanding of place meanings and attachments and the basis for those meanings and attachments. The qualitative data provide meaningful descriptions that give us insights to dependence on and identity with place in the area and the physical characteristics that play a role in these. The historical and current dependence on the seafood and tourism industries is demonstrated by the following statements:

That's all they have ever done in Franklin County is fish, shrimp, oyster, crab, and whatever. That is the livelihood!

The bays and the beaches drive the whole economy, whether it is tourism or seafood or just anything else.

This dependence is also wrapped up in cultural identity of the region as the "forgotten coast."

To me personally and historically, when I drive over that bridge and I look out and I see them oystering that gives me a sense of connectedness to the past as well as future to see those guys out there making their living on the bay, tonging with the same wooden handled tongs that they have for years and years.

As far as our economy of our area being related to commercial fishing, that's important to me that not go away. I know you can't preserve a way of life. You can't mandate a way of life, but you can do things as a community or as a government to encourage it.

Place is tied up with histories, identities, and formed communities that can effectively be revealed with focus groups. Quantitative mapping methods led by Brown (2005) and colleagues recognize many values associated with place meanings and attachments expressed during our focus groups, but the detail of the underlying context and reasons for those relationships may be missed or captured only in short write-in boxes for special places using quantitative methods.

The discussions of important places for recreation in our focus groups also provide detailed insights as to why specific places are important.

For solitude:

We enjoy going up the river to swim. I love it because no one is ever there and you can park the boat in the middle of the river and jump in.

For family:

Wetappo Creek, the reason we go there is family. My great grandparents live there, so we love to go up. My brother comes down from Tennessee and as many family members, and we just enjoy being out on the water, seeing where our great grandparents lived and boated and enjoyed life.

But there are also insights for regional dependence:

I don't know about you guys but one of the reasons I am here was because of the proximity and the availability to inshore and offshore fishing.

Many of the recent qualitative mapping studies of place make a central point of scale issues (Cacciapaglia et al. 2012; Carver et al. 2009; Gunderson and Watson 2007) and suggest different scales of analysis will yield different place attachments (Gustafson 2001; Jorgensen and Stedman 2011). As the preceding quotes recognize, participants could readily recognize specific places of importance to them (creeks, campgrounds, trails) and drew smaller polygons to represent these, but also identified and drew place at the regional setting.

In addition to place identity and place dependence, study findings demonstrate that place characteristics and the physical environment profoundly impact the bonds that develop between people and places (Eisenhauer et al. 2000; Davenport and Anderson 2005; Rogan et al. 2005; Stedman 2003). This study specifically probed for information regarding the physical characteristics of important places, a strategy recently recommended by Jorgensen and Stedman (2011). Participants bond with particular recreational areas based on nature meanings concerning the physical characteristics of the environment, such as "natural beauty," "nice white beaches," "abundant natural resources," and "remoteness":

I came from Louisiana where you have no pristine environment, and that's one of the things I love about this area.

I think when you mention the word development in Franklin County it's usually a dirty word because people don't want to end up like XXXX. They don't want high-rises.

This latter quote demonstrates Massey's (1994) contention that local place needs to be considered in the context of other areas. Temporal components of place (Massey 1994) can also be addressed through qualitative methodologies that allow participants to discuss important places that have been lost (changed) or those that they feel are threatened in the future.

The other really important land for conservation is the coastline, especially these really low elevation coastlines that with sea level rise are going to be under water. If we have development along the shoreline, we have sea level rise, it is going to be hardened shoreline, and we aren't going to have the marshes that support all the life of the bay.

Synergy

The focus-group format allows for discussion and synergy among participants facilitating dialogue regarding shared aspects of place meanings and attachments and the social relationships that occur in and help to create special places. During the focus groups, individual participants would mention and identify a location and discuss why it was important to them. Very frequently, other participants would add to that discussion, explaining why that same location was important to them. A typical example follows:

Participant 1: "We do a lot of different things. This area right here, the head of East Bay way up in here, if you haven't paddled in there it is some amazing, there are several creeks, there is Doyle Creek and Cash's Creek and Whiskey George."

Participant 2: "I fish back there in the winter months a lot. There is a lot of trout hanging in that pocket."

Most places identified as important places were supported by several (often three or more) participants in each focus group. Each participant would discuss his/her own use and why the area was important to him/her. Furthermore, conversations about one topic would lead other participants to identify additional areas of importance to them. Phrases such as "That reminds me of . . .," "This area over here is also important for . . .," and "I hadn't thought of that, but . . ." were common. Frequently, a discussion about reasons for attachment (e.g., family tradition, wildlife habitat) would lead to identification and discussion of several other similarly important places. This synergy is one of the main benefits of conducting focus groups over individual interviews.

Polygons

The use of participatory mapping of polygons as part of focus-group discussions efficiently reveals the geographical dimensions and specific locations of shared place meanings. The points used in PPGIS quantitative studies cannot determine whether respondents are marking a picnic area or a long valley bottom (Brown 2005; McIntyre et al. 2008). Drawing of polygons in qualitative research allows participants to identify their perceptions of scale and the shape of their place meanings and attachments (Carver et al. 2009; Gunderson and Watson 2007) and to do so efficiently (Brown and Pullar 2012). Results from this study in a group setting demonstrate that participants can and do identify place meanings at different scales and with different shapes, but confirm that they are frequently generalized areas with boundaries that are likely to be "fuzzy" (Carver et al. 2009; Cacciapaglia et al. 2012) (Figure 2A).

Another unique aspect of the focus group was that multiple participants could comment on the shape, location, and size of polygons as they were being drawn.

Additionally, as others discussed their attachment to the drawn space they had further opportunity to comment on the drawn area. We allowed participants to negotiate any differences among themselves to gain insight as to how this process might be discussed. However, there were very few conflicts and all groups appeared to be comfortable with roughly drawn boundaries. The areas that did elicit comments were related to knowledge issues. Examples of after the fact changes were:

Participant 1: "They [scaloping areas] are all in here."

Participant 2: "Scaloping would actually be on the southern end, favoring the inland side."

Participant 1: "I like walking on the beach at the state park [circles an area on map]."

Participant 2: "The state park is all from this side all the way down [draws more detailed area to show exactly where the state park is located]."

Conclusion

Our method integrates the benefits of (1) the rich text uncovered in qualitative place studies (interview or focus group), (2) the benefits of focus groups in synergy of dialogue, efficiency in sampling, and ability to elicit information from a range of groups with different perspectives, and (3) the easy-to-implement and efficient use of hand-drawn polygons as an integral part of the focus group. Qualitative methods of PPGIS with polygons allow participants to provide rich text and directly relate it to their own interpretation of the extent of their place attachment. Reaching saturation of these meaningful places with a diversity of focus-group types (maximum variation) should provide the full extent of these spatial attachments. As our figures indicate, this represents a large portion of the landscape. If one were to conduct a quantitative PPGIS study (Brown 2005) in this same landscape we would expect there to be no point clusters that fall outside the corresponding meaning areas identified here. We would expect the entire "fuzzy" and high-intensity areas of qualitative studies to match or fall within the total extent of our meaning areas (Carver et al. 2009). We would expect no clusters of recreation use zones (McIntyre et al. 2008) outside of areas identified under recreation. The data obtained from our method would be conservative from the perspective of identifying the maximum extent or entire spatial range of areas important for different meanings.

The choice of method may depend on management needs for specificity in context and spatial attribution of these types of important landscape meanings and values. In other words, to incorporate this data into management practice, do managers want to know or need to differentiate between rich context and general landscape values, most reported or total extent, low and high intensity designation, or hard and soft boundaries of important meaning or valued areas? We suggest that managers should interpret the "hard" borders of polygons from our method as transitional boundaries between important and not important meaning areas. This methodology may provide a useful intermediary between individual interviews that provide rich but limited representation and representative surveys that provide wide representation but limited depth into attachments and place boundaries.

There are a number of potential limitations to conducting focus groups in general and for application to PPGIS in particular. First, while we asked for 6–10 participants, we found that around 6 ± 2 was best for conducting the mapping exercise in terms of having physical access to the map for drawing polygons while still promoting dialogue. While the focus groups were conducted to saturation of ideas and thematic places to uncover their full range, the density findings should not be generalized to the larger population in terms of most important places or themes. Other limitations include the precision (exactness in drawing the boundary) and accuracy (true spatial representation) that complicate all PPGIS studies (see Brown and Pullar 2012). Finally, the mapping procedures for PPGIS in focus groups are new, and future research should test the implications of alternative instructions on how to draw place boundaries and the usefulness of the different outputs for managers. The multifaceted nature of sense of place makes it an exceptional construct for developing insight into how particular communities relate to their surroundings and the importance of areas within the larger landscape. It is hoped that this methodology will contribute to the body of place research applying PPGIS and be a source for further elaboration.

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