Connecting Place to Fire Planning on the Kootenai National Forest: Participatory Mapping and the Role of Spatial Scale

Michael Cacciapaglia and Laurie Yung

The question of how to manage fire and fuels in ways that accomplish ecological and social goals is of growing importance. In many western forests, fuels have accumulated as a result of decades of fire suppression. Higher fuel loads can increase the risk of catastrophic or stand replacing fire. Climate change may increase both the frequency and intensity of fires in the west. At the same time, rural residential development within forested landscapes has expanded and forest landowners living in the wildland urban interface (WUI) are disproportionately impacted by fire and fuel treatment. Forest fires and fuel management can affect the economic resources, scenic views, and property of such landowners. As local communities are brought into the conversation about the management of nearby forests, it is particularly important to understand the views of forest landowners on the management of fire and fuels. Place may provide an important window into landowner views on environmental change and proposed management actions as they relate to fire and fuels.

In this chapter, we explore the potential of participatory mapping to link place to decision-making. In the last decade, there has been a surge of interest in participatory mapping. By capturing the spatial dimension of place in a reproducible map, researchers may be able to communicate place concepts to managers and, therefore, better inform planning and decision-making. Below we describe a study of forest landowners living adjacent to the Kootenai National Forest in northwest Montana. We employed in-depth interviews and a computer-based participatory mapping exercise to understand the relationship between landowners and the place

where they lived, and how place meanings connect to views on fire and fuel management. This mapping exercise was specifically designed to ascertain the spatial relationship between place meanings and management preferences. In other words, we hoped to demonstrate that management preferences were different for places that landowners identified as particularly important. While we found important connections between place and management preferences, these connections are in many ways contrary to prior research on place. Below we examine the implications of these findings for decision-makers interested in using place research in planning and management, and for researchers or decision-makers using participatory mapping exercises.

Linking Place with Proposed Management Action

While managers and policy-makers recognize that people's relationships to places are important, place research only occasionally contributes to decision-making. Where place research is available it is often used to understand the broad outlines of people's relationships with the surrounding landscape. However, because such research is rarely explicitly connected to proposed natural resource management actions, it is difficult to translate research results into public preferences for specific management options. In other words, place research investigates people's views on and relationships with particular landscapes and locations, but often fails to examine how these views and relationships are related to specific management actions. Thus researchers cannot draw direct conclusions about how documented place meanings relate to different management options. For example, research might reveal the meanings associated with a particular lake or scenic view, but provide little understanding of how those meanings interact with preferences for how that lake or scenic view are managed. Far too often, researchers and decision-makers make "logical," but unfounded assumptions about the relationship between

place meanings and proposed management actions. They assume that particular place meanings are threatened by particular management actions (or that the place meanings themselves influence views on particular management actions). But many questions remain. If a particular campsite is important to local residents, should it be protected from catastrophic fire through thinning? If a beautiful scenic view is important to tourists, should managers attempt to maintain that landscape in its current condition? In most cases, decision-makers cannot be certain how place meanings translate into management preferences.

For place research to truly integrate place meanings into natural resource planning and decision-making, it must investigate the connections between sense of place and specific management actions.   We need to better understand if, how, and under what conditions place meanings are related to views on a range of management actions, from forest thinning to ski resort development. Decision-making bodies will then have information regarding why an understanding of place is relevant to specific decisions and how to use place research in decision-making. This knowledge could potentially aid managers in anticipating, if not avoiding, conflict over values or interests that may be threatened by particular management actions.

Place Meanings and the Sociopolitical Landscape

As described earlier in this book, the building blocks of people's relationship with place are place meanings. Place meanings include beliefs, values, symbols, images, memories, and personal history. Such meanings are often influenced by political ideology, material interests, and identity. Place meanings are malleable, diverse, and continuously created (Williams 2006). A fisherman prefers a particular stream because he had memorable trip there with his family as a boy. Residents of a timber-dependent community describe the surrounding landscape as a

working forest, emphasizing livelihood, resource use, and community identity. Place meanings are individual threads in the tapestry of people's individual and collective relationships with place, intricate and complex. However, such meanings are not necessarily shared or agreed upon. Even in small, rural communities, there are multiple and sometimes competing views (Belsky 2002; DuPruis & Vandergeest 1996). Place meanings are often politicized and contested, because such meanings are connected to different ideas about what is and is not legitimate use of a particular landscape or location (Yung et al, 2003). In the example above, descriptions of a working forest are inextricably connected to ideas about how that forest should be managed. Thus, place meanings, while oftentimes described as largely psychosocial, are part of a broader sociopolitical landscape characterized by agreement and difference, shared and contested ideas, and, in the case of fire and fuel management in the west, conflict over natural resource management. However, how ideas about legitimate use translate into specific management preferences, or support for particular proposals, remains unclear.

Special Places

The concept of "special places" is particularly relevant to this study, and to the effort to connect place to decision-making. To the extent that decisions are site specific (e.g. the decision to thin a specific stand of trees or to conduct prescribed burning on a hillside), understanding site specific place meanings may be critical. Schroeder (2002) described special places:

> When people have highly valued aesthetic and emotional experiences in specific places…these places…take on particular importance for them and become "special places." People become attached to such places.

Schroeder also set outs the spatial parameters of special places as "particular geographic areas."

In 2004, Schroeder suggested that understanding special places could help managers protect the

qualities that people valued in particular locations on the landscape. According to Schroeder,

> …managers should make a special effort to listen to residents and visitors to learn
> what characteristics of special places are important...adapting plans as much as
> possible to protect the qualities that make these places special. (Schroeder 2004)

Other research on special places concluded that management policies which disregard the

attachment of users to special places and are based on the substitutability of these places will not

be acceptable to users (Eisenhauer et al. 2000). Moore and Scott (2003) reiterated the importance

of managing for special places to improve user satisfaction and community-agency relations.

Because special places are assumed to be spatially discrete and non-substitutable, many mapping

efforts have focused on understanding place at this scale.

Participatory Mapping

Mapping has become increasingly important in place research. Mapping provides a

window into the spatial nature of place meanings and a way to represent such meanings visually.

Furthermore, managers make many decisions based on maps that typically include ecological

and biophysical data. Geospatial data, usually in the form of geographic information systems

(GIS) maps, has become a critical component of decision-making. However, to date, social

scientists have struggled to capture complex and nuanced social data in such formats.

Furthermore, because of the technical expertise it demands, GIS is oftentimes an inaccessible

technology and is thus difficult to utilize in to engage the public. But, if social data, such as

place meanings, can be adequately represented in a visual format, such data might be more

accessible to a range of interested parties. Specifically, participatory GIS exercises could be

incorporated into NEPA-mandated public involvement processes. Alternatively, collaborative groups could employ participatory mapping as they actively negotiate how they envision proposed projects actually happening on the ground. Oftentimes a visual aid such as a map will elicit different reactions and clarify important ambiguities present in abstract group discussion of inherently concrete phenomena. Some place researchers have suggested that such interactions can contribute to mutual learning, trust building, and much more (Carver 2003, Williams 1995, Gunderson et al. 2004).

In the past two decades, GIS and related techniques have been used to map public views and social meanings in a wide range of studies and disciplines, from mapping perceptions of crime to public views of wildness. Early efforts involved working with pencils or markers and paper maps (Gunderson et al. 2004; Jakes et al. 1998) or placing stickers-dots on maps to represent various environmental values (Brown 2005). Gradually, these methods have given way to digital mapping techniques. Brown (2006) continues to advance the landscape values/sticker-dot methods, now in digital form, while Norm McIntyre and others (Yuan et al. 2004) have developed a mapping process using GIS points and polygons. In the field of critical geography, some researchers have utilized a methodology referred to as "grounded visualization" wherein the commitments and methods of grounded theory are melded with powerful visualization capabilities of GIS in an iterative, mixed-methods approach (Hurley et al. 2008; Knigg & Cope 2006; Pavlovskaya 2006; St. Martin 2001). As transdisciplinary work becomes more common and GIS technology becomes more accessible, efforts to map supposedly qualitative data in quantitative ways will no doubt continue.

The research described herein was the third iteration of a larger research program focused on mapping place meanings to better understand local views on fire, fuels, and wilderness. An

initial study was conducted by Gunderson et al. (year) and focused on local residents'

relationship with the Selway-Bitterroot Wilderness in Montana. Watson et. al. (year) in the

second iteration of this study, described earlier in this volume, investigated place meanings and

the threats to these meanings by fire and fuel reductions on the Flathead Reservation in western

Montana.

Fire and Fuel management on the Kootenai National Forest

The question of how to effectively manage fires and fuels in the western U.S. is

increasingly important to natural resource managers, policy-makers, and forest communities and

landowners. Fuel build-up and the expansion of rural residential development, combined with

prolonged drought and the risk of high intensity, stand-replacing fires have pushed this issue to

the fore. In 2000, following a summer of widespread wildland fires, a National Fire Plan was

developed. The plan provided a guide for federal land agencies, such as the Forest Service,

regarding how to "respond to…severe fires, reduce the impacts of these wildland fires on rural

communities, [and] reduce immediate hazards to communities in the wildland-urban interface"

(USDA/USDI 2000: 1). The plan suggested several avenues for improvement to planning for fire

and fuel reductions. These suggestions included two mandates directly aimed at increasing local

participation: 1) Invest in Projects to Reduce Fire Risk, and 2) Work Directly with Communities.

These mandates emphasize achieving community protection through hazardous fuel reductions

and collaboration between managers and stakeholders.

Volumes of research have been produced concerning the economic and ecological

aspects of fire (Agee 1993; Arno & Allison-Bunnell 2002; Johnson & Miyanishi 2001). By

comparison much less research has focused on the social and cultural aspects of wildland fire.

But, according to Daniel et. al. (2003) "support for fuel reduction strategies hinges on public

perception and evaluation of a complex set of tradeoffs among uncertain and potentially conflicting values" (36), including "fire safety and aesthetic/amenity values" (42).

Much of the fire social science research has focused on the aesthetic values of forest landowners. Previous literature has established that WUI landowners often preference their landscape aesthetics over fire hazard reduction on their own property (Daniel et al. 2003; G. F. Winter et al. 2000). Nelson et. al. (2005) found that homeowners in Minnesota and Florida managed trade-offs between a wide array of values including "naturalness, aesthetics, wildlife considerations, recreation and privacy" (178) when making decisions about managing their own property for fire safety. Wall (year) found that, in Seeley Lake, Montana, homeowner views regarding defensible space were related to aesthetic preferences. Many landowners who favored thinning on public lands did not favor thinning on their own property because of specific aesthetic ideals. This seeming contradiction is well documented in the literature (Beebe & Omi 1993; Daniel et al. 2003; Vogt 2003; G. Winter & Fried 2000).

Beyond aesthetics, previous research has linked community-landscape relationships, including place concepts, and perspectives on fire and fuels. Gunderson et. al (2004) found that that local people held functional and emotional attachments for forest places, and that community place attachments were at risk from fire and fuels treatments that alter the landscape. Watson et. al. (2007) indicated that a wide range of social and ecological factors contribute to individual and community place meanings, and that some these meanings were threatened by certain types of fire (Watson 2007).

Study Site: Libby and the Kootenai National Forest

The study described here was conducted in the rural, forested community of Libby, Montana, which lies within the Kootenai National Forest (KNF). The Cabinet Mountains

Wilderness (CMW) rises sharply at the KNF's southern end (See Figure 1). Within miles of Libby, the Cabinet Range descends steeply into heavily forested foothills. The Cabinet landscape includes wilderness and roadless areas as well as units used for timber production. National Forest lands gradually phase into clusters of rural residential development and some isolated homes completely ensconced by the National Forest lands. The WUI lies here, where these private parcels adjoin and intersperse public and private forest lands.

Like many rural communities across the West, the economy of Libby was historically based on extraction of natural resources. Namely, the industries of mining and logging dominated in the past. Now the region is transitioning to a more diverse economy where extractive natural resource industries play a smaller role. Service industries, such as tourism and outdoor recreation, are being endorsed by some residents and organizations within the Libby community. However, this vision does not represent the views of many residents who still rely on and champion the traditional livelihoods based on timber and ore. Because of these competing views on natural resource use and public lands management, local views on fire and fuel management in the WUI vary considerably, and land managers have the difficult job of negotiating the interests and needs of different users and groups. Conflict over management of public lands has figured prominently in local politics. If decision-makers can better understand the residents' relationships with place, they may be able to work through such conflict and

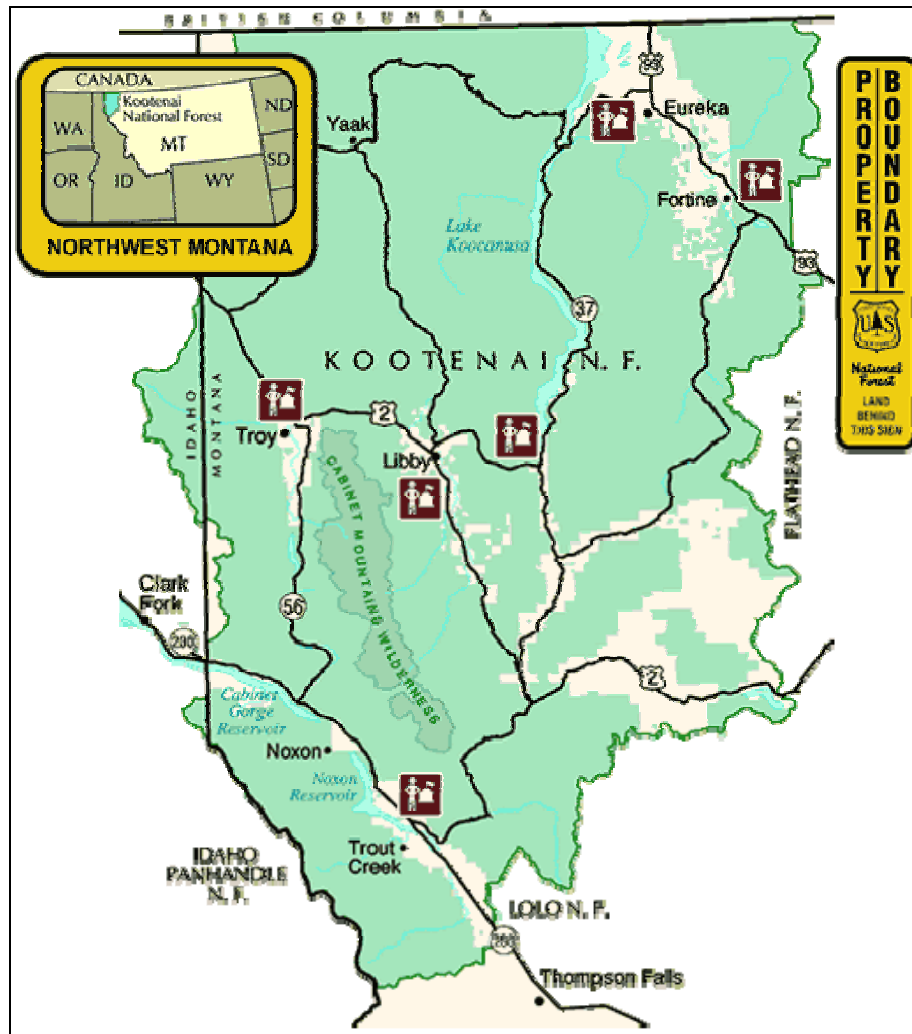achieve more desirable management results for all stakeholders.

Figure 1. Map of the Kootenai National Forest. Courtesy of the USDA/USFS.

Integrating Participatory Mapping into Qualitative Interviews

To better understand the meanings and views of local landowners, the first author

conducted in-depth, semi-structured interviews during the summer of 2007. The qualitative

method of extended interviews was chosen to gain insight into complex place meanings and

views on fire and fuel management, and connections between the two. This study focused on the

population of forest landowners living in the wildland-urban interface (WUI) near Libby. Forest

landowner was defined as an individual or family who own a parcel of forested land adjacent to

or within close proximity (<1 mile) of the Kootenai National Forest. In total, 29 interviews were conducted with 37 participants. Seven married couples were interviewed together, as were one landowner and his property manager. A diverse sample was achieved by using nonprobability, purposive sampling that included landowners who varied in length of residence, gender, age, political affiliation, ethnicity, and occupation. An interview guide ensured that interviews were systematic and that data was relevant and comparable across interviews, while also allowing for unanticipated topics to emerge. Interview questions focused on landowner relationships with specific sites and with the landscape as a whole. Landowners were also asked about wildland fire and hazardous fuel management.

After detailed discussion of place meanings and views on fire and fuels, landowners completed a computer-based mapping exercise. This mapping exercise was adapted from the Tagger mapping software described by Watson et al in the previous chapter, which aims to capture "fuzzy" boundaries rather than the points, lines, and polygons commonly employed in GIS-based mapping. This program uses a "spray can" tool which allows participants to mark locations on the map by "painting" them with bright colors. Participants can create marks that vary in size and shape. In the mapping exercise employed for this project, participants could mark specific locations on a large map that included topographic features, landownership, and human developments, or utilize a small inset map to efficiently "paint" the entire landscape.

The mapping exercise first required landowners to mark important places on a map and describe why those places were important. Landowners could mark specific locations or identify the entire landscape as important. Landowners could make multiple maps, identifying locations important for different reasons. Landowners made from one to eight maps, with an average of 3.25 maps. After mapping important places, landowners were asked to mark locations where

three different fire and fuel management options were unacceptable. The three management options were 1) wildland fire use, 2) prescribed fire, and 3) mechanical thinning. Participants were provided with descriptions of each of these options using lay terminology and standard Forest Service definitions. Landowners then created three maps related to fire and fuels, identifying those locations where each of the three management options was unacceptable. Because this mapping exercise was embedded in an interview, landowners verbally described why specific places were important or why specific fuel treatments were unacceptable in particular locations (unlike the mapping exercise utilized by Watson et al which required participants to tag locations on the map by writing text in a box on the computer).

This mapping exercise allowed researchers to better understand the spatial dimensions of landowners' place meanings and their preferences for fire and fuel management. The exercise also served as an elicitation tool, deepening the dialogue between the first author and participating landowners by allowing them to visually represent and spatially delineate their place meanings and management preferences. We hoped, at the outset of the project, that maps would also demonstrate a spatial relationship between special places (or site specific meanings) and views on fire and fuels. In other words, we set out to provide evidence for the hypothesis that understanding special places would help managers understand which management actions might be supported or opposed. We also wanted to assess the ability of the mapping exercise to meaningfully represent the social data in a visual format. We wanted to know if people's place meanings could be represented spatially in a way that captured the complexity of such meanings and provided accessible GIS data to managers. Because the mapping exercise was embedded in a qualitative interview, we could evaluate what we learned from the conventional portion of the interview versus the mapping exercise versus the two combined.
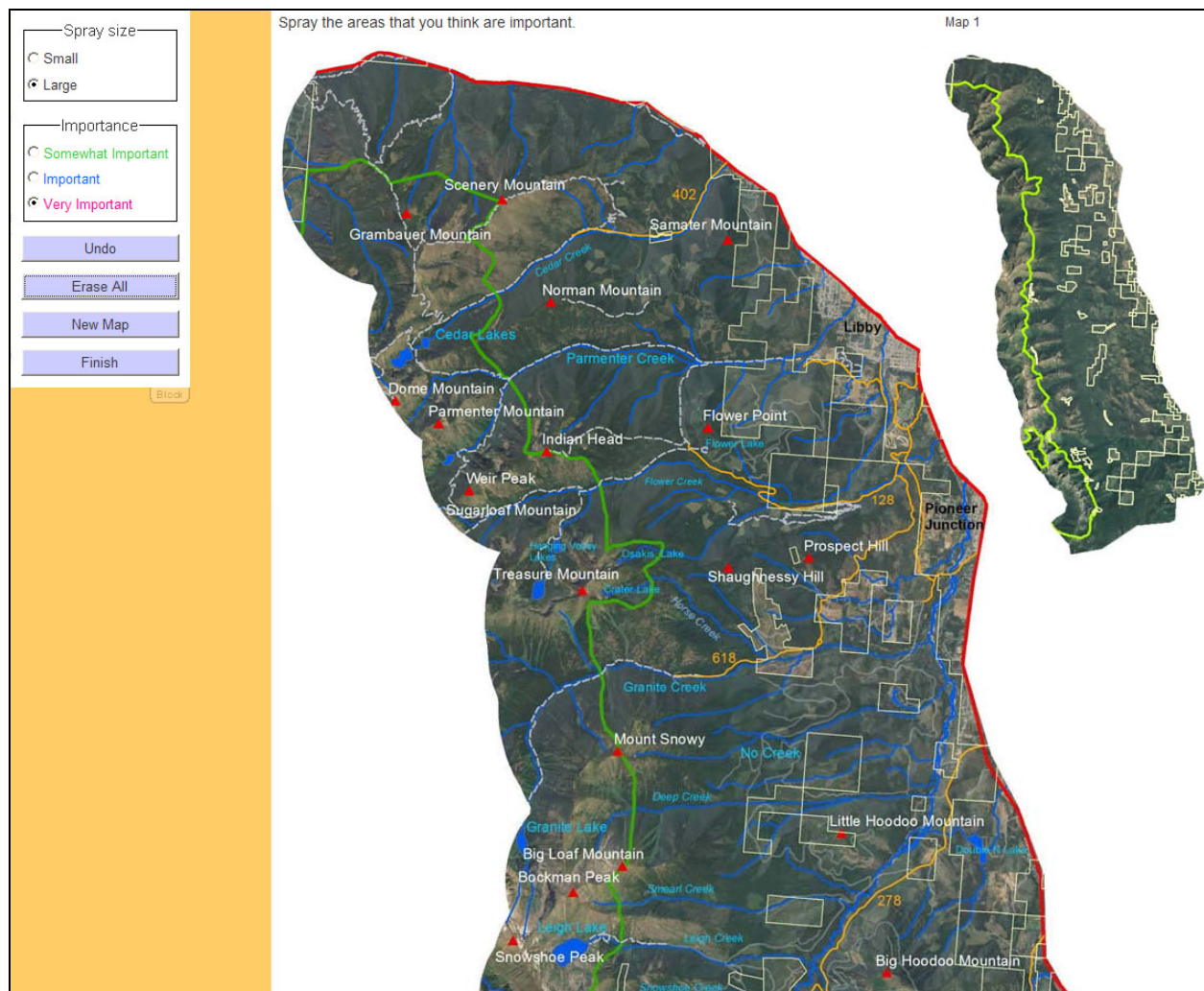
Figure 2. The mapping exercise as it appeared to participants. They could scroll down to view and mark the southern portion of the map (not depicted here).

Connecting Place Meanings and Fire and Fuels Preferences: Why Scale Matters

As described above, we expected that understanding site specific place meanings (special places) would enable us to better understand site specific fire and fuel management preferences. In other words, we imagined that place meanings and management preferences would be linked spatially, and that mapping data would therefore provide managers with insights into how to use place research in decisions about fire and fuels. We did, in fact, find that place meanings and views fire and fuel management were connected, but not necessarily at the scale suggested by

previous research. Research results indicated that landowner place meanings operated on different scales ranging from site-specific "special places" to the entire landscape, but that landowner views on fire and fuel management were almost exclusively situated at the landscape scale. Furthermore, management preferences were not connected to special places. Rather, landowner preferences for fire and fuel management were related to landscape-scale place meanings. These findings, described in more detail below, have important implications for how place research can be applied to decision-making.

Special Places: Their Importance and Unimportance

Landowners in this study described and mapped special places, often in great details, but ultimately argued that the entire landscape was more important than specific sites. Landowners described place meanings at multiple scales, from the very discreet, such as a particular stand of blue spruce trees, to the very broad, such as the entire Cabinet Mountains range. For example, landowners described and mapped special places to which they felt a bond and to which they attached meaning.   Landowners marked their special places on the map, sometimes meticulously, and discussed them in great detail, often relating very personal stories, experiences, and memories. While a range of special places were described, these special places fit into four general categories: 1) personal home and land, 2) recreational areas, 3) scenic views, and 4) hunting and gathering areas. The map below (Figure 4), paired with the following excerpt, illustrate how landowners mapped and described such special places. This landowner described his huckleberry gathering activities in great detail, as this activity was both an annual rite and part of "living traditionally." He says:

> *Well, it's all important to me. But up in the Scenery Mountain country, this is all really important, because at one time this used to be really good huckleberrying*

right in here. And in Cedar Lakes it still is… My family is old-time huckleberries.
I probably know more about huckleberries than most people in the world. (L31)

These places and the activities he associates with them hold great significance through memories, stories, and subsistence as huckleberry harvesting was something that he did all throughout his life with his family. He went on to discuss how the gathering ritual connected him to both his cultural heritage and the land. Through gathering huckleberries he came to know the land quite well, which is reflected in the incredible detail he has provided by marking so many individual locations. This level of detail in mapping and describing special places was very common among landowners.

Fig. 3. One landowner's special places to pick huckleberries.

Landowners attached multiple meanings to specific areas, as these special places were the sites of annual getaways, family events, important memories, subsistence resources, and environmental values. Previous research on special places suggests that people's attachments to

particular locations are connected to their preferences for management actions in those locations (Gunderson at al 2005, Moore and Scott 2003, Schroeder 2002). It follows that a special place, as a bounded physical unit, might be a tangible factor which could be easily accounted for in a land management strategy. However, in this study that did not turn out to be the case.

While small scale special places were important, landowners repeatedly cautioned the interviewer against overemphasizing specific sites. When the landowner above began to describe his special huckleberry spots, he said: "Well, it's all important to me." This was a critical and telling statement. Before that landowner would talk about the specific importance of huckleberries, he had to state that the whole landscape was important to him. This sentiment was echoed in by most landowners. In other words, landowners were willing to create individual maps of special places but would always remind the interviewer that "the whole thing" was tantamount. To bring this point home, many landowners created maps to demonstrate the importance of the entire Cabinet Mountains and their broad attachment to this landscape. When asked how her special places influenced her ideas about management, this landowner said:

> *Well, it is [all important], because everything is part of the whole. You can't look at it… I mean, you can. Of course you can analyze different areas. But everything is related to everything else. And it all has to be important. We can't just have this microbe focus on one, little area without taking everything into consideration.*

Some landowners actually resisted identifying specific spatial locations as any more or less important than the entire landscape. Instead, they asserted that an expanded focus on the whole landscape was required even though they *could* identify specific special places if prompted to do so by the interviewer. They concluded that, while their favorite locations were important to them, management agencies must take a broader view of the whole landscape.

This landowner, new to the area, admitted that, while she enjoyed occasional recreational outings, she placed emphasis on the importance of just *living* in the forest rather than knowing it all directly. When probed about her special places, she responded:

> *You can't single out a specific area in my mind that's better than another. It's all part of the package...It's all really important. I don't want to give it a lesser degree and say, well my place is more important and just, you know, 20 miles around is important. No, it's all important. It's all home...I can't say that I only want to take care of my spot, I don't care what happens to the rest. That's just so irresponsible to me.*

Landowners overwhelmingly related to the Cabinet Mountains as a whole landscape, despite their willingness to describe and map special places.

Fire and Fuels Preferences and Landscape Scale Place Meanings

In the preceding section we showed that while landowners related to the landscape at a number of geophysical scales from the bounded to the broad and could readily map and describe site specific special places in detail, they repeatedly suggested that the entire landscape was the important scale to consider. Similarly, nearly all landowners situated their preferences regarding fire and fuel management at the landscape-level, rather than describing preferences for particular locations. For example, Map 4 was created by a landowner to show where it was unacceptable for land managers to employ wildland fire use. Forgoing the use of the larger, more detailed map of the Cabinets landscape, this landowner used the small inset to demonstrate that wildland fire use is very unacceptable for use by managers everywhere *outside* of the Cabinet Mountains Wilderness Area. Many landowners talked about not holding spatially specific preferences, and did not need to map in any level of detail. When asked to map the locations where he thinks mechanical fuel reduction (thinning) is unacceptable, this long-term resident said:

I don't think that I could say this mile wide band on my [property] perimeter is more important than what's up adjacent to the dam. It's not any more important than the whole thing. When I talk about that they need to be managing "it", "it" is all of it. They need to start managing the whole thing [the whole National Forest]. And this piece [indicating his private property] isn't any more important to me than beyond that.

This landowner could not conceive of divorcing his private property from the entire Cabinet landscape in his thinking about fire and fuel management. The notion that one person would expect management to accommodate his personal special place seemed offensive to him and his ideas of community responsibility and stewardship. He instead described the need for management that accounts for the whole landscape. This response was common among landowners in this study.
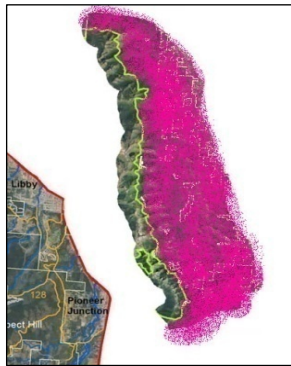

Fig. 4. One landowner's map of where WFU was unacceptable.

To explain their management preferences, landowners drew on complex sets of meanings, values, interests, and ideologies. Ideas about aesthetics, appropriate use of resources, the meaning of stewardship, and the human role in nature intermingled in two distinct narratives about the Cabinet landscapes, one which emphasized a working forest and resource use, and another which focused on natural processes and non-commodity values. Landowners who describe the Cabinets as a working landscape privileged economic interests and resource use.

They argued that human are stewards who have dominion over the forest and a responsibility to actively manage and benefit from natural resources. Allowing wildland fire or prescribed fires to burn was seen as a violation of these responsibilities. In the following excerpts, landowners explain the maps that depict their opposition to prescribed fire and wildland fire use (opposition depicted at the landscape scale).

> *I think that's poor management. We're stewards of the land. If we weren't going to be stewards of the land, then we shouldn't be here, and we should just let nature take its course. But we are. We live here, and we have a responsibility. (L5)*

> *But I think [not thinning and allowing trees to burn] is wasting resources. And in wasting the resources, you also allow the ground fuels to accumulate and so when you do have the fires, they're just that much worse. It needs to be harvested rather than wasted. (L4)*

> *I don't see why would they use a prescribed burn if they could do the same thing by utilizing some kind of economic resource by farming it. I'm not as much of a proponent of fire, because I've always seen fire as one of the biggest destroyers of the merchantable timber. (L36)*

The working forest narrative emphasized the notion that resource extraction is the most appropriate use of the forest, the aesthetic appeal of "park-like" stands with widely-spaced, and that idea that fire is generally "bad."   Thinning was mapped and described as the most acceptable avenue for fuel reductions because it provides "jobs in the woods," useable timber products, and fire protection.

By contrast, a smaller but significant portion of landowners described the Cabinets landscape as a natural forest. Although many newcomers subscribed to this narrative, it was also described by some long-time landowners. These landowners described the forest as a landscape with its own intrinsic value, emphasizing wildlife and other ecological values. Appropriate use of the forest by humans was most often confined to recreational and aesthetic enjoyment, rather

than commercial extraction of resources. Fire was described as generally "good," "natural," and "part of the ecosystem." Below, landowners connect their views on fire and fuel management to notions of the Cabinets as a natural landscape.

> *And I do agree that we could reduce the fuels. [Some people say], "they're going to go to waste." I don't agree with that. It's not wasted just because nobody used it. Nature doesn't think it's wasted. The birds don't think it's wasted. (L9)*
>
> *I have a really hard time with thinning by machine in that I have little faith in the system. I wonder what that really means to the animals and to the rest of the terrain when they go in and thin. The idea of it is probably nice. But I wonder what the reality of it is. I'd say it's unacceptable. Just as a general thing. I don't have specific places. I'm not necessarily against the thinning if I feel like it's done right…I just see that a lot of situations where a lot of machinery is brought in the land is destroyed, the animals are destroyed in the process, and I just don't have the confidence that it's going to be done right. (L29)*
>
> *I have no problem with burning as a practice. That's necessary. It's natural, and it needs to be utilized...I guess I get a little bit put off by people who go out into the forest and they want the forest managed like their township. To me, if you are fortunate enough to go out and have a place in the forest, then recognize that you are in a forest. And you adapt to the forest, don't make the forest adapt to you. That's kind of been my philosophy. I think that's appropriate because fire is a natural part of the ecological cycle so I have no problem with it at all. (L18)*

These landowners also emphasized stewardship, but envisioned appropriate stewardship as generally "hands-off," suggesting that humans should not interfere in ecological systems. For these landowners, thinning was seen as intrusive, and controlled burning and/or wildland fire use were preferred for their "regenerative" effect and because they "restore the balance of nature." Natural landscape landowners preferred a "natural" or "pristine" look to the forest (i.e. unmanaged) without overt signs of human activity.

Landowners drew on fundamental ideas about how humans interact with nature to explain what types of human management of fire and fuels were acceptable to them. In doing so, they described two competing narratives, the natural and working landscapes, which wove together meanings, values, interests, and ideologies to explain (and perhaps predict) management

preferences. Thus, these landscape narratives are much more than descriptions of a place; they are both embedded in and contain ideas about what is proper use and management of the forest and its resources. Although special places play a role in landowners' relationship with the Cabinet Mountains landscape, these site-specific places were not invoked when landowners described their fire and fuel management preferences. Instead, landowners connected management preferences to landscape-scale narratives of place.

Improving Connections between Place Research and Decision-Making

Resident Adaptability: Rethinking Special Places

We often assume that relationships with special places are of paramount concern when people consider proposed management actions. In describing the relationship between special places and forest management, Schroeder (2002) stated that "When a person's "special place" is lost or altered by a human action such as a timber harvest… or by a sudden natural change such as a fire… the person may experience intense emotions such as grief and anger" (p. 12). Similarly, a Forest Service employee interviewed for this project suggested that local support for fuel reduction would be dramatically impacted by people's passion for special places. According to her, large scale fuel reductions would be necessary to protect landowners and the community of Libby from large, intense fires. But, she argued that "The likelihood of that ever happening is pretty low because you're getting into that very special area that people are pretty passionate about." Both researchers and managers imagine a strong and direct link between special places and responses to management actions and environmental change.

In this study, we found that relationships with special places, while important to landowners, had little bearing on landowner preferences for fire and fuel management. Very few

landowners felt strongly about proposed alterations to their special places. Instead, most were very willing to accept change in their special places, acknowledging with equanimity that such change is an inevitable and integral part of the forest landscape. Several landowners maintained that their places will remain special even in the face of dramatic ecological and aesthetic change (such as fire) or significant management intervention (such as fuel reduction). Others said that they would find new special places if fire destroyed the old ones, indicating that, in certain situations, special places may actually be substitutable. Rarely did a forest landowner in this study conclude that their special places should be accommodated by a fire management decision.

Differences between residents and visitors might explain why this study's conclusions contradiction much of the literature on special places. Previous studies on special places have focused largely on recreationists, who might have different kinds of attachments to specific geographic locations. The relationships that recreationists have with special places may be more salient because, at least some cases, recreationists only experience the landscape in a limited set of locations. Thus, those locations may be particularly important repositories of meaning and memory. Residents, in contrast, experience many different locations on the local landscape and they have multiple relationships with these locations, including, but not limited to recreation relationships. Thus, for residents, place meanings may be connected to larger number of geographic sites and these meanings may be more diverse, drawing from recreational use during different seasons, from views on community history and agency management, and from livelihood needs. Furthermore, landowners who reside in the WUI are directly affected by National Forest management and experience such management on a daily basis, suggesting another factor that might influence relationships with place. Finally, because fire and fuel

management is such an important local issue, landowners may simply prioritize such management actions over personal needs associated with special places.

The lesson here is that the relationship between place and management decisions may be highly contextualized. The population of interest might differ, as we suggested for recreationists and residents. The management issue, such fire, water quality, or wildlife habitat, might change the way place meanings interact with management preferences.

It Could be the Forest, Not the Trees: Avoiding a Scalar Mismatch

We often assume that a variety of social phenomena operate at the same scale, including place meanings and public views on management actions. As described above, past research has suggested that understanding how people view special places on the landscape (identifying discrete locations and the meanings associated with such locations) will help managers understand which management actions will be acceptable in which locations. Because place situates social phenomenon in geographical space, the place concept demands that we think more carefully about the role of scale and how different scales interact.

In this study, landowner preferences for fire and fuel management were situated almost exclusively at the landscape scale and were not related to special places. Instead, management preferences were connected to meanings that landowners explicitly situated at the landscape scale. In other words, the stories that landowners told about the Cabinets landscape as a whole and about their relationship with this landscape, which together revealed the meanings, values, and interests associated with the area, were closely connected to views on fire and fuels.

There existed, in this study, a mismatch in scale between special places and management preferences, which was revealed in large part through the mapping exercise. Getting scale

"right" is critically important to management, especially for public lands managers engaged in project planning at multiple scales, from site specific treatments to landscape level restoration. In certain situations, if decision-makers are not alert to a potential mismatch, they might rely on information about special places to guide decision-making, thus missing the social phenomena most relevant to management preferences. In the Cabinet Mountains area, a hazardous fuel management decision based on accommodating special places would have overlooked the values and interests that were actually linked to landowner preferences for fuel treatments. This sort of scalar mismatch would have resulted in inaccurate conclusions about public views of different fire and fuel management options. Instead of effectively integrating local views into decision-making, getting the scale wrong might have increased local conflict or public opposition to National Forest management efforts.

Decision-makers and researchers need to be attentive to place meanings that operate at different scales, and choose the appropriate scale to lend insight into the management issue of interest. We also need to recognize that not all management preferences will be tied to specific locations on the forest; some management preferences are instead tied to broad values and interests that people apply to the entire landscape, ideas about proper forest management and resource use, local economies and decision-making, and the meaning of stewardship.

Using Participatory Mapping to Understand Local Views

Social mapping, or the spatial representation of values, views, and interests on GIS-based maps for inclusion in decision-making, is increasingly popular. As federal, state, and local agencies work towards greater civic participation and democratization, tools such as participatory mapping of social data may become an important part of planning. If social data,

such as data on relationships to place, can be adequately represented on GIS maps, then decision-makers might be able to integrate such data with biophysical data.

In this study, participatory mapping provided additional insights beyond traditional interviews. First, the mapping exercise provided an important elicitation tool that revealed additional insights into both place meanings and views on fire and fuels. Second, the mapping exercise was critical in understanding the issues of scale described just above. Because landowners were able to map at a variety of scales, the exercise exposed an important scalar mismatch. This scalar mismatch between site specific special places and the "location" of management preferences could easily be overlooked, particularly in a mapping process that privileged site-specific phenomena such as special places. Thus, in order to capture the social phenomena most relevant to the decision at hand, it is important that mapping exercises allow participants to identify locations at a variety of scales.

Because this mapping exercise was part of a qualitative interview, we were able to assess the effectiveness of the mapping portion for capturing the nuances and complexity of social views expressed during other portions of the interview. While the maps added to the interview in the ways described above, the maps alone did not adequately capture or represent the rich detail of place meanings or the complexity of views on fire and fuels. Thus, mapping cannot be seen as a substitute for other types of social research; it is not a quick method for obtaining the same information in a handy GIS format. Maps of special places may only capture certain components of individuals' and communities' complex relationships with places. A static, two-dimensional map will never fully convey the dynamic, multi-dimensional nature of place relationships or perhaps any social construct. By attempting to get place research into planning via mapping, decision-makers may paradoxically run the risk of reducing the complexity of local

relationships, the complexity that makes these relationships so important in the first place. Decision-makers need to include more than just maps of social data to truly understand public views on proposed management actions.

To the extent that mapping exercises can be part of a larger conversation about place and proposed management actions, spatial data can be contextualized within a larger set of social data. In this study, we were able to capture unanticipated or emergent meanings because the mapping exercise was part of an in-depth interview. In the context of a qualitative interview, landowners were able to raise issues and ideas that were not predicted, results that might have been missed by mapping alone. Participants were able to comment directly on the mapping exercise, suggesting the ways in which it did or did not effectively capture their views. For example, a few landowners suggested that the mapping exercise did not adequately capture their relationship with the landscape. Mapping in the context of focus groups or other community conversations would likely accomplish similar goals.

Because the maps that landowners created in this study were inseparable from their discussion of place and fire during other portions of the interview, this mapping exercise failed to produce maps of spatially-specific preferences that could be utilized as standalone products and be easily integrated with typical GIS data. However, the mapping exercise provided important insights into the role of participatory mapping in communicating management preferences to decision-makers.

Conclusion

Participatory mapping provides an important mechanism for linking place to decision-making. However, to realize the potential of participatory mapping, researchers must be attentive to issues of scale and how place meanings fit into the larger sociopolitical landscape. To fully

integrate the lived experiences, stories, values, and interests of stakeholders, mapping should be

combined with other methods of gathering social data, and mapping results must be understood

within the context of a broader program of social research.

References

Agee, J. K. (1993). *Fire Ecology of Pacific Northwest Forests*. Washington, D.C.: Island Press.
Arno, S. F., & Allison-Bunnell, S. (2002). *Flames in Our Forest: Disaster or Renewal?*
        Washington, D.C.: Island Press.
Beebe, G. S., & Omi, P. N. (1993). Wildland Burning: The Perception of Risk. *Journal of
        Forestry, 91*(9), 19-24.
Belsky, J. M. (2002). Beyond the natural resource and environmental sociology divide: Insights
        from a transdisciplinary perspective. *Society & Natural Resources, 15*(3), 269-280.
Brown, G. (2005). Mapping spatial attributes in survey research for natural resource
        management: methods and applications. *Society & Natural Resources, 18*, 17-39.
Brown, G. (2006). Mapping Landscape Values and Development Preferences: a Method for
        Tourism and Residential Planning. *International Journal of Tourism Research, 8*, 101-
        113.
Carver, S., Evans, A. J., Kingston, R., & Turtin, I. (2001). Public participation, GIS, and
        cyberdemocracy: evaluating on-line spatial decision support systems. *Environment and
        Planning B: Planning and Design, 28*, 907-921.
Daniel, T. C., Weidemann, E., & Hines, D. (2003). *Assessing public tradeoffs between fire
        hazard and scenic beauty in the wildland-urban interface*. Bloomington, IN: North
        Central Research Station, USFS.
DuPruis, E. M., & Vandergeest, P. (1996). Introduction. In P. Vandergeest & E. M. DuPruis
        (Eds.), *Creating the Countryside: The Politics of Rural and Environmental Discourse*
        (pp. 1-25). Philadelphia: Temple University Press.
Eisenhauer, B. W., Krannich, R. S., & Blahna, D. J. (2000). Attachments to Special Places on
        Public Lands: An Analysis of Activities, Reason for Attachments, and Community
        Connections. *Society & Natural Resources, 13*, 421-441.
Fischer, F. (2000). *Citizens, Experts, and the Environment: The Politics of Local Knowledge*.
        Durham: Duke University Press.

Gunderson, K., Watson, A., Nelson, A., & Titre, J. (2004). Mapping place meanings on the Bitterroot National Forest - A landscape-level assessment of personal and community values as input to fuel hazard reduction treatments. BEMRP Research Project Summary, on file with the Bitterroot Ecosystem Management Research Project, USDA FOrest Service, Rocky Mountain Research Station.

Hurley, P. T., Halfacre, A. C., Levine, N. S., & Burke, M. K. (2008). Finding a "disappearing" nontimber forest resource: using grounded visualization to explore urbanization impacts on sweetgrass basketmaking in greater Mt. Pleasant, South Carolina. *The Professional Geographer, 60*(4), 1-23.

Jakes, P., Fish, T., Carr, D., & Blahna, D. (1998). Functional communities: a tool for national forest planning. *Journal of Forestry, 96*(3), 33-36.

Johnson, E. A., & Miyanishi, K. (Eds.). (2001). *Forest Fires: Behavior and Ecological Effects*. San Diego: Academic Press.

Kellert, S. R., Mehta, J. N., Ebbin, S. A., & Lichtenfeld, L. L. (2000). Community natural resource management: Promise, rhetoric, and reality. *Society & Natural Resources, 13*(8), 705-715.

Knigg, L., & Cope, M. (2006). Grounded visualization: integrating the analysis of qualitative and quanitative data through grounded theory and visualization. *Environment and Planning A, 38*, 2021-2037.

Langston, N. (2005). Resource management as a democratic process: adaptive management on federal lands. In R. G. Lee & D. R. Field (Eds.), *Communities and Forests*. Corvallis, OR: OSU Press.

Nie, M. (2003). Drivers of natural resource-based political conflict. *Policy Sciences, 36*, 307-341.

Pavlovskaya, M. (2006). Theorizing with GIS: a tool for critical geographies? *Environment and Planning A, 38*, 2003-2020.

Schroeder, H. W. (2004). *The Way the World Should Be: Order, Cleanness, and Serenity on the Experience of Special Places*: USFS.

St. Martin, K. (2001). Making space for community resource management in fisheries. *Annals of the Association of American Geographers, 91*(1), 122-142.

Stewart, W. P., Larkin, D., & Larkin, K. W. (2003). Community identitiesas visions for landscape change. *Landscape and Urban Planning., 69*(2-3), 315-334.

Vogt, C. (2003). *Seasonal and Permanent Home Owner's Past Experiences and Approval of Fuels Reduction*. Bloomington, IN: North Central Research Station, USFS.

Watson, A. (2007). personal communication.

Winter, G., & Fried, J. S. (2000). Homeowner Perspectives on Fire Hazard, Responsibility, and Management Strategies at the Wildland-Urban Interface. *Society & Natural Resources, 13*(1), 33-49.

Winter, G. F., Vogt, C., & Fried, J. S. (2000). Fuel Treatments at the Wildland-Urban Interface: Common Concerns in Diverse Regions. *Journal of Forestry, 100*(1), 15-21.

Yuan, M., McIntyre, N., Payne, R. J., & Moore, J. (2004). Development of a spatial values-based recreation planning framework for Canadian Crown Lands. In *Working papers of the Finnish Forest Research Institute 2 (pp. 93-99)* (pp. 93-99). Helsinki, Finland: Finnish Forest Research Institute.