



“There's a lot of life in a dead tree”: Attachment, loss, and the permeation of place through wildfire recovery in northern California

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ABSTRACT

Place attachment provides a useful lens for understanding relationships with environments, highlighting how experiences, histories, social ties, and functional dependencies bond individuals with place. Disasters, however, threaten place, along with the social networks that provide support and reinforce ties to place. Here, we examine how dimensions of place attachment manifested in narratives about housing recovery after wildfires across northern California. Relying on 69 photo elicitation interviews with survivors that lost their primary homes to wildfire, we find that place identity, place dependence, and nature bonding were largely intertwined, mutually supportive, and pervasive within survivor narratives. We also find place detachment, or the straining and diminishment of place attachments, within many of the narratives. Given rising wildfire losses in California and across the world, understanding the foundational role of place attachment in the lived experiences of wildfire survivors is critical to ensuring that people and places endure rising threats from wildfire.

1. Introduction

Wildfire is endemic to landscapes across the American West, contributing to both the visual distinctiveness of natural environments and the health of ecosystems (Kennedy et al., 1988; Schoennagel et al., 2017). Widespread development in the wildland-urban interface (WUI), climate change, and human modification of wildfire regimes through decades of fire suppression and increased ignitions, however, have altered the character and function of these wildfire-dependent places. Rising wildfire losses have prompted calls for Americans to begin to “live with fire”, that is, sustain human well-being while accommodating wildfire as a beneficial ecological process (Moritz et al., 2022; Syphard et al., 2022). Many of these efforts are focused on vegetation management to reduce risk or technological advances to increase fire detection and suppression response; the ways in which residents are coping with and negotiating changes in fire prone settings are less understood (Horing et al., 2025; MacDonald et al., 2023; Schwartz, 2021).

Wildfire is akin to other natural hazards in requiring risk reduction actions across scales ranging from the house level (e.g., noncombustible materials, defensible space) to the community and landscape levels (e.g., evacuations, fuel treatments). Yet wildfire is unique in that the regrowth of vegetation after fire can be both a product of ecological recovery, often valorized as a symbol of post-disaster resilience (Porter et al., 2023), and a source of renewed risk (i.e., fuel) for the subsequent fires. Accordingly, understanding which aspects of places are valued by residents and at which scale(s) they are valued can provide insights on how to encourage household- and community-level recovery that supports risk reduction.

Place attachment, the tangible and intangible meanings assigned to place, provides a valuable framework to understand residents' relationships with their homes, communities, and environments, as it allows for residents to express how their identities are interwoven with meanings and lived experiences in a place, as well as with functional bonds centered on livelihoods and regular activities (Lewicka, 2005).

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Building on these foundations, which are described in detail below, this study contributes to the literature by examining how place attachment manifests in the context of disasters, specifically the wildfires in northern California (2015–2021). In this context, we present a novel examination of the dimensions of place attachment that were most salient for homeowners whose primary homes were lost or significantly damaged by wildfire, and the scales at which place attachment manifested, ranging from homes, neighborhoods, and communities to regions. Notably, we include negative manifestations of place attachment within our conceptualization (e.g. alienation, place relativity, placelessness, and detachment) which, apart from environmental damage, are rarely considered (Greer, Binder, Thiel, Jamali, & Nejat, 2020; Hummon, 1992; Schumann, Mockrin, Balachandran, Binder, & Greer, 2025).

Our research design combines reflexive photography with photo elicitation, enabling respondents to self-author and share photographs through a guided, semi-structured interview process (Schumann et al., 2019). These visual participatory methods are well suited for exploring lived experiences, particularly in WUI settings, where residing next to or within a densely forested landscape can be both a valued natural amenity and a potential threat from wildfire. Using a relatively large sample, 69 interviews, we examined how, where, and at what scale place attachment manifested in wildfire housing recovery across northern California. We found that place permeated survivors' narratives in how they described conceptualizations of self, home, and their housing recovery journey after wildfire. Survivors, too, articulated attachments that were often interdependent in nature and carried importance across a range of geographic scales. Given the rising wildfire losses in California and across the world, understanding the foundational role of place attachment in survivors' lived experiences of wildfire recovery is critical to ensuring that people and places endure rising threats from wildfire.

2. Literature review

Places are locations that individuals and groups, through a social process, imbue with meaning and purpose (Adger et al., 2011), and become bound to (Stokols & Shumaker, 1981). Individuals develop attachments to a place over time and through repeat visits, interactions, and experiences that occur there (Tuan, 1977; Twigger-Ross & Uzzell, 1996; Milligan, 1998). Places where people spend their childhoods, get married, raise their children, build bonds with neighbors, connect with nature, work, visit for vacation, and call home are interwoven with a sense of self and contribute to a sense of security and wellbeing (Jack, 2010; Low & Altman, 1992; Williams & Vaske, 2003). These attachments develop at different scales, from homes, neighborhoods, and communities to cities, regions, and countries (Massey, 1995). While researchers have proposed a number of definitions, place attachment, broadly defined, captures the emotional and functional bonds individuals form with a particular place (Brown et al., 2015). Understanding how individuals develop place attachments and how those attachments affect behaviors is important to several fields, including geography, psychology, and sociology, among others. Past studies have leveraged understanding of the construct to explain involvement in civic activities (Lewicka, 2005), the relationship between place and well-being (Rollero & De Piccoli, 2010b), opposition to public projects (Devine-Wright, 2013), and bonds with tourism sites (Suntikul & Jachna, 2015).

In part attributable to these disciplinary differences, conceptualizations of place attachment vary considerably across the literature. While most authors agree that place attachment is multi-dimensional, there is a lack of consensus regarding how many dimensions are needed to fully capture the construct. Most conceptualizations build on Williams and Roggenbuck's (1989) initial conceptualization of place attachment as two dimensions: place identity and place dependence. Place identity captures the role that place plays in conceptualizations of self, encompassing how people ascribe symbolic meanings to place and find their

sense of self in their connection to a place (Anton & Lawrence, 2014; Vitman-Schorr et al., 2025; Williams & Roggenbuck, 1989). Place dependence, in contrast, highlights the functional bonds people have with places they consider important for their livelihoods or regular activities (Anton & Lawrence, 2016b; Brown et al., 2015; Suntikul & Jachna, 2015; Williams & Vaske, 2003).

While often including some form of identity and dependence, other authors have attempted to add nuance to our understanding of place attachment by considering additional dimensions. Many of the dimensions share considerable definitional overlap, lacking mutual exclusivity. Several studies have considered emotional reactions or feelings toward place, often labeled place affect, when measuring attachments (Anacio et al., 2016; Pretty et al., 2003). For instance, while studying place attachment and pro-environmental intentions among tourists in Canada, Halpenny (2010) included three dimensions of place attachment: place identity, place dependence, and place affect, finding that affect related to both identity and dependence, and that place attachment did lead to place-protective actions. While most authors define place attachments as inherently positive (Anacio et al., 2016; Brown et al., 2015; Devine-Wright, 2013), others have noted how the emotions or relationships associated with place can be negative and undermine or erode attachments, adding in dimensions such as alienation, place relativity, placelessness, and detachment (Greer et al., 2020; Hummon, 1992; Schumann et al., 2025).

Another strand of scholarship has considered dimensions that capture the distinctive elements of a place and connections to nature as part of place attachment. In this vein, scholars have attempted to measure place definition, or considerations of how we bound place and the features that make a place unique (Hatori et al., 2023; Lewicka, 2011; Shamsuddin & Ujang, 2008). For example, relying on a five dimensional conceptualization to understand how time affected place attachment, Lomas et al. (2024) found that changes in the physical environment altered definitions of and perceived familiarity with place, often leading to a redefinition of place for their participants. Within the literature on recreation and high-amenity areas, both qualitative and quantitative studies have considered nature bonding, or how connections to nature contribute to place attachment, and in turn, well-being and environmental protection (Basu et al., 2020; Jayakody et al., 2024; Zhang et al., 2014). Measures of nature bonding attempt to capture connectedness to nature, environmental identity, and affinity to nature (Raymond et al., 2010).

Lastly, past work has noted interdependencies between the concepts of place, attachment to place, and social bonding, or the relationships we form with people in a given place (Chishima et al., 2023; Relph, 1976). This social bonding has, however, been considered in a number of different forms. Raymond et al. (2010) considered how neighborhood attachment, belongingness, and familiarity contributed to place attachment among rural landowners in South Australia. Pretty et al. (2003) included measures of sense of community (defined as affiliation and belonging) in examining intentions to move from a rural setting. Other authors, such as Manzo and Perkins (2006), suggest that sense of community is a social form of affective place attachment, differentiating between feelings about people in a place and direct feelings about a physical place. Mihaylov and Perkins, 2014 define this as community-level place attachment, as opposed to the individual level affective dimension, while also capturing related concepts of neighboring and citizen participation in the community.

2.1. Place attachment in disaster literature

For the purposes of this study, we are interested in how place attachment manifests in the context of disasters. As outlined above, we know that place contributes to our formation and reinforcement of identity, provides functional amenities, and that individuals form emotional bonds to the natural landscape and to unique features of a place. Disasters, however, often threaten place, including the

dimensions that create and reinforce emotional and functional bonds, bringing latent place attachments to the fore and potentially leading to protective responses (Anton & Lawrence, 2016b). This disruption to place, or perceived risk of disruption to place, also threatens social networks that provide support and reinforce ties to place. A variety of crises and disruptions, such as voluntary or forced displacement or relocation, may disrupt place attachments (Brown and Perkins, 1992; Butler et al., 2019; Devine-Wright, 2009; Qian et al., 2025). Disasters neatly fit within this context, as they result in a loss of human-environment relations and create “hassles”, or additional burdens that interrupt daily life (Kanner et al., 1981). This loss, in turn, induces stress and other negative emotional responses as individuals experience solastalgia, or mourn the loss of place (Albrecht et al., 2007; Stanley et al., 2024). In recovery, individuals work to redevelop ties with their previous place and/or develop bonds to a new place, while also engaging with individual and community recovery, in what Berroeta et al. (2024) term a “regeneration of socio-spatial attachment”.

As we have described in prior work (Greer et al., 2020), most studies of place attachment in a disaster context either examine how disasters shape place attachments or how place attachments shape protective actions and recovery from disasters. Literature on the former highlights how many disaster agents alter the physical landscape and disrupt social networks in affected areas. This can, in effect, weaken place attachments by disrupting the features to which individuals are attached (Carroll et al., 2009), though this disruption may be temporary and followed by a recommitment to place and to the restoration of a community (Silver & Grek-Martin, 2015). Literature on the latter suggests that higher place attachments leads to reduced risk perceptions, where individuals with higher place attachments are more likely to underestimate the likelihood of hazards occurring (Bonaiuto et al., 2016). That said, other research has found that individuals with higher place attachments are more likely to return after a disaster and actively contribute to recovery efforts (Chamlee-Wright & Storr, 2009; DeWaard et al., 2016).

Here, we are particularly interested in extant research examining the relationship between wildfires and place attachment. While limited, studies have generally focused on differences across urban and rural settings and the effects that place attachment has on hazard adjustment measures. In a study of the 2018 Woolsey Fire, Tinoco (2023) found that decisions to rebuild were driven by nature bonding and social dimensions of place attachment. Further, he found that returning residents that could collectively mobilize pushed for more response capabilities for future fires. Anton and Lawrence (2014, 2016a) examined how place attachment, defined as place identity and place dependence, varied across rural and urban dwellers exposed to varying levels of wildfire risk in Australia, finding that rural residents had notably higher levels of place identity than their urban counterparts. Counter to the general place attachment literature, they found that place dependence was higher in areas with higher wildfire risk, whether rural or urban. The authors suggest that this may be due to a valuing of functional dimensions (e.g. their homes) that are perceived as at risk. Further, they found that place attachment drove hazard adjustments among rural residents, but not among urban residents. Finally, using small-scale ethnographic methods, Reid and colleagues (2020) investigated the construction of place identity in three Australian communities vulnerable to bushfire, in peri-urban, rural, and a more remote setting. In all cases, preservation of place identity was often at odds with, and took precedence over, adopting preparedness or mitigation efforts externally imposed or recommended by the state government. However, residents tended to embrace recovery or risk reduction practices that reified their own and their community's place identity (e.g., by instinctually caring for one another or the forest).

3. Study area description

Wildfire is a fundamental, ecologically valuable component of

California ecosystems, with a long history of indigenous fire management before the arrival of settlers/colonists (MacDonald et al., 2023; Schwartz, 2021). Despite efforts to mitigate wildfire risks, area burned has increased over the last decade (MacDonald et al., 2023), and over 76,300 buildings were destroyed in wildfires from 2016 to 2025 (Hernandez, 2025). For this study, we selected four northern California counties (Fig. 1) that have all experienced high profile, destructive wildfires over the past decade (Table 1). Among the four counties, Plumas and Lake are rural, mountainous, and forested, with widespread federal lands and smaller populations. Butte County comprises both agricultural and urbanized areas (Chico, Oroville) in California's Central Valley and rural, forested foothill communities. Most land in Butte County is privately owned. Sonoma County has the most varied land base, with private and state-owned land, and a range of land uses including ranching, vineyards, and a range of shrubland and forests, including coastal redwoods. It is also the most affluent (i.e., highest median incomes) and urbanized overall among our study communities. In Sonoma County, housing losses included suburban-style homes in the more densely developed area of Santa Rosa (e.g., Coffey Park) and up-scale site-built homes just outside the city. Housing losses in the three other counties included older, more modest homes in smaller cities (e.g. Paradise in Butte County) and in rural, forested neighborhoods or towns (e.g., Concow in Butte County, Cobb in Lake County, or Greenville in Plumas County).

4. Methods

4.1. Research design

For this study, we employed photo elicitation interviews within a broader procedure informed by photovoice. Photovoice is a participatory method developed in public health research to document the needs of marginalized populations for policymakers (Wang and Burris, 1997). Photovoice data collection involves reflexive photography, where participants capture aspects of their lives via photograph (Cahyanto et al., 2013; Harper, 2002; Schulze, 2007), and photo elicitation, where the photographs are then used as props in a guided focus group or interview to elicit visually grounded, narrative-driven perspectives (Bukowski & Buetow, 2011; Cho et al., 2019; Molloy, 2007). Combining reflexive photography with photo elicitation prompts participants, during an interview, to reflect on memories and feelings embedded at the sites of photography (Schulze, 2007). Although these two key elements of photovoice were preserved in the current study, along with a participant training protocol and public town hall share-out events with policymakers, other aspects were intentionally omitted to limit the burden on participating households still recovering from disaster. Omitted elements included facilitated focus group discussions, an iterative participant-driven feedback process integrated with analysis, and involvement of policymakers in designing photo prompts. While rarely leveraged in disaster studies (Schumann et al., 2019), photo elicitation and photovoice methods have shown promise for increasing participant engagement in the research process, documenting latent constructs that are challenging to verbalize (Börner et al., 2015) and capturing place-based attributes that are often lost in traditional interviews (Lyons et al., 2025). Here we suggest that participatory visual methods present opportunities to understand how place attachment manifests in the wake of wildfire.

4.2. Procedures

We relied on a few approaches to recruit our participants. First, we worked with local partners in nongovernmental organizations, local and state government agencies, and universities across the state whom we had connected with during a pilot study for this project examining changes in the post-fire policy environment across California (Schumann III et al., 2025). Through these partners, we shared flyers that solicited

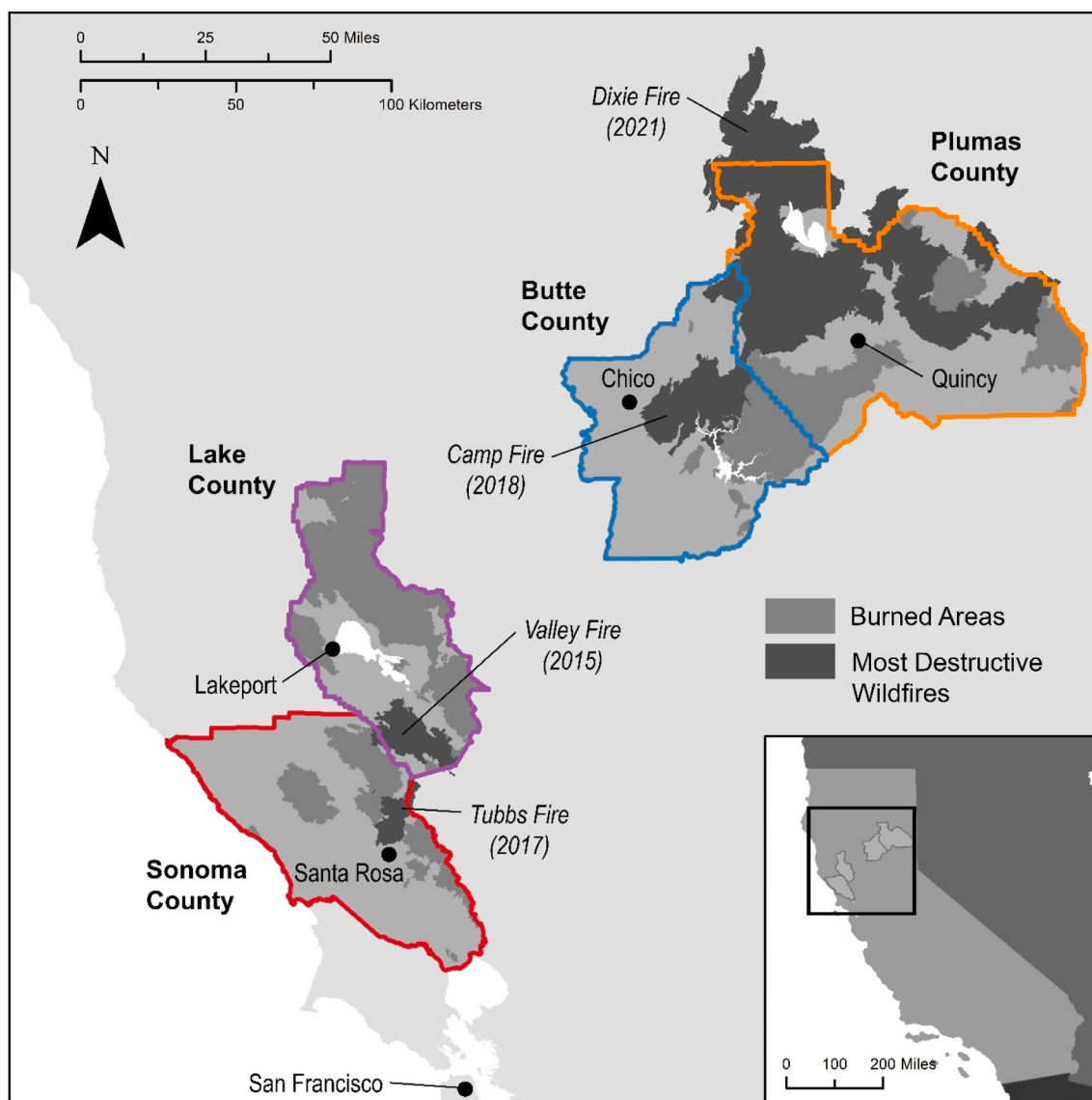


Fig. 1. Map of four study counties and their primary cities (i.e., most populous or county seat). Areas burned by wildfire (2015–2021) and each county's most destructive wildfire, by structure loss, are shown.

Table 1
Study counties.

County	Population (2021, American Community Survey 5-Year Estimates)	Major Fires (2015–2021)	Cumulative Destroyed Buildings (2015–2021)
Butte	217,884	Camp, Bear (North Complex)	21,410
Lake	67,749	Rocky, Valley, Clayton, Mendocino Complex, August Complex	2,936
Plumas	19,631	Dixie, Beckwourth Complex	1,324
Sonoma	492,498	Tubbs, Nuns, Pocket, Kincade, Walbridge	8,055

participation in a digital intake survey. The intake survey was used to verify eligibility, gather contact information for participants, and obtain informed consent for participation in the study. Second, we attended in-person and virtual local meetings to share our materials and recruit

participants. Third, due to challenges in recruitment in rural areas, we mailed a postcard to potential participants in Lake and Plumas counties that explained the study and directed them to our digital intake survey. Lastly, we closed every interview by asking participants to refer us to other potential participants.

Building on Wang and Burris (1997), our data collection involved three phases. First, we conducted training sessions with participants. Prior to the training session, each participant received a copy of the informed consent form and a handout with photo taking instructions. Training sessions, conducted either face-to-face or virtually, enabled researchers to review logistic and ethical matters, including photography instructions, camera ethics (e.g., obtaining permission to photograph people or private property), data usage (e.g., permission to publish and display photos and interview quotes), and data confidentiality protocols (e.g., redaction, deidentification, and secure storage of photos and transcripts). These procedures were approved by the University at Albany Institutional Review Board (IRB00005390). Consistent with the phenomenological nature of our method, participants were asked to take up to 27 photos in response to two prompts: (1) take pictures around your house that tell the story of your recovery, and (2) take pictures of things in your neighborhood, community, and natural

environment that show changes since the fires that are meaningful to you. While many participants shared photos they had taken before the fire, we asked that at least half of the photos be from after the fire. Second, participants were given approximately six to eight weeks to take photos that they shared with us virtually or via a disposable camera that we made available to all participants. Due to the emotional nature of this step, when we checked in with participants, we also reminded them that they were free to discontinue participation without penalty. Third, we conducted semi-structured interviews from 2023 to 2024 with participants across all four counties, with the photos displayed for reference. Our interview guide examined past wildfire experience, their recovery journey, pre-fire reasons for living in their community, motivations for rebuilding or relocation, post-wildfire changes in their communities, and visions for the future of their community. Prior to each interview, photographs were arranged in a grid pattern and numbered to provide a unique identifier, so interview commentary could later be linked with supporting photographs. Throughout the interview, we encouraged participants to reference photos that spoke to their answers to our questions. During interviews, we adjusted our pacing, modified the question sequence, and incorporated breaks, as needed, to minimize possible participant distress.

4.3. Participants

Sixty-nine households were included in our study. In several cases, we interviewed a set of spouses that represented a single household. Owing to our inclusion criteria, all participants were homeowners in our selected counties who lost their primary home in a wildfire since 2015 and were 18 years of age or older. While many renters were affected by these same wildfires, we constrained our sample to homeowners due to the agency they have in the housing recovery process (Mukherji, 2015). We continued our recruitment until we reached theoretical saturation (Guest et al., 2006). See Table 2 for a breakdown of the fires our participants experienced. Among our sample, 35 households rebuilt in the same location, 8 were in the process of rebuilding, 24 had already relocated, and 2 were planning to relocate at the time of their interview. While some of our participants had experienced multiple fires, we asked participants where they lived at the time of the fire that affected their home the most. For context, we provide a column that highlights the length of time between the fire that affected their community the most and when we conducted the interviews. Geographically, 24 participants represented Butte County, 14 represented Lake County, 8 represented Plumas County, and 23 represented Sonoma County.

Interviews ranged from 37 to 151 minutes with a mean of 85 minutes. We conducted a mix of in-person and virtual interviews, based on the availability and preferences of participants. Most interviews took place in person and generally in participants' new homes, while others were conducted in public libraries, coffee shops, or local gathering spaces. All the interviews were audio recorded. At the conclusion of the interview, we provided participants with a \$50 gift card and a copy of

Table 2
Fires our participants experienced by county.

County	Fire	Year	Years between fire and interviews	Number of households ^a
Butte	Camp	2018	5-6 years	25
Butte	Bear	2020	3-4 years	1
Lake	Valley	2015	8-9 years	11
Lake	Rocky	2015	8-9 years	1
Lake	Clayton	2016	7-8 years	2
Plumas	Dixie	2021	2-3 years	8
Sonoma	Tubbs	2017	6-7 years	12
Sonoma	Nuns	2017	6-7 years	4
Sonoma	Glass	2020	3-4 years	7

^a 71 losses and 69 participating households (two households lost homes in two separate fires).

their photos as tokens of appreciation for their participation. We also returned to each community and facilitated a town hall session where participants and other members of the community viewed our preliminary findings from across our study communities and provided us with feedback on our research and on policy and program recommendations.

4.4. Data analysis

Recorded interviews were first transcribed verbatim, and personal information was redacted. To protect participant confidentiality and facilitate analysis, each interview file was assigned an alphanumeric code indicating the household's pre-fire home county (e.g., B03 for Butte County, household 3). Sections of each transcript pertaining to specific participant-authored photographs were linked using the photo numbers from the recorded interviews. In this way, our analysis focused exclusively on the interview transcripts, which articulated the meanings embedded in the photographs. Photos with faces or personal identifiable information were identified and copies of these photographs were made with these details removed (i.e., blurred) for later use in dissemination.

Relying on the place attachment literature referenced above, we developed a deductive codebook (see Table 3) to capture the dimensions of place attachment in the photo elicitation interviews. Because place attachment literature acknowledges the conceptual overlap between dimensions, we employed simultaneous coding, allowing multiple codes to be applied to the same segment of text, throughout the transcripts (Saldaña, 2025). Likewise, we coded, where evident, the scale of the attachment, ranging from home to country (see Table 4). We used NVIVO 14, a qualitative data analysis software that allows researchers to organize, code, and retrieve segments of textual data, to code the transcripts. Two members of the research team simultaneously coded the data. After refining the codebook on a selection of five transcripts, we applied the deductive coding scheme to the remainder of the transcripts.

Table 3
Deductive coding scheme for place attachment dimensions.

Dimension	Definition
Place definition	The features and physical attributes of a place that are unique to people and on which they construct the boundary of a place (Mihaylov and Perkins, 2014).
Place identity	A self-conscious process or an interpretation of self in relation to the place-based factors. This includes individuals' place-based memories, observation of cultures, etc. (Bonaiuto et al., 1996; Mihaylov and Perkins, 2014).
Place dependence	An individual's functional dependencies to a place related to how it meets the daily necessities of their lives (Mihaylov and Perkins, 2014; Williams & Roggenbuck, 1989).
Sense of community	Feelings of being part of the communal group where people share mutual interest (Hidalgo & Hernández, 2001; Raymond et al., 2010; Stedman, 2003; Trentelman, 2009).
Sense of belonging	An affective connection to place that involves feeling of being part of something through social connections that makes people feel satisfied with place (Devine-Wright & Howes, 2010; Gillespie et al., 2022; Greer et al., 2020).
Place affect	Emotional bonds with a place, the change in which may impact the survivor both positively or negatively (Raymond et al., 2010; Williams & Roggenbuck, 1989).
Nature bonding	Direct or indirect bonds that individuals share with the natural environment through repeated interactions, embedded histories, finding solace, and a sense of responsibility to protect the environment (Raymond et al., 2010).
Detachment	A sense of disengagement from a location, feeling demotivated to take part in neighborhood-related activities, overwhelmed by the shared trauma and inclined to relocate from the neighborhood (Devine-Wright, 2009; Greer et al., 2020; Mihaylov and Perkins, 2014).
Place alienation	Lack of satisfaction with the place, and the development of negative perceptions of place (Hummon, 1992).
Placelessness	Lack of an emotional connection to place, particularly to a place previously considered "home" (Hummon, 1992).

Table 4
Deductive coding scheme for place attachment scales.

Scales	Definition
Home	A safe place or sanctuary where individuals' emotional and functional needs are met (Anton & Lawrence, 2016b; Hidalgo & Hernández, 2001).
Neighborhood	Limited spatial space distinguished by a cluster of individuals or homes, often including specific housing patterns, shared norms, cultures, and histories (Galster, 2001; Hidalgo & Hernández, 2001; Lewicka, 2005).
Community	A group of people who are connected by common interest or geographic location and work together to achieve common goals (Plunkett et al., 2018).
City	An administratively distinct unit with a defined name and representative government (Hidalgo & Hernández, 2001; Rollero & De Piccoli, 2010a; Shamai & Ilatov, 2005).
Local area	A geographic unit with no fixed boundary, often referenced with neighborhood, community, and physical settings of the surroundings (e.g., urbanity, rurality of the area) (Anton & Lawrence, 2016a).

To address intercoder reliability, we adopted a consensus agreement approach. After both coders independently completed coding of all transcripts, we compared coding at the level of individual code instances and discussed discrepancies until reaching 90% agreement (Cascio et al., 2019; Pagano et al., 2025; Stiles, 1997).

5. Findings

For the purposes of this manuscript, we were interested in exploring how and at what scale place attachment manifested in narratives about wildfire recovery across California. Given that many social science disciplines have studied place attachment, the diversity in how scholars have parsed the concept contributes to some overlap and repetition in defining its dimensions. While we saw evidence of most dimensions of place attachment, we noted the prominence of three main aspects, on which we focus this manuscript: place identity, place dependence, and nature bonding. We note that nature bonding was an aspect of place attachment that spanned both identity and dependence. Lastly, in many cases, participants spoke of place detachment, which does have precedence in the literature, and we explore this phenomenon separately. We saw that these dimensions were, in many cases, interdependent and important to participants at varying scales. Collectively, these provided both narrative centrality and explanatory depth (Braun & Clarke, 2006). These four dimensions were central to the narratives of our participants, who often relied on these dimensions when recounting their recovery journey for us, decisions they made during the recovery process, and for describing how they related to place after the fire. We highlight these themes below, accompanied by participant-authored photos, where relevant and where we could ensure participant confidentiality. Note that participant quotes often include references to specific photos (e.g., “photo number 8” or “4A”), which were numbered and displayed on either a physical or electronic posterboard by the research team during each interview.

5.1. Place identity

Across our sites, we saw that place identity emerged often in individuals detailing how their connections to place manifested after the fire. Participants described their familial and personal history in the local area and, more specifically, ties to their property. Participants detailed how generations of their family had lived in their communities, and even on their property, and that the memories they had made in those places resulted in strong place bonds. Beyond their private property, several participants invoked the broader history in the area, their stewardship of that history, and a responsibility to rebuild in situ for future generations.

S14 - My instinct was I had struggled for years, worked 60 hours a week to make sure I kept my house, that my son had a stable location. My husband had been sick for years. And so, I was the major breadwinner. And I did not choose to lose my house. I didn't choose to sell it and damned if some fire was gonna take it from me. And that really was, I didn't think, oh, I should buy something else. I thought that's my home. That is where number 8— [shows picture of her child] that little guy—that's where he was raised. He was six months old when we moved into it. You know, I have very vivid memories of him standing at the big picture window waiting for the garbage truck every week. You know, him playing with his friends out front, water fights. His, you know, he has all his memories from his dad there.

B09 - Well, I feel that this property's really special because it's indigenous property. You know, they would go up and down these creeks, and there's a lot of history here. We uncovered a bunch of grinding stones that were on the property. That oak tree is 500 years old, and it's called the hanging tree, too, because [name of road] was the only road that was up in the gold [mines] here. And the stage-coach would stop under there and they would switch horses many times. But there's a lot of history and I felt that I always felt like a conservator, you know?

Many participants often discussed how their investment and experience in place informed conceptualizations of self, and how ties to others in the local area (sense of community) intertwined with that investment to shape their attachments to place.

S19 - We didn't just lose a home, we really lost a community ... [my wife] had raised her kids there. She was there 30 years. And other people were too, a lot of people. The majority of the people there were there a long time, so they, and it was a really well-oiled machine. I mean it wasn't perfect, but everyone got along, and it was a beautiful place to live.

Participants noted that the history that bound them to a place was often a reflection of functional (dependence) features that they perceived as meeting their needs, particularly relating to their homes and the local area, and aspects of access to nature (nature bonding) that were powerful and persistent.

L04 - Well, I grew up here. And then I went away to college ... And then we were looking for a place to start our family, and we had been traveling all over the country looking for that right fit, and we just decided to come back up here ... We wanted to raise our kids in an environment where there was sunshine and soil and community and live with the seasons and, you know, be really connected to nature and all those things. Number 12, yeah. And so, the mountain is here, it's really big. But this is the view. Our new house is built for the view. And so just, I can't, once you have a view like that, you can't not have one ... Being able to just have that connection, that quiet place, the view, the garden, having those roots and then having the community.

P07 - There's a connection to place and it's not based on buildings. Although there's an iron fence in [photo 1D] there, that I was so grateful that was still there. Because that's a bridge to a lifetime spent here. I've invested my life here. It doesn't matter that there's no buildings. It doesn't matter that a lot of people are gone. I am connected to this place by shared memories, by the natural resources ... I have no reason to seek a connection elsewhere when I can live my connection here ... I love seeing the oak trees. Yes, they're dead, but there's a lot of life in a dead tree. That was part of why I have the oak in my family house with the clouds. I mean that's fricking gorgeous. 1F ... That was the view from my family home that I grew up with. Well, a little bit fuller from a vegetative standpoint. But the cloud, just Indian Valley is beautiful. The clouds, they are absolutely beautiful. Mist in the valley. It's freaking drop dead gorgeous. That's

the beauty I grew up with. The tree, we had a treehouse up there. Tons of stories associated with the treehouse.

5.2. Place dependence

Place dependence surfaced throughout the interviews, particularly in reference to participants' homes and the local area. Participants described how having their home in the wildland urban interface gave them access to community and the diverse amenities in the area while still owning property that provided solitude, independence, and the space to be self-reliant. Given the rural setting, many participants also highlighted the ability to enjoy recreational opportunities, such as hiking, camping, and biking in the local area. Given the outdoors nature of many of the activities, this functional dependence was often intertwined with a love of nature.

P06 - Not a big house, a comfortable house that the two of us could live in with shop space. Because I'm not even interested in a house that doesn't have some shop space. I really liked being in the country. I was on nine acres on the edge of town, so it was nice to be able to walk to town. The girls would walk to school, but we couldn't see our neighbors, and we liked that ... So, the reason that we came back was partly the beauty of the area and wanting to be back here. But the other half of the reason we wanted to come home is because we realize this is where our friends are. We can go to multiple lakes. If we want to kayak, we can take off and go on. What I like to tell people are 4,000 miles of roads in Plumas County and some of them are paved and most of them aren't. If you're into gravel bikes or mountain bikes, you can ride forever. There's some wonderful rides and they're still wonderful ... now we have views that we didn't have before because we can see through the trees in certain places.

S10 - We got it for the dogs [laughter] —number 9. We have four dogs now. And almost always have three or four dogs and we just wanted a little extra space that we could hike the dogs on the property and they could run and, you know, I could train and do stuff like that. It wasn't schlepping everywhere all the time. And then the other one was also probably like the views, whether it's walking down, this is the backside of the house ... you can walk and there's like three creeks that run through there that run during the winter-time The house does have spectacular views and you know, you can see from like number 19 or number 21, that when you're inside of the house, you know, we loved it when it was the house before and we would've preferred to just keep the house before. But definitely the rebuild that we have right now is optimizing just kind of that sweeping view that you get.

Participants comparisons of their pre-fire and post-fire homes and communities tended to include explanations of a series of tradeoffs—examples of how practical realities, such as the cost of building materials and inadequate insurance, restricted their post-fire housing options and decisions, and often decreased their functional place dependence. This remained true for both residents that rebuilt and ones that relocated.

B07 - So, this is in a town, but it's a small town. It's like less than 1000 people. So, that felt like, we didn't want to live in a city. And actually, when the fire came, we had two horses, and the horses escaped the fire. But we gave them away because we didn't know if we could even find a shelter for the two of us, let alone with acreage with room enough for livestock and everything. So, we downsized to a house. So, the downside of being here is the extended winter. Like right now, if I look at my window, all I see is white. There's berms of snow that are five, six, seven, eight feet tall near every window or near every road. And so, that means that my gardening, which I used to love to do, is now kind of restricted to these containers [laughter] ... So, I kind of miss that because the growing season is so short. The tall

trees are shady, and this is also not far from Mount Lassen, the volcano. So, the ground is strewn with volcanic rock, so you have to import the soil or create it or something in order to garden. So. And, I built a greenhouse, or I got a pop-up greenhouse, but it got inundated with snow and it's covered. So that's a loss.

Notably, some older residents noted increased accessibility in their new homes as a positive change that would better allow them to age in place after the fire.

B38 - The other house, it was a two story house. And don't get me wrong, I like the house but I was getting older and I was going, you know, I had some back problems where I couldn't ... And that was when this place here, I was going "Well, thank God." You know, this place here, you can get around with a walker. Other house, it wouldn't be feasible. So that aspect, that was kind of nice, we built an "old fart" house. All the doors, you can get through with a wheelchair ... When you get older, that's the thing. When you're younger you don't think about it.

L02 - in some ways, you know, as we're getting older, it's better because we're, it's a one story, you know. This [previous home] was a two story.

5.3. Nature bonding

When describing where they lived, both before and after the fire, participants often highlighted the natural beauty of the region, the views from their home, and their deep knowledge of the local environment. While often acknowledging the damage to the natural environment, many participants explained that their proximity to nature, particularly in relation to their home and the local area, was important to their conceptualizations of and attachments to place.

B31 - Okay, so number 2. Major reasons we came back being surrounded by nature, they're just feet off of the back porch and here. Number 6. That's just beautiful with even with the burnt trees, they're still beautiful now [referring to 14] I mean, where do you knock out of your back gate and find that?

Notably, trees were central to how many participants described their experiences and attachments. Participants described how they saw their lives and their recovery as embodied in the survival and recovery of trees on their property. This was further reinforced by their connections to trees on their properties, and deep knowledge of native vegetation and ecological systems in the area.

S04 - But I think ... So, this is a black oak tree and I think part of the reason I live here is because I love the look of this land. And we have black oaks and white oaks and valley oaks, and it's, as I said, it's oak woodland, which is really a special environment. Was special to the Native Americans. It's special to the wildlife. And these big crown trees ... I have a couple down here. I talk about my trees like I know them individually and a lot of 'em I do.

P05 - Well, I should have put in a picture of our valley. 2A was our house. Like an acre and a third with 215 trees. We were surrounded by oak, fir, pine, cedar. And some old, old trees that have been there a long time ...

In the post-fire environment, many participants noted that they maintained their bonds with nature in the untouched pockets of the environment or worked to discover beauty in a recovering environment. In Paradise, we often heard about daffodils, the official flower of the town, as a sign of the resilience of the town and of nature. In other communities, we heard similar stories of finding resilience and connection in returning nature. At the same time, we saw with several participants an understanding that vegetation would be slow to regrow, or in some cases, would be replaced by other vegetation communities –

for example, ponderosa pines might be replaced by oak shrublands. As vegetation regrew, however, they saw hope for the future of their community.

L08 - Yeah. I just love the trees. I love, I have to tell you, one of the, this is kind of crazy, but one of the really beautiful things that happened after the fire is the first spring the wildflowers were nuts. Everywhere. Everywhere. They were so beautiful. That was, that was a blessing of the fire, it made things grow.

P04 - Well, I mean, just look at 21 and 22 and burned hills. There ain't very many trees left up there. They were covered completely with trees. There was trees everywhere you looked. They're gone and they're just sticks of dead trees. Yeah, it's not a pretty site. I moved back into the middle of a devastation zone. I'm not going to sugarcoat that. It's ugly. It's ugly in many ways, and it's only—we have to dream the beauty.

S11 - I'm very connected to the natural world. Every night I sit out on that porch and just listen to the toads and the, the birds and the animal sounds. That's why I love it here. And it's a, you know, it's not a beautiful area right now, but it was a very beautiful area. And I think to me, it's kind of like if you had a really, really good friend, and the person was really beautiful or good, handsome, and then they got into some horrible accident and they were grossly disfigured. And at first when you saw your friend, you would go, oh, my poor friend. They're so grossly disfigured, but then it would just be your friend again. You would get used to it and then it would just be your friend, and everything would be you know, normal with your relationship with your friend. And so, that's kind of how it is for me here ... It's beautiful. You know, it, even though it's really ugly here right now, it's still beautiful in certain ways if you are looking for those things.

S15 - These were olive trees that we planted at the birth of our grandchildren and then when my parents died. And so, they all burned up. Except eleven of them came back. And we'll show you that. So, you discovered which are stump sprouters. So, the madrone trees have come back, the bay trees come back. Some of the ... hardwoods. The maples will do that too. But, so in our lifetime we won't see that. You know, we're putting, but it was, it's the magic of children. But planting acorns with kids last week and you say, you know, maybe you'll come back here with your grandkid, and you'll see a tree.

5.4. Post-fire detachment

While many conceptualizations of place attachment do not acknowledge the negative manifestations of place attachment, we saw many cases where survivors noted that their place attachments were diminished after the fire in relation to several aforementioned dimensions of attachment. Participants described how relations with neighbors were strained by their wildfire experience, and how, in some cases, interactions with other survivors pushed them to leave their pre-fire communities.

B06 - We tend to be very insular now ... We still love to have a party, but it's pretty much just us ... one of the more poignant moments was this woman outside of church ... we left the service and it happened to be windy that day and she was losing it because of the wind because most of us are affected by wind now. And, she just, this wasn't a woman I knew particularly well, and she was just holding onto me and crying and sobbing and just like, I could feel her finger was clawing into me and she's like, why do you think God did this? Why do you think God would do this to me? Don't you think it means something? And I'm like, it doesn't mean anything. It's okay. She's like, I think it's, you know, the wrath of God and she was taking it to levels that I was like, where is your husband [laughter]? He's around here, somewhere, right? [laughter] I gotta go. Okay. Cause I need to

go. But yeah, that was probably one of those moments where I'm like, I don't have it to give anymore. And I realized I've been giving to so many people trying to backfill all their trauma. I pulled away from all the trauma therapy I was doing at the time. I just went back and, like I don't wanna deal with trauma anymore. I think I've had enough.

Likewise, for survivors that returned to their communities, we often heard how the relocation of neighbors and relatives had challenged their sense of community and sense of belonging.

B01 - Interviewee 1: Well, hmm. Part of the emotional thing is that we're separated from family. Our daughter and granddaughters that lived in Magalia. Dad decided he didn't want to be as close to here. He moved to Montana. And then our daughter and granddaughters decided they'd better go too and have no desire to come back. Part of our, when we retire where we're going to go? Somebody wanted to be near the coast. Somebody wanted to be near the mountains—

Interviewee 2: I think it was our social circle. That was the hardest thing to lose. Because you have friends that moved out of state and you say you're going to stay in touch. You've got Facebook, you've got all of that stuff. You don't do it. Yeah. You know, everyday life gets in your way. The friends that we do have now, you just hold a little tighter to them.

Beyond friends and neighbors, the loss of businesses and services were also strained attachments after the wildfires. Particularly in Paradise, participants noted how the loss of grocery stores, banks, and key infrastructure, like the hospital, challenged the long-term sustainability of the community. In other cases, survivors pointed out subtle visual reminders that challenged their ability to move on emotionally after the fire. In Sonoma County, in many cases, these were the remains of trashcans, since the fire occurred on waste pickup day for many of our participants. A common sentiment across all the communities was that the fire had fundamentally destroyed their local connection to nature, and that the remaining dead trees, referred to as *widowmakers*, served as a visual reminder of the fire.

S06 - It was so funny, because that's what I want to point out here, in number 2, that you see if you walk in the neighborhood, you will see these blank stains. These were the trash cans. Because it was trash day on Monday. And you still see the residues of the melted plastic. And of course, the county hasn't done anything to repair the streets or anything. So, that's like a cons— when you are walking it's a constant reminder that you know, something happened, something bad happened. You know, it's just one of those things that you, if you leave now you don't want to even take a walk. Now it's a wonderful neighborhood because everything is new. But we lost that feeling. Also, the vegetation, that's one other of the things. You know, as you can see here all these areas that are completely, you know, gone. We used to have tons of trees like, you know, a little bit here. But now they are all gone ... That is going to take ages to recoup.

P08 - But the community is not going to recover. It's not ever going to recover ... I don't know if you guys have seen it, but it's really ugly there. It's just a lot of black sticks. In bare, scorched earth. And that's not very attractive. For me I need a lot of natural beauty around me to be healthy. That's not that environment. It looks like you're living on Mars or something. The people that are rebuilding there, I can't believe they're rebuilding. That community is not going to recover. It'll be interesting to see, has it been five years since the Camp Fire? And I know there's a lot of houses going up in Paradise. But Greenville, no. There won't be anybody there and there's not anybody there to this day.

In other cases, we had participants outline how damage from the fire challenged how they defined place. This was particularly poignant in Greenville, where the town was founded during the California Gold Rush and retained an Old West character. We heard from several survivors

about concerns that this original charm the town had would not be retained in reconstruction efforts. Likewise, we heard that code requirements for keeping vegetation away from homes changed the look and feel of the landscape for survivors. Still other participants highlighted how changes to the landscape challenged their ability to recognize and navigate their fire-affected communities.

L05 - So it had been a while since [my father] had been here ... five years. My mom was here. I think we're on [my daughter]'s second birthday. But I think one reason they actually don't come back is because they don't recognize this, which is legitimate. I mean, this road the very first time I drove this road in the night after the Valley Fire, I was like, where the heck am I like you know, I used to drive the road every single day, multiple times a day. Like, you know the road. And all of a sudden the landscape is different and like no connection with where am I? What is going on? It was crazy. I couldn't believe. I seriously was like in shock at the loss of the landscape affected it. Apparently I'm one of those 'turn at the tree' people.

6. Discussion

In this paper, we have explored how and at what scales place attachment manifested in narratives about housing recovery after wildfires from four Northern California counties that have recently experienced major and repetitive wildfires. Starting from a comprehensive deductive coding scheme, our results highlight the prominence of place identity, place dependence, and nature bonding, as well as a fourth dimension, detachment, in this post-wildfire context. Our findings elucidate the deep, multi-faceted role of place attachments in wildfire contexts. Here, we will address three observations taken broadly from the collective findings.

First, as articulated by our study participants, residents' lives and identities, and by extension their wildfire recovery experiences and post-fire decision-making processes, were permeated with place and their relationship with the place(s) they called home. When considering place identity, for example, our participants described ways in which residents in our study communities did not simply buy their home or land, but had, through experience in time, become rooted there. They fought for their home, worked hard to maintain it, and in some cases, inherited it from ancestors who had worked hard for it and subsequently entrusted it to them as a gift to respect and steward for future generations. These findings represent an extension of previous studies that have shown how unique place-based characteristics anchor disaster-affected residents to the place they call home (Chamlee-Wright & Storr, 2009) and suggest deeper influences may be at play. The role of nature bonding, which has received some previous attention in the wildfire literature (Ford et al., 2025; Tinoco, 2023), was remarkably evident here ("I talk about my trees like I know them individually and a lot of 'em I do"). This powerful connection to the natural environment, particularly in rural and WUI locations, was likely influenced by the effort required to live in these communities and the self-reliance this fostered in the residents (which the fire also threatened). Additionally, participants' stories suggest relationships with nature were further deepened by observing or by supporting the post-fire healing process. Nature bonding often manifested as something akin to a two-way familial relationship, causing us to question whether, when strong enough, it begins to function like place dependence.

Second, with devastating effects on the physical environment, we saw how wildfires resulted in redefinitions of place, in keeping with findings from Lomas et al. (2024). Many of our participants described how they developed a different, but still inherently positive or reverential, relationship with the post-fire environment. This is evident in statements such as, "I love seeing the oak trees. Yes, they're dead, but there's a lot of life in a dead tree," and in numerous statements from participants about sunsets that were newly visible, having previously been blocked by trees. Conversely, some participants struggled to find

any redeeming qualities in the post-fire environment, in keeping with previous studies that have documented experiences of loss and grief associated with disaster-induced damage to valued landscapes (Ford et al., 2025; Silver & Grek-Martin, 2015; Stanley et al., 2024). Rather than seeing new beauty in altered spaces, these participants' experiences centered on postfire tradeoffs, most often in descriptions of new or rebuilt homes or new communities that they felt were not suited to their needs or preferences. For these participants, a core theme may be summarized as difficulty reconnecting to an altered environment. These distinctive responses may suggest that there are meaningful differences in recovery among individuals who are able to positively redefine place, and those who are less able to do so. What is it that can make two individuals look at the same, severely altered landscape, yet see two very different realities? Such differences may be related partially to financial agency ("we didn't know if we could even find a shelter for the two of us" compared with "Our new house is built for the view") and physical agency ("we built an 'old fart' house"). Our narratives suggest that exploring the role of personality in wildfire recovery, in conjunction with the above factors, may be a fruitful future research direction.

Third, though related to the point above, we want to highlight the experience and consequences of place detachment (Greer et al., 2020; Hummon, 1992; Schumann et al., 2025). Given that a criterion for inclusion in the study was the loss of a home to wildfire, the nature of the damage and loss that resulted from the wildfires was absolute for participants, in many cases. We have shared findings related to the emotional cost of these losses, although the consequences were also social and practical. Changes in the physical environment caused some participants to report a sense of disorientation and eventual disillusionment. In the immediate aftermath of a fire, the loss of natural landmarks compromised the ability of individual survivors to navigate home, while over the longer term, physical and social remnants of the fires (e.g., melted trash cans, widowmakers, traumatized survivors) prompted avoidance of these areas and deflated hopes of positive recovery trajectories. This is in line with other research suggesting that direct experience with fire leads to stronger negative emotional reactions to the fire and a reconceptualization of place after the fire (Knez et al., 2021). We raise disorientation and disillusionment as issues to be explored further in future studies.

7. Conclusions

Although research on place attachment is well-established throughout the social sciences, the concept has, thus far, received limited use in exploring post-disaster housing recovery, generally. The uniqueness of the wildfire context, where vegetation surrounding homes is simultaneously a cherished amenity, a visible signal of recovery, a symbol of trauma and loss, and a source of future risk made it a compelling focus. Given variation in the literature on the definitions and components that comprise place attachment, this study used photographic methods and a deductive analysis of 69 household narratives of housing recovery after wildfires across northern California to identify the most salient dimensions and scales at which place attachment manifested. Findings from the study showed the pervasiveness of place identity, place dependence, and nature bonding in survivor narratives. As expected, based on the place attachment literature, these three dimensions were largely intertwined and mutually supportive. We also saw evidence of place detachment, or the straining and diminishment of place attachments, in our data. Regarding scale, we observed the prevalence of house/property and community scales; however, we were surprised that descriptions of nature bonding largely focused so close to home rather on the broader local area.

The current research is not without limitations. Most notably, aspects of the sampling strategy and photographic methods limit the transferability of findings. The participant sample was limited to only homeowners, and place attachment dimensions may manifest differently for renters and the precariously housed. Additionally, our sample

lacked diversity in age and race (most participants in our sample were over 65 years old and were white), though it generally reflected the study community populations. The lack of younger participants can be explained partially by the amount of time and effort required to undertake reflexive photography and elicitation, which lent itself better to retirees' schedules, and partially by California's high housing costs, where few young adults can afford to own a home. Within our study counties, the WUI and rural areas where housing losses were concentrated, were also home to primarily white populations. Future research could explore place attachment among a broader cross-section of household demographics. Likewise, as with any study that relies on voluntary participation, there is the possibility that self-selection bias limits the transferability of our findings, where we missed cases where individuals did not feel ready to talk about their experiences with recovery, or where households perceived their experiences as mundane and not interesting for research purposes. Other limitations stemmed from our analysis. Due to our focus on place attachment, we largely focused on emotional and functional bonds with place described by residents, often to the exclusion of social and practical factors (e.g., insurance, finances, labor to rebuild) that shape their relationship with place, although these factors were also present and weighed heavily in decisions to rebuild or relocate. Beyond this, we cannot separate where other factors outside the bounds of this study, such as plans households had in motion before the fire, also shaped housing decisions after the fire. In future analysis, we intend to explore these factors together.

Broadly speaking, this research illustrates the foundational role of place attachment in survivors' lived experiences of wildfire recovery and in visions for their recovered homes, communities, and natural environments. In doing so, it makes several theoretical and practical contributions. First, this study adds to the place attachment literature by assessing the utility of its components for use in wildfire and post-disaster contexts. Dimensions identified through this research may serve as useful starting points for future disaster scholars who center place attachment in their inquiries. Second, the study contributes to knowledge on recovery, generally, by revealing a significant degree of interaction between the emotional recovery of survivors and the recovery of both physical and natural environments they inhabit. To date, the disaster recovery literature has only hinted at such connections (cf. Ford et al., 2025; Greer & Trainor, 2021; Morrice, 2013; Wolfe et al., 2024). Further exploration here may be useful in guiding practical changes to housing recovery programs that reduce survivor stress, increase psychological support, and improve program retention.

Third, this research highlights detachment as an integral dimension of place attachment, which could benefit from further exploration and theorization in a disaster context. Literature such as Brown and Perkins (1992) theorizes that after disruptions such as disasters, individuals develop new attachments through repeated interactions and social integration, which could emerge where they lived prior to the disruption (reattachment) or in relation to new locations. Practically, the recent emergence of ecotherapy after wildfire (Ellis, 2025) could be evaluated in its ability to foster such reattachment. Finally, this study's findings on rootedness carry practical implications for policies aimed at reducing risk from wildfires and climate-induced disasters, more generally. People who are rooted in their properties, though nature bonding or place identity, may be resistant to relocating. So, rather than encouraging abandonment and retreat, such policies could integrate love of place into reinvestment efforts to "live with fire" and the range of other endemic hazards in cases where remaining in place is a viable option (Reid et al., 2020). Values of stewardship towards home, neighborhood, and environment can be powerful motivators for residents to undertake risk reduction actions (e.g., home hardening, restoring native and fire-resistant vegetation). Moreover, those with strong place attachments may make the best champions to guide mitigation and stewardship efforts in their communities, thereby ensuring that meaningful places endure the impacts of future hazards.

CRediT authorship contribution statement

Alex Greer: Conceptualization, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Validation, Writing – original draft, Writing – review & editing. **Sherri Binder:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Writing – original draft, Writing – review & editing. **Ayesha Islam:** Investigation, Methodology, Writing – original draft, Writing – review & editing. **Ronald L. Schumann:** Conceptualization, Data curation, Funding acquisition, Investigation, Methodology, Project administration, Writing – original draft, Writing – review & editing. **Miranda Mockrin:** Conceptualization, Investigation, Methodology, Writing – original draft, Writing – review & editing.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jenvp.2026.103134>.

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