FINAL REPORT

Title: Defining "Resilient Landscapes"
from Multiple Stakeholder Perspectives
in a Wildland-Urban Interface (WUI) Area

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Abbreviations & Acronyms

CU: University of Colorado at Boulder
H: Hypothesis
MFG: Magnolia Forest Group
MMG: Multi-party monitoring group
NIMBY: *Not-in-my-back-yard* activism
RQ: Research question
USFS: United States Forest Service
WUI: Wildland-urban interface

Keywords

communication;
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Abstract

Fuel treatment projects in wildland urban interface (WUI) areas are highly visible to public scrutiny, which can lead to intractable conflicts between land managers and the public that could block the implementation of those treatments. If agencies and publics are not able to reach adequate consensus regarding the definition of "resilient landscapes" then land management agencies will be prevented from performing important fuels management activities, amplifying already dire wildfire risks in high value areas. We investigated how land managers and publics defined a "resilient landscape" to discover where agencies and publics might find both common ground and points of resistance regarding land treatments. We accomplished this through tracking the re-implementation of the Forsythe II fuels treatment project near Nederland, Colorado on the USFS Arapaho and Roosevelt National Forests, Boulder Ranger District. Forsythe II was initially blocked by a vocal citizen group in 2014. Examining the project's re-implementation and aftermath provided an opportunity to better understand specific perceptions of "resilient landscapes" in direct relation to a treatment project. Goals of the project included using mixed methods research to: 1) Contribute to social scientific understandings of intractable conflicts; and 2) facilitate outreach between land managers and the public.

Our Phase 1 qualitative study involved analyzing observation of and/or documentation from 21 meetings over three years, and conducting group and individual interviews with 31 residents. Findings showed that differing notions of "resilient landscapes" emerged throughout the course of an intractable conflict between the USFS and a vocal citizen opposition group (Magnolia Forest Group). In this case, certain valued landscapes anchored different sets of meanings about personal connections to the spaces and perceptions about how they should be managed. This project produced two related sets of findings. The first set of findings illustrated sets of issues that comprised two distinctive understandings for "resilient landscapes." Specifically, notions of a "resilient landscape" were based on contrasting understandings of *resilience* (leaving the landscape alone vs. managing landscapes for human safety), *wildfire risks* (accepting wildfire risks vs. protecting against wildfire risks), and *interpretations of past fuel treatments* (as evidence of destruction vs. as proactive measures benefiting the community in the future). The second set of findings was grounded in the *place attachment* literature, and suggested how the USFS public comment process did not allow residents' place attachment concerns to be recognized as legitimate, which possibly contributed to intractability between the USFS and the Magnolia Forest Group.

Findings from the qualitative study raised several questions we explored in the quantitative study, including: How representative in the Nederland community are the various attitudes toward Forsythe II that we observed at public meetings and in interviews? Therefore, the Phase 2 quantitative study involved a census survey of the town of Nederland (approximate population 1900), resulting in N=637 completed surveys (34% response rate). Findings demonstrate that despite the controversy surrounding Forsythe II, residents living in the project area report broad support for forest management practices to reduce risk to human habitation and to improve forest resilience. Consistent with these broad sentiments, the majority of survey respondents expressed support for the Forsythe II project. We close with recommendations for land managers.

Objectives

The Practical Problem: Intractable conflicts between land management agencies and publics can stall implementation of fuel treatment projects

The wildland urban interface (WUI) is a pressing concern for fire, fuels, and other land managers for several related reasons. First, the intermixing of residences within and adjacent to public lands that characterize WUI areas presents a wildland fire risk. Stakeholders, such as landowners, risk property loss in the event of wildland fires and prescribed burns. Second, the presence of citizens and property in WUI areas amplifies the importance of conducting preventative land management activities aimed at generating a resilient landscape. However, third, land and fuels treatments in WUI areas are often highly visible, which subjects them to public scrutiny, and in some cases, even opposition. When publics oppose land and fuels treatments, these projects run the risk of being incompletely executed or even blocked. If agencies and their stakeholders are not able to reach adequate consensus regarding the definition of "resilient landscapes" then land management agencies will be prevented from performing important land and fuels management activities, and the lack of land treatment can pose a more extreme wildfire risk.

With the expanding WUI, intractable conflicts between land management agencies and the public are increasingly possible. Therefore, understanding what constitutes an intractable conflict around *defining a resilient landscape* offers foundational understandings that can provide direction on how to manage and hopefully overcome similar conflicts in the future in this and other WUI areas. Toward that end, this project is grounded in the communication discipline which understands that any definition process involves negotiation of meaning between multiple stakeholders, including the US Forest Service land managers and members of the public, specifically land owners in WUI areas. It is not sufficient to propose scientifically grounded treatments if vocal publics oppose or block their implementation. Therefore, understanding multiple perspectives on the definition of what comprises a resilient landscape can possibly enable land managers and stakeholders to come together to find common ground that enables action, rather than remaining divided—and paralyzed—in their differences.

This project was a collaboration involving an organizational communication scholar, an environmental sociologist, and communication students (undergraduate and graduate). We investigated how land managers and public stakeholders *define a "resilient landscape"* for the purpose of discovering where agencies and publics might find both common ground and points of resistance regarding land treatment activities. We accomplished this through tracking the re-implementation of the Forsythe II fuels treatment project, which was initially blocked by a vocal citizen group in 2014. Examining the project's re-implementation provided an opportunity to better understand *specific* perceptions of "resilient landscapes" in direct relation to the treatment project, providing more insight than discussing resilient landscapes in general.

Overview of Project Plan and Key Developments

As proposed, this project used mixed methods (i.e., qualitative and quantitative) to follow the re-implementation of the 3,840 acre USFS Forsythe II vegetation treatment project aimed at improving the landscape's resistance and resiliency to catastrophic fire and other natural disturbances. Initial proposed treatments included 3,170 acres of mechanical and hand

treatments, and 970 acres of broadcast burning. The project was approved through the national environmental protection act (NEPA) process. However, when implementation began in 2015, it was blocked by a vocal group of community members and landowners who disapproved of the treatments. The Boulder Ranger District re-assessed the Forsythe II project, issued a revised version in July 2017, and at the time of this report, is moving toward implementing the first treatments. The re-implementation of Forsythe II provided an opportunity to examine how the USFS and vocally-opposed community members in this Colorado Front Range WUI define a "resilient landscape" through the course of this contested fuel treatment project.

As planned, the research team conducted qualitative research methods to follow the re-implementation of Forsythe II for approximately two years (26 months). This process involved conducting individual and focus group interviews with various stakeholders in the WUI area closest to the Forsythe II treatment sites, as these stakeholders are more likely to be aware of, and to comment on the Forsythe II project. These interviews involved directly asking how interview participants defined "resilient landscapes"—including identifying areas of public resistance to fuels treatments, and what these participants would like to see instead. In addition to interviews, the research team also attended and observed public meetings in which Forsythe II was a topic of concern (e.g., USFS open houses, field trips, multi-party monitoring, Nederland town council). These meetings allowed us to see what issues residents and others raised, and provided an opportunity to recruit attendees for follow-up interviews.

Throughout data collection, we worked back and forth between themes we identified in the meetings and interviews, and additional scholarly literature that would help us best explain the dynamics of the intractable conflict surrounding Forsythe II. Two academic concepts emerged as particularly important. First, the notion of *conflict frames* comes from the environmental conflict literature; it refers to ways that parties position their values and concerns in ways meant to persuade (e.g., framing Forsythe II as resulting in a *loss* of a valued landscape (loss frame)). Conflict frames literature also accepts that any position on an issue (e.g., definition of a "resilient landscape") will include a repertoire or set of related issues. Second, we noticed early in the observation and interviews that residents (regardless of their opinion about Forsythe II) expressed that they found the landscapes in their local WUI to be personally meaningful. This insight led us to the literature on *place attachment*, which refers to the bond people feel toward certain landscapes. We revised our *research questions* and *objectives* from the initial proposal to account for emerging insights and these two important concepts. These changes add nuance to our understanding of stakeholders' definitions of "resilient landscapes," and enable us to make targeted contributions to literature on intractable conflicts, frames, and place attachment.

Table 1: Revision of Research Questions Given Emerging Findings and Relevant Literatures

Topic	Initial Research Question (RQ)	Revised RQ
Defining a "resilient landscape"	RQ1: How do stakeholders compare in their definitions of what comprises a "resilient landscape"? RQ2: What are points of similarity and difference across these definitions?	RQ 1: (a) How do parties define a "resilient landscape"? (b) How do aspects of physical landscapes inscribe meaning in spatial frames (and contribute to "resilient landscape" definitions)?
Understanding intractability	--	RQ 2: To what extent does a formal organizational (i.e., USFS)

		comment/objection process contribute to intractability? RQ 3: How do parties communicate place attachments when framing their perspective (e.g., opposition, support) of a planned landscape disruption?
Facilitating outreach	RQ3: What are potential openings for dialogue and consensus regarding contrasting definitions of a "resilient landscape"?	Practical Question 4: What are potential openings for dialogue and consensus regarding contrasting definitions of a "resilient landscape"?

Originally, the work plan for this project included administration of a household survey to approximately 200 participants along the Front Range. As described in the study proposal, this approach was intended to capture public views on forest resilience at a conceptual level and across a broad space. While conducting interviews, several participants referred to a "silent majority" who supported Forsythe II and a vocal minority opposing the treatment. We recognized it would be valuable for the community and land managers to explore the extent to which views expressed in the interviews and public meetings were representative for the community as a whole. As a result, rather than survey WUI communities throughout the Colorado Front Range as initially proposed, we decided it would be valuable to make this entire project a case study focused on the Forsythe II fuel treatment and the Nederland, Colorado WUI community. Thus, the second data collection was a mix of mail-based and online survey data collection approaches. We conducted a census survey of the entire 80466 zip code (approximately 1900 households). This survey was based on research literature, data from the qualitative portions of the study, and input from local leaders. Specifically, the survey followed up on major themes found in the qualitative data regarding support for Forsythe II and other land management activities (generally), perceptions about wildfire risk, levels of place attachment, and queries about fuel mitigation activities people had conducted on their property.

We studied the re-implementation of Forsythe II using communication-centered mixed methods to accomplish two objectives: 1) contribute to social scientific understandings of intractable conflicts, and 2) facilitate outreach between land managers and the public.

Objective 1: Contribute to Social Scientific Understandings of Intractable Conflicts

This study draws from theory and research that aims to understand intractable conflicts, and provide solutions to overcoming them. Intractable conflicts are intense, resistant to resolution and de-escalation, and often are deadlocked (Coleman, 2000). The focus of intractable conflicts tends to be something of fundamental importance to parties involved (e.g., needs or values). Further, these conflicts often persist over time, fluctuating between various levels of intensity. Ultimately, parties are locked in a win-lose orientation toward each other and perceive that there is no easy or simple solution to their disagreement (Coleman, 2000). Intractable conflicts often arise around natural resource issues (Samuelson, Peterson, & Putnam, 2003; Putnam, Burgess, & Royer, 2003).

Fuel treatments are a type of landscape disruption that could invite opposition, especially in the wildland urban interface (WUI). On the one hand, fuel treatments might be considered a pro-environmental activity because they are motivated by a land management agency's mandate

to care for the land; however, on the other hand, fuel treatments also might be fittingly labeled a "disruption" because some members of a community might perceive them as altering a landscape in undesirable ways. Therefore, a central issue for WUI areas is that residents may have conflicting perspectives on how best to manage private and public interests to protect residents and structures from destructive wildfires, particularly at the intersection of private and public lands (Paton and Buergelt, 2012; Paveglio, et al., 2009; Rieman, et al., 2010). Residents in WUIs might be attached to the current state of their surrounding landscape and resistant to changing it (Brenkert-Smith, Champ, and Flores, 2006). Attachment may be associated with conflicting viewpoints among various stakeholders (e.g., residents, land managers, municipal representatives) when desires to maintain the status quo collide with land management plans to change a landscape. Because WUI residents' attachment to landscapes is symbolic and enacted, scholars need to understand how WUI residents *make sense*, or build interpretive schemes, about meaningful places that inform how they frame their perspective on an issue.

Framing Understandings of "Resilient Landscapes"

A *frame* provides a way to structure one's experiences into a coherent storyline or explanation that gives meaning to events (Goffman, 1974). Individuals develop frames by sorting through a range of observations and ordering them into a plausible account, or interpretive scheme, of what is happening (Weick, 1995). Like a picture frame, interpretive frames "impart meaning and significance to elements within the frame and set them apart from what is outside the frame" (Buechler, 2000, p. 41).

Conflict frames. Research on environmental conflicts has yielded a substantial body of work about frames (Brummans, et al., 2008; Davis and Lewicki, 2003; Dewulf, et al., 2009). Davis and Lewicki (2003) explained that parties mobilize frames to identify whether problems exist, and if so, to define their nature. Parties then take action based on how their frames define a problem. Parties with different definitions of a problem will likely differ in their understanding of what actions are necessary or appropriate for resolving it, which can lead to disagreements among parties with different perspectives. Also, frames provide a common purpose that can mobilize collective action by marshalling support toward a position on the issue. Several frames commonly emerge in environmental conflicts, including those linked with personal *identity*, how parties *characterize* an issue, *conflict management* methods parties use, *fact-finding* legitimacy (or whose expertise is considered credible), which party has *social control* over decisions about the issue, *power*, and expected *losses/gains* resulting in a course of action (Davis and Lewicki, 2003, see Table 2).

Frames become especially important when considering how parties mobilize them to strategically position an issue and heighten intractability (Shmueli et al., 2006). For instance, *power* frames pertain to how people understand relative positions of legitimacy in a conflict. When people perceive they are on the weaker end of a power imbalance, they are likely to view interactions with a more-powerful stakeholder as a zero-sum endeavor in order to maximally advance and legitimate their position (Shmueli, et al., 2006). For instance, WUI residents who oppose federal agency land management activities might see themselves in a David and Goliath struggle against a powerful government institution, which can render them resistant to negotiation (thus legitimating their position) when the agency offers anything short of complete concessions. Second, and related, parties invoking a *loss* frame are more likely to work harder to prevent risking a loss, than will people seeking a commensurate gain (i.e., operating within a *gain* frame) (Elliott, 2003; Shmueli, et al., 2006). Thus, if those same WUI residents view land

management activities as stripping the landscape of what they love (i.e., a loss frame), they will likely be especially motivated to halt the operation; conversely, residents who support the project to an equal extent are not likely to fight as hard for its implementation. Further, disputants become increasingly polarized when their *fact-finding* frames diverge; that is, when they disagree about which sources of information are legitimate for justifying their positions, and discount the expertise from which the other party draws its conclusions (Kaufman, et al., 2003; Shmueli et al., 2006).

Table 2: Common Environmental Conflict Frames, Definitions, and Examples

Frame	Definition*	Examples**
Identity	Invoking values tied to group memberships or personal identity	Jonas[1]: The woods is part of…your soul…and that is worth preserving. Sarah: everyone knows me and my dogs because we're always on those trails
Characterization	Making (typically negative) attributions about other's behaviors; placing blame on others for causing a problem	Brett: Forsythe II is just another instance of the USFS enabling the growth and expansion of our community. Laura: Blocking Forsythe II is just negligence--it puts our whole town at risk [of a fire].
Conflict Mgmt.	Party's preferences for how to make decisions and manage the ongoing conflict process	Jerry: the USFS needs to consult us before cutting any trees. Joanna: People had the chance to give input on several occasions and they didn't. The USFS should move ahead with Forsythe II.
Fact-finding	Labeling technical information or expertise as trustworthy/acceptable (or not)	Alexis: There's this attitude [of the USFS]…of, "well, we're the forest managers and we know about this stuff and you just live here." And our thought is… you may know something about forestry, but you don't really know about this forest Justin: We have to actively manage [the forest] because…we are interfering with its ability to let natural processes take place. We have to make decisions about [it to]…make sure the people who live here are safe
Social control	Identifying who/what has jurisdiction over a social issue, and appropriate paths toward resolving the issue	Jerry: Your only hope then is your mitigation around your home so the home just doesn't burn [in a fire] Erik: We need to work together to find a compromise because if we have a catastrophic fire, we might lose…the entire community we love up here.
Power	What parties say to persuade or gain leverage over other parties	Jerry: There are going to be large fires…and there's no fire mitigation that's going to stop that from happening [Large fires are inevitable and entirely beyond human control, making preventive measures futile]. Val: We all like our tree-lined road. But we need a new paradigm for what it means to live here with fire. [Large fires are inevitable, and preventive measures are necessary.]
Risk	Invoking losses/gains, advantages or hazards associated with environmental actions	Rod: We live here to be part of nature...You got to understand that it comes with risks, forest fires are a part of this. Laura: Would I rather it be all forested and there's no fires? Yeah. But I feel like that's just negligence to not try to mitigate community fire risks.

*Definitions adapted from Davis and Lewicki (2003).
**Examples drawn from our data set.

[1] All names are pseudonyms.

Central to WUI areas, but under-explored in the above examples of frames, is the role of the physical landscape itself. In particular, we need to better understand how the meaningfulness of a space might contribute to, for example, parties talking on a loss frame, or adopting an unyielding orientation toward other stakeholders with an interest in a landscape.

Spatial frames. Given the meaningful and enacted connections people develop with specific landscapes, particularly in some WUI areas, physical spaces become the material embodiments of sets of meanings and experiences (Stedman, 2003). A spatial frame, like the frames discussed previously, is a discursive construction that sets some aspects of experience within the frame and other aspects outside of it (Buechler, 2000). A spatial frame may be unique from other frames because it captures ways that meanings are not only discursive, but also material (an aesthetic quality of one's viewscape) and enacted (acted out in daily life through hiking on community trails, etc.). Moreover, symbolic spaces inscribe meaning, and as such, it is possible that spatial frames inscribe people's experiences of *specific* landscapes, such as the forest bordering on one's property rather than the forest in general (Halpenny, 2010). Therefore, spatial frames might emerge in conversations as parties reference these specific, contested landscapes when talking about their personal experiences, or when recalling memories of changes to that space. We might expect that spatial frames would be resistant to modification because they are grounded in the bodily enactment of not only a landscape, but one's sense of identity as acted out within the landscape. That is, spaces become meaningful places when people act out who they are through activities they perform in a landscape. A landscape also becomes particularly meaningful when people perceive that it is *not substitutable* for certain activities. We might consider, then, that memories of and connection to a landscape could render the imagery of a space resistant to change. One might be reluctant to imagine a certain meaningful landscape taking on a different look resulting from land management activities (e.g., through removing trees, etc.), especially those that would change one's physical enactment of it (e.g., seeing a densly-timbered trail as less desirable if it had fewer trees). From these assumptions, our conceptualization of *spatial frames* is based on the notions that some physical landscapes are *enacted* and *non-substitutable*. Therefore, given that residents might enact landscape-specific activities (e.g., hiking) to reinforce valued personal identities, generate lived experiences and memories in particular spaces, and come to see a landscape through those physical experiences, we ask:

> RQ 1: (a) How do parties define a "resilient landscape"? (b) How do aspects of physical landscapes inscribe meaning in spatial frames (and contribute to "resilient landscape" definitions)?

Place Attachment as an Anchor for Intractability

Wildland urban interface (WUI) areas are a ripe location for conflicts between residents and land managers in part, because people often find such landscapes meaningful and are attached to them. *Place attachment* refers to the strength and nature of human bonds to a valued landscape (Halpenny, 2010; Manzo, 2003). Place attachment captures the idea that people develop situated identities that reflect both their social and spatial positioning; the concept pertains to both the use of a space and emotional connections that are made salient by one's personal investment in it (Greider & Garkovich, 1994; Pellow, 1992; Shellabarger, Peterson, Sills, & Cubbage, 2012; Stedman, 2003; Williams & Vasque, 2003). This multi-dimensional concept attends to functional attachments that render a place unique and not easily substitutable with another place (place dependence), ways place attachments make aspects of one's sense of

self salient (place identity, Proshansky, 1978), emotionally-valenced attachments to a place that invoke feelings (place affect, Halpenny, 2010), and social connections occurring due to one's use of a landscape (place social bonding, Ramkissoon, Smith, & Weiler, 2013).

Place attachment often becomes salient alongside other environmental issues. That is, "disruptions" to a meaningful landscape can activate place attachment, which further predicts certain behaviors and intentions (Devine-Wright, 2009; Halpenny, 2010). Importantly, landscape disruptions encompass a range of activities, due to industry impacting nature, mineral extraction, waste dumping, and infrastructure expansion (e.g., wind farms), and others. Both actual or potential disruptions are equally likely to pose a "threat" to one's experience of the dimensions of place attachment, and as such, can motivate action (Devine-Wright, 2009). For instance, a proposed disruption to a valued landscape could threaten one's sense of identity as connected to that landscape (place identity), prompt negative and uncertain feelings (place affect), remove the ability to use a landscape to fulfill a particular need (place dependence), or make some social connections more difficult (place social bonding). Given that landscape disruptions can threaten all dimensions of place attachment, it is not surprising that the concept has been linked with resistance to projects that would alter a valued landscape (Devine-Wright, 2009).

NIMBY opposition as an expression of place attachment. There is a substantial amount of research on *not-in-my-backyard* activism, or NIMBYism, a phenomenon where individuals who may, in some circumstances, be supporters of certain policies, projects, and developments (e.g., wind turbine development, affordable housing, disposal sites, etc.) engage in public opposition to these developments when proposed locally at or near their communities (Devine-Wright, 2009; Van der Horst, 2007). Dear (1992) defines NIMBYism as "the protectionist attitudes of and oppositional tactics adopted by community groups facing an unwelcome development in their neighborhood" (Dear, 1992, p. 288). Folks who share a NIMBY sentiment toward some project or development tend to work collaboratively to establish a form of "community" opposition (Dear, 1992; Takahashi & Dear, 1997). Further, these individuals typically share some demographic characteristics (e.g., high socio-economic status, advanced education) which facilitate the ability to engage in opposition to community development projects they may disagree with (Mansfield, Van Houtven, & Huber, 2001).

Contemporary work considers that NIMBYism is, in effect, an expression of place attachment. Devine-Wright (2009) calls for NIMBY scholars to consider the role that place attachment and place identity play for NIMBY groups, as inherently, NIMBYism is a place protective action that prompts community members to organize in response to some kind of emotional and/or identity threat. Devine-Wright (2009) makes a case for scholars to consider that oppositional responses are due to a perception of poor symbolic "fit" between a project and the meanings stakeholders have regarding the landscape and the project.

Poor symbolic fit between a project and landscape may bring about NIMBY responses, as projects (particularly those that alter landscapes) may be perceived as threatening to stakeholders' ideas of place (Devine-Wright, 2011). For instance, Devine-Wright and Howes (2010) found that contradictions between a project (a wind farm) and place tended to arise as identities of those with strong place attachment were threatened (Devine-Wright & Howes, 2010). Place attachment emerged as community members collectively considered the implications for changes that could occur (Devine-Wright & Howes, 2010). Ultimately, a lack of 'fit' in the ways in which stakeholders symbolically came to understand a project and the place where it would be implemented played a significant role in whether they supported or opposed it.

Conversely, positive associations between a project and a meaningful place—or good symbolic fit—was associated with stakeholder acceptance of the project, and therefore, the absence of a NIMBY response (Devine-Wright, 2011). In particular, Devine-Wright (2011) examined community responses to the installation of a tidal energy converter in Northern Ireland, a project for which no NIMBY opposition had manifested. Results of the study found a strong relationship between place attachment and acceptance for the project, and no NIMBY opposition occurred. Rather, the proposed project enhanced place attachment among residents. These findings supported Devine-Wright's (2009) assertion that changes to place are not always disruptive but may actually enhance place attachment "in situations of good 'fit' between symbolic meanings associated with both place and project" (Devine-Wright, 2011, p. 341).

Taken together, this scholarship linking place attachment and opposition to proposed projects highlights the need to consider how parties *frame* place attachments when opposing (or supporting) a landscape-altering project. As such, this study asks the following research questions:

RQ 2: To what extent does a formal organizational (i.e., USFS) comment/objection process contribute to intractability?

RQ 3: How do parties communicate place attachments when framing their perspective (e.g., opposition, support) of a planned landscape disruption (i.e., Forsythe II)?

Objective 2: Facilitate Outreach Between Land Managers and the Public.

The final practical question we explored with this project (see Table 1) was: *What are potential openings for dialogue and consensus regarding contrasting definitions of a "resilient landscape"?* This project sought to foster outreach between land managers and the public through conducting a *workshop* and developing a WUI *neighbor-to-neighbor conversation guide*. However, these final deliverables reflect some evolution from the initial proposal. The original proposal called for a *data visualization* depicting different visual definitions of a "resilient landscape," which was slated to be shown at a *workshop* for the purpose of generating dialogue between USFS land managers and the public. However, our qualitative data collection process revealed that the conflict between the USFS and Nederland residents who opposed Forsythe II was entrenched to the extent that bringing these parties together on this specific issue was not likely to generate any new lines of argument or consensus. Rather, we found that parties already understood the other side's perspective. Further, we anticipated that the visualization and workshop deliverables, as initially envisioned, might worsen the polarity regarding Forsythe II.

To fulfill Objective 2, we partnered with the University of Colorado at Boulder Center for Sustainable Landscapes and Communities to conduct a *workshop* ("Preparing Today's Boulder Forests for Tomorrow's Wildfires") targeted toward Boulder, CO WUI residents and focused generally on themes of landscape resilience, wildfire preparedness, defensible space, and fuel treatments. Panel participants included Boulder city wildland firefighters and county open space land managers, Boulder County Wildfire Partners, and residents whose properties were impacted by recent wildfires. The workshop explored a set of issues parallel to what we observed in Nederland related to Forsythe II. Specifically, this event allowed us to gauge how Boulder WUI resident's sense of bonding to their WUI as a meaningful landscape was potentially connected with their openness toward creating defensible space on their property, and their levels of support and understanding about fuel treatment on adjacent city, county, federal lands, and home owner association (HOA) common areas.

The workshop and qualitative data collection process made salient the importance of neighbors in helping to form WUI residents' knowledge and opinions about fuel treatments and defensible space. This observation echoes findings by Brenkert-Smith (2010) that residents are more likely to perform property fuel mitigation if they've talked with a neighbor about it. Following these insights, we developed a *neighbor-to-neighbor conversation guide*, which provides general information about defensible space and fuel treatments, highlights common reasons why one's neighbors might be opposed to reducing fuels on and adjacent to their property, and provides listening and conversation strategies and talking points residents can draw from when talking to their neighbors about wildfire preparedness in the WUI.

Phase 1 Qualitative Study: Stakeholders' Definitions for a "Resilient" Landscape

This applied case study used a mixed methods design. Mixed methods research combines qualitative and quantitative methods to understand a phenomenon more completely than a single method allows (Greene, Caracelli, & Graham, 1989; Johnson & Onwuegbuzie, 2004). Mixing methods serves such purposes as enhancing convergent validity of findings, counteracting biases, and overcoming limitations in one method by supplementing it with another (Myers, 2014). Phase 1 employed qualitative methods (e.g., observation, interviews), while Phase 2 used quantitative survey methods.

Phase 1 Methods

Qualitative Data Collection

We gathered field notes and other documentation (e.g., meeting summaries, PowerPoint slides) from 21 public meetings taking place over three years regarding Forsythe II. The research team took handwritten field notes during each meeting we attended, typed our individual notes shortly after, and shared them with each other in a common folder. These data comprise over 100 pages of single-paced documents and notes in addition to five multi-slide PowerPoint presentations.

To unpack themes we observed in the public meetings and associated documents, and to probe for depth, we conducted follow-up individual and group interviews. Group interviews included a mix of participants who opposed and supported Forsythe II. We conducted four group interviews (including 3-5 participants each) with $n = 19$ participants. Group interviews allow for insights cued through interaction. However, while some participants might speak candidly with their peers, others might find it uncomfortable to freely express themselves in a group. We also conducted individual interviews with $n = 12$ residents who preferred to privately express their views, and/or to accommodate their schedules. The interview protocol asked residents to speak about: (a) their attachment to the physical landscape and its uniqueness (if any), (b) how they viewed the health of the forest, (c) what USFS's role should be in managing the land, (d) their 'social values' of living in the WUI (i.e., special or intangible qualities of living there), and (e) their expectations for firefighter response if a wildland fire occurred. This project received human subjects approval. We obtained informed consent before conducting all interviews. Interviews were recorded and lasted 45–120 minutes, although group interviews were typically

longer due to including more participants. Interview audio was transcribed into 340 single spaced pages.

Table 3. Timeline of Events Related to Forsythe II and Data Collection

Date	Event	Details
Dec. 2014 & Apr. 2015	Forsythe II Field Trips	USFS hosts informational fieldtrips with the public to proposed Forsythe II treatment sites
Sep.-Oct. 2015	Forsythe II 30-day project scoping period	USFS sent postcards to the nearly 2000 neighboring residents near F2 treatment areas; announcements made through news and social media; open house and field trip hosted by USFS during this time
Nov. 2015	Researcher workshop	Title: "Fire severity in lower vs upper montane forest wildfire regimes"
Dec. 2015-Jan. 2016	Public Comment Period	Members of the public were able to send comments about Forsythe II to the USFS Boulder Ranger District
Jan. 2016	**Meeting 1**	01/11/2016 USFS info session on F2 at Nederland community center
Jul. 2016	Cold Springs Fire	The wildfire threatened Nederland – July 7-14th, 2016; burned 528 acres, 8 homes destroyed/$2.43 million in damage; 2000 people and large animals evacuated; cause: illegal campfire
Oct. 2016	**Meeting 2**	10/15/2016 Researcher outreach workshop regarding Cold Springs Fire
Nov. 2016	Environmental Assessment	USFS releases Forsythe II Environmental Assessment
Dec. 2016	**Meeting 3**	12/13/2016 USFS information session at Boulder RD
Feb. 2017	**Meeting 4**	02/03/2017 Objector resolution meeting: USFS regional, forest, and district representatives engaged in mediated discussion with primarily residents opposed to Forsythe II including representing Magnolia Forest Group (MFG), and miscellaneous individuals
Feb.-Apr. 2017	**Interviews**	**Group and Individual Interviews.**
Jul. 2017	Updated Forsythe II Plan	Forsythe II updated project released--Project update took resident feedback into account
Sep. 2017	**Meeting 5**	09/20/2017 Colorado Forest Restoration Institute (Colorado State University) begins a Multi-Party Monitoring Group between the USFS and MFG
Sep.-Nov. 2017	**Survey**	**Census survey administered in 80466 zipcode**
Oct. 2017	Multi-Party Monitoring (MMG) begins	CFRI hires external trained facilitator to run the MMG; meetings and fieldtrips ongoing approximately monthly from October 2017 to present.
	Meeting 6	10/17/2017 Nederland Board of trustees meeting discusses Forsythe II implementation timeline and community member views on it
	Meeting 7	10/28/2017 MMG field trip to Gross Reservoir
Nov. 2017	**Meeting 8**	11/20/2017 MMG meeting
Dec. 2017	**Meeting 9**	12/09/2017 MMG field trip to West Magnolia
Feb. 2018	**Meeting 10**	2/21/2018 MMG meeting
Mar. 2018-August 2019	**Documented Meetings 11-21**	Analysis of documentation from MMG meetings ongoing approximately monthly

Note: Observation, interview, and survey data collection events in bold-faced type.

Qualitative Data Analysis

Observation and interview data were qualitatively analyzed for the various dimensions of "resilient" and not resilient landscapes. We analyzed data using an iterative process of working back and forth between theory and emerging findings from the data (Tracy, 2013). We employed primary-cycle coding, leading to a codebook. We read the transcripts line by line, labeling what

people talked about regarding the physical landscapes and land management decisions. We then read meeting fieldnotes and other documentation to capture broader themes and look for connections with interview data. After that, we used secondary-cycle coding, which involves organizing the primary codes into interpretive concepts (Tracy, 2013). We used both *deductive codes*, which we derived from theory and research, and *inductive codes*, which emerged from the data (Hennink, Hutter, and Bailey, 2011).

Phase 1 Results

This project produced two related sets of findings. The first set of findings pertains to parties' definitions for a "resilient landscape." These findings are grounded in literature on conflict frames and illustrate the sets of issues that comprise two contrasting understandings for resilient landscapes that came into focus throughout the meetings between the USFS and Nederland area residents, and in the interviews. The second set of findings is grounded in the place attachment literature, and examines how the USFS public comment process appeared to fall short in allowing place attachment concerns to be recognized as legitimate, possibly contributing to intractability between the USFS and opposition by the Magnolia Forest Group.

Defining a "Resilient" WUI Landscape (RQ 1)

The first research question asked (a) how different parties define a "resilient landscape," and (b) how aspects of physical landscapes inscribe meaning contributing to one's understanding of a "resilient landscape." Overall, we found two dominant definitions for a "resilient landscape." Possibly because we centered this study on the Forsythe II fuel treatment, the major differentiation between definitions of resilient landscapes was whether one opposed or supported Forsythe II. Definitions for a "resilient landscape" differed based on three sets of understandings about *resilience*, *wildfire risk*, and participants' experiences with specific fuel treatment landscapes (*spatio-temporal frames*).

Table 4. Phase 1 - Framing "Resilient Landscapes" based on Opposition vs. Support for Forsythe II

Opposition to Forsythe II	Support for Forsythe II
Resilience frames	
"Resilient"= Landscapes are left alone	*"Resilient"= Lands managed for human needs*
Maintain landscape status quo	Adapt to new circumstances
Keep all trees	Cut trees to slow large fires
Cutting trees reduces resilience	Humans need to adapt to climate change
Wildfire Risk frames	
Accept wildfire risk	Protect against wildfire risks
Social orientation: Individual values	Social orientation: Collective values
Wildfires are beyond human control	Wildfires require proactive land management
Responsibility for individual safety	Communities need to protect citizens
Spatio-temporal frames	
Temporal orientation: Retrospective	Temporal orientation: Prospective/Future focus
Past fuel treatments are evidence of:	Past fuel treatments are evidence of:
Violated expectations	Landscape resilience
Degradation and loss	Community safety
Prior mistakes	

Resilience frames. For those who opposed Forsythe II, resilience meant leaving the landscape alone or maintaining the status quo, including keeping all or most of the trees intact. Participants contended that removing trees from the landscape reduced the resilience of the area, either because they felt it was the "wrong" ecological prescription, or because they thought it would worsen the effects of climate change.

For those who supported Forsythe II, resilience meant that WUI lands were managed to account for human needs. In particular, they argued that WUI areas especially need to adapt to new environmental circumstances either due to human habitation in those areas or due to climate change. These residents generally supported some level of tree removal to facilitate creating areas to stage firefighting resources, or slow a large fire's advancement.

Table 5. Phase 1 - Exemplary Quotes Showing Resilience Frames

Opposition to Forsythe II *Resilience= Leave landscape alone*		**Support for Forsythe II** *Resilience = Adapt Land to human needs*	
Maintain Status quo (SQ), keep trees	Jonas: The woods is part of you…It's part of your soul in every breath that you experience, and that is worth preserving. Edna: And people come from all over the world, really. They come to [these mountains]. They come to Nederland to see the trees. They want trees	Adapt SQ, cut some trees	Val (public forum): "We all like our tree-lined road. But we need a new paradigm for what it means to live *here*. With fire."
Cutting trees reduces resilience	Brett: One of the biggest issues with climate change, is our deforestation of the planet, and it's happening all over the Earth. It happens in your community. Wherever you happen to live, that's where that's happening. It's happening all over the planet and I look at this Forsythe II project as a big chunk of deforestation. That's all I can see it as and that's our carbon sink, and we're destroying a carbon sink.	Cutting trees can enhance resilience	Will: But, if we're going to live here, then we have to do something to compensate for the lack of fire. So we have to do something to restore the health of the forest. So these forests that are not allowed to burn, they're overly dense. They create an incredible fire danger for the homes in the area. They're not healthy for wildlife. And yeah, they look pretty, and a lot of us moved up here because it was pretty and we loved it, but I think we have to get used to a different regime.

Risk Frames. Interviewees who opposed Forsythe II often rebutted the common argument that fuel treatments were important for wildfire safety. These participants insisted that they accepted *individual* responsibility for assuming the wildfire risks inherent to living in a WUI area. They expressed a perspective that large wildfires were beyond human control, and that *instead of* land management agencies conducting fuel treatments on public lands, WUI residents should make sure to conduct fuel mitigation on private property. It is important to emphasize the individualist-orientation of this frame, as residents generally considered that wildfire risks should be borne by individual property owners.

Interviewees who supported Forsythe II took on a collectivist orientation toward the issue of wildfire risk. They argued that fuel treatments were a preventative measure against large wildfires gaining momentum in the WUI. Moreover, these participants felt that fuel treatments helped communities fulfill a commitment to protect residents from a large-scale fire. Toward that end, these interviewees viewed the USFS as a necessary partner that could help the community conduct a large-scale fuel treatment project beyond the scope of what the town of Nederland could conduct for itself.

Table 6. Phase 1 - Exemplary Quotes Showing Wildfire Risk Frames

Opposition to Forsythe II *Accept Wildfire Risks*		**Support for Forsythe II** *Protect Against Wildfire Risks*	
Accept wildfire risk	Rod: You're asking us about the wildland urban interface, which is I think is why we want to live here, why I want to live here. To be part of nature... You got to understand that it comes with risks, forest fires are a part of this risk.	Protect against wildfire risk	Laura: I feel like that's just negligence--to not try [to mitigate fire risks for the community with Forsythe II]. We choose to live here, these are the conditions that I accept. Would I rather it be all forested and there's no fires? Yeah. But we have to think about the community.
Individual responsibility for wildfire safety	Anne: We all understand that there's a risk that we might lose our home to fire. We're prepared for that. We don't live in a forest without understanding that forest fires come through, and they could burn your house down. No matter how good your home defensible space is, you might still lose your house. I hope nobody's counting on firefighters ... I don't think that they really are at this point, that no, if a forest fire comes through the fire, firefighters are going to come and protect my house. No. People don't think that.	Collective responsibility for wildfire safety	Justin: I'm in support of the work the USFS is doing with Forsythe II because the goal of the treatments is to enhance public safety. These fuel treatments create places to stage resources; they make a difference in slowing down the fire; and they set the stage for firefighting resources to actually make a difference. They are necessary because in a WUI area, the forest can't be left to manage itself.
Addressing wildfire risks for one's property	Jerry: There are going to be fires. … There's no fire mitigation that's going to stop that from happening if there's a terrible combination of weather conditions and so on, that is a possibility. Your only hope then is your mitigation around your home so the home just doesn't burn when a fire sweeps through. I think we should leave the rest of the forest as it is.	Addressing wildfire risks for the community	Erik: We need to find that compromise and work together because if we do have a catastrophic fire, something that starts on the west and roars through town…I'm not sure we'd recover from it. Not only would we lose the forest that we all love, the area that we love, we might lose the entire community we love up here. So finding that balance is why we keep having meetings about Forsythe II.

Spatio-temporal frames. Spatial frames served as anchors for meaning. Residents frequently mentioned two specific fuel-0treated landscapes to justify their opposition or support toward Forsythe II. Those who opposed the project often invoked the Forsythe I fuel treatment site as an example of why the slated fuel treatment should not proceed, while residents supporting Forsythe II frequently invoked the Sugarloaf 151 fuel treatment site as a reason why the slated treatment was necessary and desirable. Although these physical landscapes both were fuel treatment sites, they appeared to inscribe different sets of personal meanings and enacted experiences (i.e., place attachments). That is, each site anchored sentiments of opposition or support for Forsythe II differently.

Interviewees who opposed Forsythe II viewed previous fuel treatment sites, particularly the Forsythe I clearcut, as evidence of what fuel treatments look like generally. Importantly, these participants inscribed previously treated landscapes with undesirable memories of violated expectations about the scale and final aesthetics of the treatment, an overwhelming sense of degradation and loss, and impressions about what they considered to be land management mistakes. These frames were retrospectively focused on activities that occurred in the past on specific landscapes, and created an impression of what these residents expected future fuel treatments to look like.

Interviewees who supported Forsythe II viewed previously treated sites, particularly the Sugarloaf 151 treatment, as evidence of the usefulness of fuel treatments for protecting their community against wildfire threats. The Sugarloaf 151 fuel treatment played a role in stopping the 2016 Cold Springs Fire, which threatened Nederland. These residents associated positive meanings with the Sugarloaf 151 fuel treatment site, and they extended this positive view to their expectations about the Forsythe II treatment. Overall, these participants showed a prospective (rather than retrospective) temporal orientation toward fuel treatments, emphasizing that Forsythe II was important for enhancing wildfire and ecosystem resilience, and enhancing community safety in the face of eventual catastrophic wildfires.

Table 7. Phase 1 - Exemplary Quotes Showing Spatio-Temporal Frames

Opposition to Forsythe II *Retrospectively focused*		**Support for Forsythe II** *Future focused*	
Violated expectations	Jake: [Forsythe I] isn't attractive to look at, it doesn't make it desirable to hike back there anymore, but that's how [the USFS] chose to do it. Anne: We'd hike those trails almost on a daily basis, even if it was raining or..heavy snow, we would..enjoy being out in nature….That was hugely important to us. Part of that has been taken away [by Forsythe I]	Community safety	Justin: I'm in support of Forsythe II because the goal of the treatments is to enhance public safety…[Fuel treatments] are necessary because in a WUI area, the forest can't be left to manage itself. We have to actively manage it because we are living in it, and interfering with its ability to let natural processes take place. We have to make decisions about it so we can make sure people who live here are safe.
Degradation & loss	Katherine: I feel literal grief at the loss of this forest every day. I understand the scientific perspective, but it's something different for me, living [near] this beautiful forest. It's now gone [due to Forsythe I], and, I think, unnecessarily.	Resilience	Will: [Forsythe II is] encouraging wildlife and just making a healthier forest…I can see West Magnolia in five years, and it's gorgeous, as opposed to just seeing a wasteland. Erik: [Since Forsythe I] you go up into West Magnolia, and you have the little ponds, surrounded by some forest, the big aspen groves that are now coming back, the open meadows, the views, the diversity of it, where you can actually experience different, almost mini-ecosystems in one hike.
Prior mistakes	Jerry: I'm very nervous about [Forsythe II] because what we saw in Forsythe I … was that the contractors didn't do what the [fuel treatment plan] specified. And all kinds of things were done wrong. So I don't have a lot of faith that, even if we got [what we asked for] from the Forest Service, that it would actually happen [as planned]. So, my preference would be to let the forest do its thing.	Empathy toward opposition views	Jill: a big concern of people is just they saw what they did a few years ago on Magnolia [the Forsythe I treatment], and many people were very upset by that. I was, too. […] The thing is, [a firefighter] explained to me, "this is a staging area where we can put our crew and keep them safe in there." Then it made more sense, what they did. I think I kind of accept that a little bit more [after that conversation].

Expressing Place Attachment in a Public Comment Process Privileging Scientific Arguments (RQ 2, RQ 3)

The second research question asked what formal opportunities existed for publics to communicate their place attachment concerns to the US Forest Service. The USFS formal process for managing public input on federal land treatment projects involved a mix of public outreach and education activities, a public comment period, a USFS official response to comments, and release of the final treatment plan to be implemented. All of these activities took place in the early stages of the Forsythe II project (Table 3). In addition to the formal public outreach activities, the Forsythe II project included opportunities for public and land manager interaction, including an objector resolution meeting, and educational workshops hosted by scientists from University of Colorado at Boulder and Colorado State University. Throughout the unfolding conflict between the USFS and Magnolia Forest Group (MFG), we observed that MFG members invoked both manifest (explicitly stated) and latent (not explicitly stated) expressions of place attachment in justifying their objections to Forsythe II.

Manifest expressions of place attachment. Since the beginning of the conflict, MFG members called on the USFS to recognize that the landscapes slated for vegetation treatment under Forsythe II held unique "social values" for nearby residents. It is beyond the scope of this study to detail all of MFG's alternative recommendations. However, it is worth noting that one theme unites all of MFG's recommendations: an emphasis on maintaining the status quo by eliminating or, at least, limiting disruptions to the landscape. At a USFS informational session held January 11, 2016 (Meeting 1), MFG residents critiqued the Forsythe II plan for failing to consider the "social components" of the areas slated for treatment. Around that same time, a handful of the $N = 374$ submitted public comments directly discussed the "social values" of the area ($n = 17$), making the case that the landscape should be preserved as-is rather than treated by removing trees. Public comments argued that Forsythe II should place "more importance on scenic and social values, wildlife habitat, as well as preserving future old growth [timber]" (Comment 363, January 17, 2016). It should be noted that many of the public comment letters mentioning social values stated common points using identical or nearly-identical wording that appeared to have been copied and pasted from a list of talking points distributed among MFG members. One MFG commenter (Comment 51, January 15, 2017) elaborated on social values as follows:

> "On the destruction of social values, the project is within the "Wildland Urban Interface" or "WUI." But the "urban" quality continues to be ignored, i.e., the impact on the human population living in this wildland and/or using it for recreation, rest, revitalization, etc…. [Forsythe II] destroys the beauty and recreational value of those lands for many decades, or even a century or more. Given our contemporary social ills: mass shootings, youth addiction to heroin and painkillers, road rage, etc., planning to "treat" an environment of such importance to the physical, mental, and emotional health of the community without any analysis of the "treatment's" social impact shows a stunning lack of attention to human life and well-being."

The above excerpt echoes Devine-Wright's (2011) notion that a NIMBY response might come about due to a perception that a project is a poor symbolic "fit" for a particular landscape, especially when the landscape will be altered in ways that change how residents connect meaningfully to the space. Specifically, the comment alludes to a poor fit by emphasizing that the "urban" aspect of the particular *wildland urban interface* area was not taken into account.

That is, what made the landscape, for residents, a meaningful wild landscape was how they used it to fulfill quintessentially human desires (i.e., "recreation, rest, revitalization," "attention to human life and well-being"). These human-centric uses stood in competition with land management practices emphasizing the "wildland" aspect of the term *wildland urban interface*, as this commenter expressed concern that the wildland needs were prioritized over human uses of the landscape.

The mention of "social values" was again focal in a USFS information session held at the Boulder Ranger District office almost a year later (Meeting 3, December 13, 2016). According to field notes, residents objected to Forsythe II because they felt the project would destroy forests they saw as being an extension of their "backyard." The most striking emphasis on social values came at the mid-point of a 4-hour mediated objector resolution meeting (Meeting 4, February 2, 2017). After spending two hours facilitating a conversation between MFG members (and other publics opposed to Forsythe II) and the USFS representatives at District- Forest- and Regional Office-levels, the mediator summed up what residents stated were their priorities moving forward. According to field notes, the mediator wrote on a whiteboard residents' requested changes to the Forsythe II plan (e.g., larger buffer zones between private property and treated areas, reducing the number of acres treated, retaining larger/older trees). After completing the list of everything residents requested, the facilitator asked, "does this list capture the changes people want to see?" The reply was a resounding "NO!" called out in unison from most of the 30+ attendees. A male attendee yelled out, "That's the minutiae—it's not the real issue!" There were several vocalizations around the room supporting his statement. Through the ensuing conversation, it became clear that the social values were the "real issue," and even the residents' proposed changes to the Forsythe II plan (i.e., "the minutiae") were not going to be enough to maintain the status quo aesthetics and current symbolic uses of the landscape.

In several exchanges residents expressed concerns about "social values," but the USFS often answered with a scientific or ecological justification for the proposed actions, failing to directly acknowledge the social values component of the question. Invoking a science-based justification for land treatment project is to be expected from the USFS, however, what appeared to be important in this case was that MFG residents felt that their "social values" concerns were not being directly addressed, which over time amplified their frustration and distrust for the USFS. For instance, in Meeting 1, a USFS representative justified that Forsythe II was an appropriate treatment given the ecosystem and typical wildfire behavior (i.e., fire regime), and that certain tree removal methods were chosen due to low cost. In Meeting 2, interagency wildland firefighters and other local responders attempted a wildfire safety argument, explaining that their successful suppression of the timely Cold Springs fire, which threatened Nederland in the midst of this ongoing conflict, was due to existing fuel treatment areas that offered a strategic advantage for wildland firefighters, and that Forsythe II would offer a similar strategic advantage for future catastrophic fires. In Meeting 3, USFS representatives, when pressed about the scientific basis of the project, reassured residents that they were indeed taking the appropriate scientific studies into account in justifying Forsythe II fuel treatments. The crux of the intractability appeared to lie in how the USFS responded to MFG's "social values" concerns early in the formal comment process, which set the stage for future dysfunctional communication between parties. During the first 4 meetings, mentions of social values were countered with USFS representatives justifying that Forsythe II was ecologically sound according to various scientific sources, and that the plan made strategic sense from a wildland firefighting vantage point. Further, in Meeting 4 (the mediated objector resolution meeting), USFS representatives

sought to identify specific changes they could make to the Forsythe II plan. However, while MFG members proposed concrete changes to minimize impact on socially-valued areas, they appeared upset that the conversation did not explicitly address the "social values" of the slated treatment areas.

It is important to note that invoking land management best practices and ecological science-based justifications for Forsythe II fit the genre of the USFS' formal public comment process. This process was intended to both inform the public, and to assist in revising the plan if a treatment approach was incorrect according to the best available science. That is, the purpose of the scoping and public comment periods was to present a plan and justify it with science, and if needed, revise the plan if the science turned out to be wrong. Therefore, the public comment process was centered on scientific justifications for what land management techniques were appropriate for a landscape. An important consequence of the scientific slant of this formal process was that it did not provide openings in which publics could discuss "social values" in a way that allowed these symbolic concerns to be recognized as legitimate. Given this insight, the second research question addresses how opposing publics, namely MFG, communicated place attachment—specifically, talk of social values--through ways they *framed* their opposition to Forsythe II during later public meetings, once they realized that directly mentioning "social values" was not having the results they might have hoped it would.

Latent expressions of place attachment. The third research question asked: how do parties communicate place attachments when framing their perspective (e.g., opposition, support) of a planned landscape disruption? As the previous section said, residents opposed to Forsythe II directly (i.e., manifestly) expressed their place attachment concerns early in their conversations with the USFS regarding Forsythe II. However, they felt these "social values" concerns were not heard. Rather, the USFS invoked scientific prescription, ecological resilience, and wildfire safety as reason why the Forsythe II project needed to move forward. Following from these early interactions with the USFS, MFG members adapted their arguments against Forsythe II by mirroring and refuting the USFS arguments based on scientific prescription, ecological resilience, and wildfire safety. In effect, MFG's overall goal of maintaining the status quo of the landscape never changed, but the way they advocated their place attachment ("social values") concerns did. Rather than mention social values explicitly, MFG members raised these concerns in a latent manner through *masking* their place attachments as science-based concerns, and *ignoring concessions* from the USFS. These latent expressions of place attachment seemed to heighten intractability regarding Forsythe II.

Masking place attachment. The first communication strategy for subsuming place attachment under other conflict frames occurred when MFG members *masked* place attachment. Masking place attachment involved proposing the desired outcome (i.e., maintaining the status quo), and justifying the proposal by invoking resources deemed legitimate within the comment process genre (i.e., scientific studies supporting the position) rather than stating the justification directly. This type of communicative move was grounded in *fact-finding* frames (Davis & Lewicki, 2003), which pertain to ways that technical information or expertise factor into conflicts, especially as parties negotiate whose expertise is deemed trustworthy or acceptable (Kaufman et al., 2003). MFG members masked place attachment using several lines of argument. This group of residents sought to maintain the status quo, and to advance that argument, they invoked scientific studies in ways that allowed them to make such an argument without having to mention "social values" directly.

A particularly prevalent example of using a fact-finding frame to mask place attachment or "social values" was MFG members' argument that the Forsythe II project applied the "wrong" ecological prescription to the landscape. Field notes from both Meetings 1 and 4 noted that MFG members insisted that the Forsythe II project was based on scientific recommendations for a "lower montane" ecosystem, when in fact (they argued), the area in question was an "upper montane" ecosystem requiring a different, much less extreme suite of land management techniques. In Meeting 1, one MFG member said, "This project has been cast as a 'restoration' project. But what we (MFG) see is you (USFS) trying to take an upper montane forest and reduce it to a lower montane forest. How can you call that 'restoration'?" The USFS silviculturist replied, "That is not entirely what we are trying to do. We are treating the area for lodgepole pine [a specific tree species that burns in an especially destructive manner]. That means we have to put larger breaks [openings] in the [timber] stand to stop the spread of fire [toward homes]." This fact-finding frame that the USFS was using the "wrong ecological prescription" was picked up in subsequent public meetings and became a focal point in an alternative fuel treatment plan that the MFG members wrote and requested that the USFS implement instead of Forsythe II. Importantly, what made this "wrong prescription" line of argument—namely, embedding place attachment within a fact-finding frame--an example of *masking* place attachment was that the alternatives proposed would result in altering the landscape to a much lesser extent. In effect, none of the MFG recommendations for the USFS invoked science in such a way as to increase changes to the landscape.

Ignoring concessions. The second communication move that subsumed place attachment concerns under other conflict frames was through *ignoring concessions*. Ignoring concessions involved a refusal to acknowledge that another party had made *any* concessions on an issue because that party had not made *all* requested concessions. Ignoring concessions was based on *social control* frames, which pertain to how parties make decisions about an issue, particularly who has jurisdiction over the issue and potential paths for resolution, and the extent to which parties feel they are able to influence outcomes (Peterson, 2003; Shmueli, 2006). In this case, MFG residents appeared to perceive they were in a less powerful position relative to the USFS, and they declined to recognize ways that the USFS had changed the Forsythe II plan in their favor. Declining to accept USFS concessions, in effect, put the USFS in a position to find a new path for resolution due to their jurisdiction over Forsythe II and thus their ability to make changes. This approach was apparent in an exchange between an MFG member and the USFS District Ranger (Meeting 1):

> MFG member: I have seen no sign of concession on this [updated Forsythe II plan].
>
> USFS District Ranger: We worked diligently to incorporate your feedback.
>
> MFG member: You say that. But the maps are the same, the units look the same, the 'recipe' for what each area is going to look like is the same.

MFG members subsumed their expression of place attachment under a *social control* frame. In particular, the USFS made several significant changes to the Forsythe II plan that reduced impact to the landscape. However, MFG members leveraged their less-powerful position in the conflict through their rejection that the USFS had made concessions at all, much less adequate ones. This approach of *ignoring concessions* turned the conversation into a zero-sum endeavor for MFG members who appeared interested in 'small wins' because it might further diminish their bargaining position with a more powerful party (see also Shmueli, 2006).

In sum, these latent expressions of place attachment—masking, and ignoring concessions—discredited the USFS personnel's expertise and the agency's science-based

justifications for Forsythe II, which had the overall effect of intensifying the intractability between parties. However, it can be argued equally that these communicative approaches emerged in the first place because the standard USFS comment process did not lend legitimacy to "social values" (place attachment-related) concerns. We flag this deficiency in the USFS public comment process as a potential hurdle in other WUI-located land treatment efforts. We suggest that land management agencies consider revising the public comment process so that it lends legitimacy to place-based, or "social values," concerns tied to meaningful WUI landscapes.

Phase 2 Quantitative Study: Follow-up Survey

Phase 2 Methods

Quantitative Data Collection

We initiated survey data collection to all households in the 80466 zip code at the end of September 2017 (See details in Table 8). Invitation letters with a two-dollar token of appreciation (Brenkert-Smith, Dickenson, & Flores, 2018) were mailed to 2171 households on 24 September 2017. This letter introduced the study and invited residents to participate in the survey online. The initial letter was co-signed by representatives from a range of organizations in the hopes of ensuring broad public participation. Co-signers included the project manager of Boulder County Wildfire Partners, the Chief of the Nederland Fire Department, the Mayor of the Town of Nederland, and the leader of the most vocal, local opposition group, the Magnolia Forest Group.

On 19 October 2017, after having culled bad addresses (274) and early respondents (134) from the list, a second mailing was sent to 1763 residents. This time, the mailing was a packet that included a slightly modified cover letter with the same signatories, a paper survey, and a postage-paid return envelope. A second survey packet with, again, a slightly modified cover letter with the same signatories was mailed on 9 November 2017 to those who had yet to respond (1576). A final mailing was conducted on 21 November 2017, for which half the remaining non-respondents were mailed a letter and with the weblink (685) and the other half of the non-respondents were mailed a letter with a weblink, along with a paper survey and return envelope (685). A total of 637 households are represented in the response, an approximately 33.5% response rate. Well over half (63.11%) were conducted via a web-based survey, while 36.89% completed the survey with a traditional mail-in paper survey.

Table 8. Phase 2 Census Survey - Mailing Strategy to Every Household in 80466 Zipcode

	Dates	Numbers Mailed
Initial letter – web link + $2 incentive	9/24/2017	2171 (1897 delivered)
Packet 1 – survey packet & web link	10/19/2017	1763
Packet 2 – survey packet & web link	11/9/2017	1576
Final mailing A – web link	11/21/2017	685
Final mailing B – survey packet & web link	11/21/2017	685

Quantitative Data Analysis

The main goal of the quantitative portion of the study was to determine the extent of support or opposition among community members residing in the vicinity of Forsythe II. We first ran a battery of descriptive statistics to understand overall support and opposition to Forsythe II and other fuel treatment activities. We then conducted deeper analysis of the data using logistic regression and stepwise regression approaches. Specifically, we used the statistical package R v. 3.5.2 (R Core Team, 2018), to determine the survey variables most associated with 1) having an opinion on the Forsythe II project and 2) the level of support for the Forsythe II project for those who had an opinion. For 1) we fit a logistic regression to predict the presence/absence of an opinion and used forward and backward stepwise regression to choose our final model based on which in the series of candidate models had the lowest Bayesian Information Criterion (BIC). BIC evaluates how well the independent variables explain the dependent variable, but subtracts a penalty for the total number of variables in the model (Venables & Ripley, 2002). For 2), we fit a multiple linear regression to predict the level of support and used forward and backward stepwise regression to arrive at our final model as described in the Phase 2 Results section.

Phase 2 Results

Support for Forsythe II Outweighed Opposition

Since the primary objective of the household survey was to determine the extent of support or opposition among community members residing in the vicinity of Forsythe II, we first describe the respondents. The vast majority of respondents (94%) are full-time residents, occupying their home 12 months of the year, and 88% own their own home. Almost a third (31%) of respondents are long-time residents, having moved to their current residence before 1998. Importantly, almost a quarter (24%) arrived between 2013 - 2017 while the remaining 45% are spread relatively evenly across the years between 1998 and 2012.

Table 9. Phase 2 -How do the following activities contribute to making the WUI safe for human habitation?

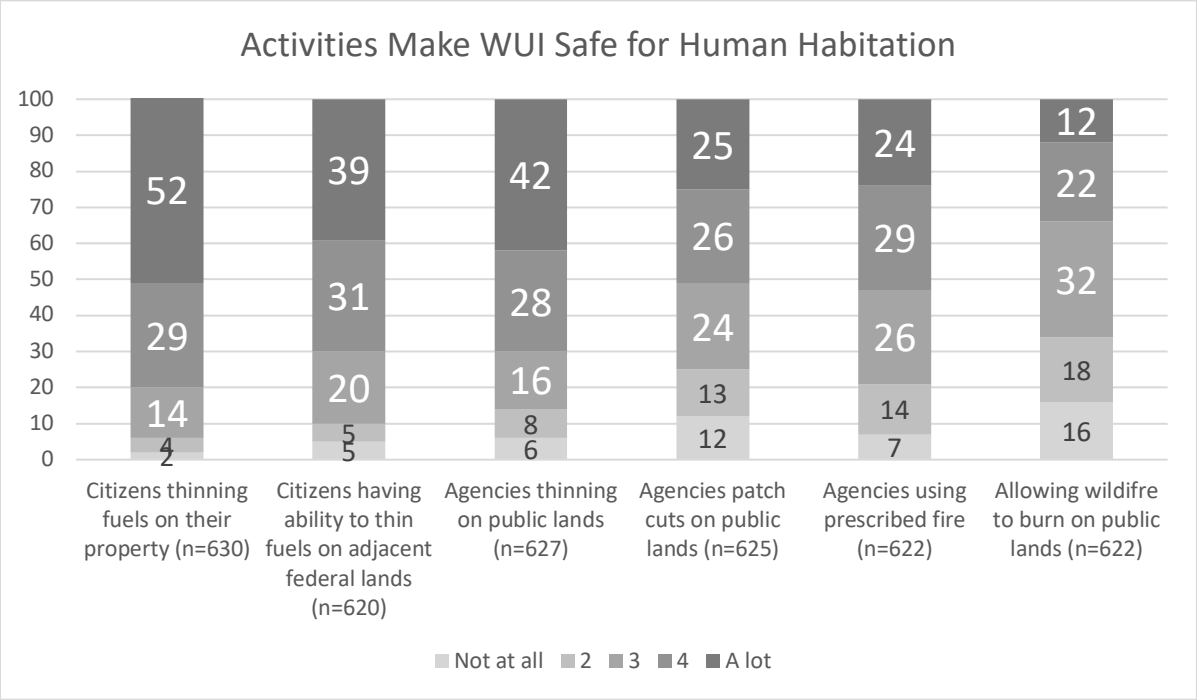
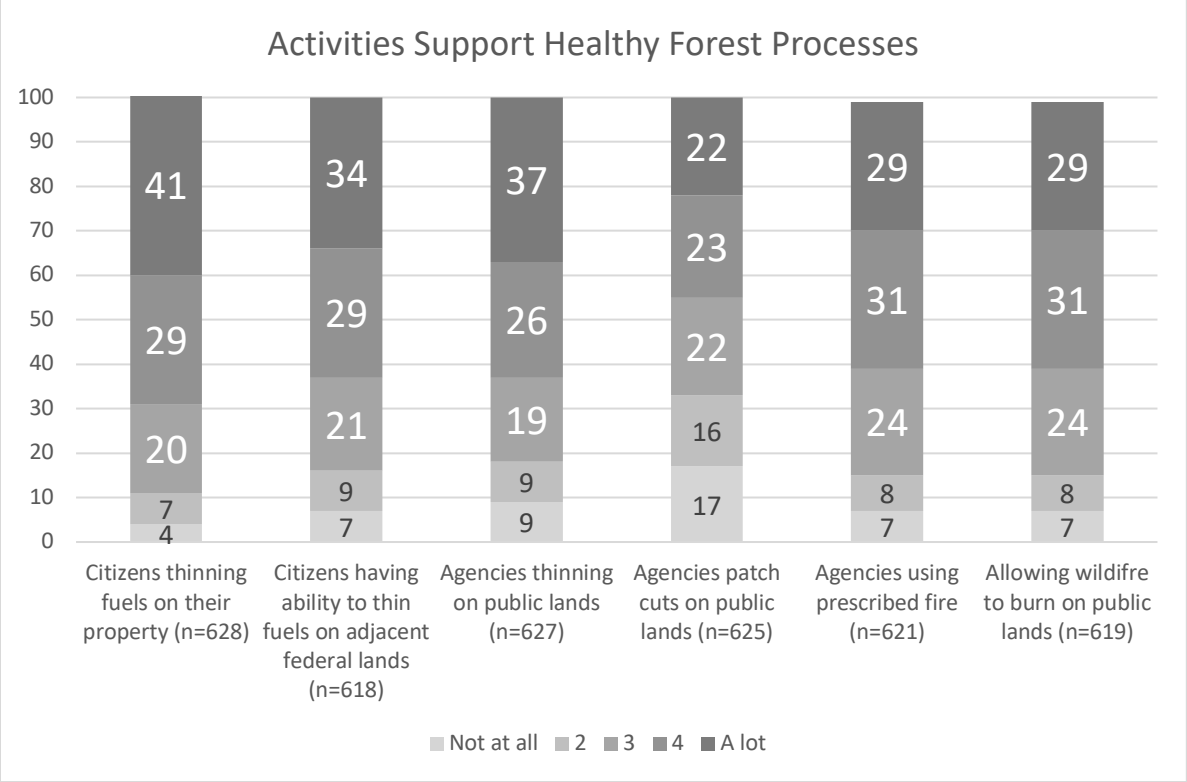


Table 10. Phase 2 - How do the following activities support what you understand to be healthy forest processes?



NOTE: Two of the bars do not sum to 100 due to rounding.

When asked specifically about the Forsythe II project, we see nearly a third (31%) of the survey respondents report support or strong support. We see that just over a quarter (27%) oppose or strongly oppose the project. Notably, a comparable portion (28%) report either not being sure of their opinion or not knowing whether or not they support the project. Also of note, just over a fifth (14%) who responded selected a neutral position and 11 survey respondents did not answer this question.

Table 11. Phase 2 - Overall support/opposition to Forsythe II (n=626)

	Number of respondents	*Percent of respondents*
Strongly support	87	14%
Support	104	17%
Neutral	90	14%
Oppose	76	12%
Strongly Oppose	92	15%
Don't Know	177	28%
Totals	**626**	**100%**

Variables Associated With Having an Opinion About Forsythe II

Next, we consider the fact that notable number of respondents did not report an opinion on the Forsythe II project, having selected the "Don't know/Not sure" category. As such, we ran the first stepwise regression to identify key variable predicting having an opinion. We include all the possible relevant variables in the full model, performing a forward/backward stepwise regression based on BIC to identify a final model that identifies the key variables associated with having any opinion on the Forsythe II project.

We see four key variables associated with having an opinion about the Forsythe II project. First, we see that a respondent's reported length of tenure is associated with having an opinion, with those with longer opinions being more likely to have weighed in with their opinion of the project. We also see one item from the place attachment battery associated with having an opinion: those who more strongly agreed with the statement "The friendships developing by doing various community activities connect me to the public lands surrounding Nederland" were more likely to have an opinion on the fuels work. Two survey questions seeking to gauge views on forest management practices were also associated with having an opinion. Those who agreed that "Allowing wildfire to burn on public land" (Q16_HH) helps make the WUI a place that is safe for human habitation were more likely to have an opinion. While those who agreed that "Land management agencies thinning on public lands to reduce wildfire loss/damage" (Q13_HFP) supports healthy forest processes" were less likely to have an opinion. In other words, those who have an opinion vs. those without reporting an opinion differed on these variables.

After that, we ran a second stepwise regression in order to identify the key variables associated with strength of support/opposition, among those who indicated their level of support on the 5 point Likert scale that ran from 1 "strongly oppose" to 5 "Strongly support" (n=448). In this regression, we see six key variables that determine strength of opinion.

First, we see that the more strongly respondents agree with the statement "When I spend time in the public lands surrounding Nederland, I feel a deep sense of one-ness with the natural environment" (Q4_Dplace4) the less support they report for the Forsythe II project. Next, we see that if respondents report that they anticipate feeling more attachment to the landscape *after* a fuels treatment project, we see that they express more support for the project (Q6_Rx_effect). Then we see four general forest management practice opinion questions associated with support for the project. We see that those who agree that *Land management agencies thinning on public lands to reduce wildfire loss/damage* (Q13_HH) and *Land management agencies implementing patch cuts on public lands in the appropriate forest type to reduce wildfire loss/damage* (Q14_HH) supports making the WUI safe for human habitation indicate stronger support for Forsythe II. Similarly, those who agree that *Land management agencies implementing patch cuts on public lands in the appropriate forest type to reduce wildfire loss/damage* (Q14_HFP) and *Land management agencies managing public land using prescribed fire* (Q15_HFP) supports healthy forest processes indicate stronger support for Forsythe II.

With a strong response rate among residents in the vicinity of the Forsythe II project area, we feel relatively confident that the survey results indicating broad public support for both the overall goals of forest management practices to both make the WUI safe for human habitation and to support healthy forest processes reflect the general sentiments of the residents in the area. We also see from the survey results that despite the vocal opposition to the project, the majority of respondents support the work.

The data also do demonstrate variation among respondents, likely reflecting the views of those who oppose the planned fuel treatments. It appears that the volume of the opposition may be outsized for the extent to which it represents the community as a whole.

Conclusions

Objective 1: Contributions to Theory about Intractable Conflicts

The first objective of this project was to contribute to academic literature on intractable conflicts. This project makes novel contributions by incorporating *place attachment* concerns into conflict frames literature, and it provides additional insights on communication strategies that escalate intractability among parties in an environmental conflict.

Framing Place Attachment

This study contributes a spatial-temporal understanding of frames to the conflict frame literature (Brummans et al., 2008; Davis and Lewicki, 2003; Dewulf et al., 2009). Our study contributes to this work by looking at place attachment, and in doing so, shows how conflict frames are inherently grounded in spatial-temporal meanings (see Shellabarger, et al., 2012 for a similar argument). That is, those who opposed a decision primarily viewed previous vegetation treatments as evidence of harm to the landscape and their attachment to it, whereas those who supported the treatments imagined something different and better for that landscape. Framing repertoires also reflected, particularly, the temporality of their frames with opposers focusing on the past, and supporters focusing on the future. Overall, our study suggests that those who oppose an environmental land management decision have a more varied framing repertoire than those voicing support. This finding supports conclusions from the conflict frames literature that suggest that opposers will expend more effort to fight a project than supporters will expend to

push for its implementation (Shmueli et al., 2006). Our findings extend this work by showing how opposers cultivate a more varied framing repertoire to enhance opposition efforts.

This project also contributes to place attachment literature by combining it with work on conflict frames. Given the recent literature showing a connection between NIMBY activism and place attachment, a further connection with work on conflict frames is a natural fit. In particular, this project suggests that a higher degree of *place dependence* might be associated with opposition toward large-scale land management activities. In particular, the findings suggest that, in an environmental conflict, we might see *place identity* associated with either support or opposition toward an environmental decision. However, we might expect *place dependence* to primarily be associated with opposition toward a land management decision especially if that decision is associated with a loss frame (Devine-Wright, 2009 for similar argument). This claim is based on our opposition findings suggesting that residents who described place dependence seemed to express a narrower range of landscape alterations they found acceptable, and importantly, that narrow range of possibilities aligned with their desire to maintain the status quo.

Moreover, by studying how conflict around a specific fuel treatment project unfolded over a few years, we were able to contribute to place attachment literature by proposing that bonds to a place might be expressed in either a manifest (explicitly stated) or a latent manner (embedded in other lines of argument). This insight is important for land managers because it suggests that they might benefit from advice on how to *listen for* place attachment and other framed concerns (see Objective 2: Implications for Land Management Agencies).

Finally, this project provides a different way to think about residents' risk perceptions in fire-prone areas (Paveglio, et al., 2009). Our study showed that place attachment was grounded in residents' wildfire risk perceptions through illustrating how spatial frames inscribed meaning specifically around what residents perceived that they "risked" losing: Opposers perceived that wildfires were inevitable and beyond human control. They felt they "risked" losing the meaningful places where they lived no matter what—either the vegetation treatment would alter the landscape permanently, or a wildfire would. Therefore, opposers wanted to maintain the status quo as long as possible. In contrast, supporters expressed concerns that they "risked" losing their community to a wildfire, and that vegetation treatments could help avoid such an outcome. These conflicting frames set a trajectory for how residents responded to vegetation management projects. As such, this study provides a different way of conceptualizing and thinking about natural hazards management as a component of broader environmental management dilemmas.

Environmental Conflict Strategies and Intractability

This project provides insights on ways that framing an issue can heighten intractability between parties. Our findings showed that ways MFG members used other frames as a proxy to communicate place attachment appeared to close off dialogue and enhance polarization such that MFG was less receptive to and trusting of the USFS. This finding contributes to other research looking at framing and intractability. Shmueli et al. (2006) described frames functioning as "models of reality that, by necessity, trade detail for clarity…This selective simplification filters people's perceptions and defines their fields of vision" (p. 208). Moreover, frames play an important role in intensifying intractability because parties' diverging frames "paint parties into negative characters, yield mutually incompatible issues, and focus attention on specific outcomes that impede exploration of alternatives (Shmueli et al., 2006, p. 209). Pertaining to the present

study, as the David and Goliath perception of the conflict was amplified, MFG intensified its zero-sum tactics against the USFS. Shmueli and colleagues (2006) propose that tractability is possible through mediators and facilitators in such situations, however, the first step to moving away from polarization and toward a more collaborative approach is for parties to develop reflexivity about their framing repertoires—to confront how their frames have limited their ability to fulfill desired goals. For instance, this study identified latent expressions of place attachment through specific framing strategies—masking place attachment, ignoring concessions—which both operated in ways that discounted/discredited the USFS, rendering small changes to the Forsythe II plan, namely concessions, undesirable or inadequate. Critical reflection on the use of these framing techniques, through multi-party monitoring groups (as are currently being used in the Forsythe II case) or other forms of mediation, are useful so parties can devise a mutually beneficial plan.

Objective 2: Implications and Recommendations for Land Management Agencies

Recognizing Place-Based Concerns

The finding that the standard USFS comment process did not lend legitimacy to residents' place attachment concerns highlights the practical problem that wildland urban interface (WUI) areas create unique land management dilemmas. This is because land managers, who are focused on ecosystem health and managing fire regimes need to also manage the *symbolic ecosystem* of WUI resident place attachments. Toward that end, the findings from this study contribute to research that links place attachments to NIMBY responses. This study supports Devine-Wright's (2011) conclusion that the presence or absence of a NIMBY response to a landscape-altering project will be based on the extent to which publics see a poor or good symbolic "fit" between treatment and landscape. Land management agencies should consider that place attachment is a tangible and urgent concern for residents in WUI areas. To acknowledge those concerns with sincerity, land management agencies need to give such concerns a legitimate place, alongside ecological justifications and wildfire risk messaging, in their dialogue and objection process. Considering place attachment as a legitimate concern during the USFS formal comment process counts as a perspective-taking approach in which the USFS would engage in understanding the conflict from MFG's perspective (Shmueli et al., 2006). While a predominant focus of public meetings was to help residents understand the USFS scientific justifications for the project (i.e., the USFS perspective), the process was initially deaf to the validity and credibility of MFG's place attachment or "social values" concerns. An important next question is: *How can land managers develop skills at listening for and responding to WUI residents' framed concerns?*

Listening For and Responding to Framed Concerns

Police negotiation literature provides advice that can be applied as land managers develop reflexivity about the frames within which stakeholders raise concerns. In particular Hammer's (2007) S.A.F.E. model (see Table 12) identifies four frames within which police negotiations commonly take place. The four frames include the following: *substantive demands* are personally-relevant tangible wants (e.g., money, keeping trees intact on a landscape). *Attunement* refers to the nature of the interpersonal relationship between the negotiator and the person they are interacting with, such as whether interactions are friendly or hostile; it also refers to the power dynamics between interacting parties (e.g., if one party feels overpowered or dominated

by the other or by an external/3rd party, or vice versa). *Face concerns* come up when people make reference to a valued personal or group identity (e.g., firefighter, education level, profession, "I've lived here for 30 years" etc.) or show concern for how other people see them (e.g., "I'm not a bad person," "I'm a responsible resident," "I know a lot about this area."). *Emotion* refers to direct references to emotions ("I'm angry about this.") or the emotions apparent in how somebody says something (e.g., yelling, crying, withdrawing).

Further, Hammer (2007) proposes that in conflict-laden police negotiations, negotiators must first *identify* the frame a communicator is using. They then *match* the frame by talking about similar concerns with their interactant. Once the negotiator and interactant have developed affiliation or trust within that frame, the negotiator can *shift* to a new frame.

Table 12. S.A.F.E. Model for Listening for and Responding to Framed Concerns*

Frame	Definition	What to Listen For
Substantive	*Central substantive* demands are wants directly related to the situation at hand	Increased flexibility regarding central substantive demands, and fewer requests for peripheral substantive wants → signals trust or affiliation → conflict de-escalation
	Peripheral substantive demands are wants that do not depend on the specific situation	Increased commitment to central substantive demands, and increased number of peripheral substantive demands → signals lack of trust → conflict escalation
Attunement	Attending to interpersonal issues to develop a positive relationship with the other person, showing empathy, and developing trust	Establish trust by overcoming sources of distrust: Be attentive to the other person's frustration about a lack of control over the situation, or their power (or lack of) to change it. Reduce relational distance by showing empathy and demonstrating trustworthiness.
Face	How individuals or groups wish to be perceived	Be aware that concerns people raise are often intimately tied to a sense of individual or group identity, which should be acknowledged and respected.
Emotion	Recognizing and managing emotional distress or escalation to keep the conversation focused on rational options and decisions	Listen for the type of emotion being voiced (e.g., anger, frustration), and ask for clarification: *It sounds like you're frustrated, would you like to tell me more about what is frustrating you?*
Communication process		
1. *Identify* the other communicator's predominant frame. 2. *Match* your frame with the one the other person is using, and interact within that frame. 3. *Shift* the conversation out of the frame (if necessary) to de-escalate conflict and/or re-focus conversation.		

*from Hammer, 2007

The primary thing that makes the S.A.F.E. model an effective negotiation technique is the simple act of letting the other person know that you acknowledge their concern. In effect, the S.A.F.E. model is a *listening* technique. Specifically, one needs to be able to *identify* which frame others are speaking within, and then one must demonstrate their acknowledgement by *matching* or speaking within that frame. The conversation will not move forward (or *shift* frames) until communicators are interacting within the same frame.

Applying the S.A.F.E. model to the objector resolution meeting (Meeting 4, Table 3) described previously can help shed light on why attendees were unhappy with the concessions offered by the USFS. A passage from an earlier section of this document said:

> After completing the list of everything residents requested, the facilitator asked, "does this list capture the changes people want to see?" The reply was a resounding "NO!" called out in unison from most of the 30+ attendees. A male attendee yelled out, "That's the minutiae—it's not the real issue!" There were several vocalizations around the room supporting his statement.

The list of substantive "wants" the facilitator read out loud reflected everything the attendees had thus far requested in the meeting. However, attendees were uniformly unhappy because those requests were likely *peripheral substantive demands*. The *central substantive demand* was to acknowledge the "social values" of the landscape by maintaining the status quo. By this point in the Forsythe II conflict, Magnolia Forest Group members had experienced several instances in which "social values" concerns—which were closely tied to both personal and group identity—had not been directly acknowledged. Over time, MFG and other residents who opposed Forsythe II became increasingly committed to their *central substantive demand* (maintain status quo and protect "social values") such that making additional demands of the USFS mainly served to demonstrate a lack of trust and appeared to escalate the conflict.

We also observed that USFS representatives were committed to maintaining an emotionally neutral countenance in order to keep Forsythe II-related conversations rational. Part of remaining emotionally neutral, however, involved avoiding direct discussion of stakeholder emotions. Given the S.A.F.E. model, it might be helpful to listen for, label, and ask about the emotions stakeholders are expressing (*It sounds like you are frustrated. Would you like to tell me more about what is frustrating you?).* It is possible that acknowledging the emotional currents underlying early conversations on a controversial project might then allow land managers to shift focus to another frame, such as building trust through the attunement frame, understanding more about how a valued personal or group identity is motivating them to raise a concern in the first place, or inquiring about and discerning between central- and peripheral-substantive wants/priorities.

Introducing Citizen Volunteer Opportunities into WUI Land Management Projects

Given our findings that residents have strong personal connections to particular landscapes, we recommend that land management agencies build volunteer opportunities into land management plans to promote a forward-looking framing repertoire. Agencies might design volunteer opportunities around areas in which they are already short-staffed, and could include: letting residents patrol trail systems, monitor campsites for illegal campfires, and observe government contractors' implementation of fuel treatment activities. A volunteer citizen patrol group could address the issue of illegal campsites that residents discussed in the destruction frame. In high-use, socially-meaningful WUI areas, it might also be useful to introduce opportunities for multi-party monitoring of vegetation treatments early in the implementation process to stay abreast of resident/stakeholder concerns and interests. These interventions fit with how people practice their lives in a space (e.g., hiking, place attachment), by building volunteer opportunities into WUI-area vegetation treatment projects.

Using Demonstration Plots to Set Expectations About Scope and Aesthetics

Our findings reinforce previous research about engaging community members early and often to set expectations about what the landscape will likely look like after vegetation treatments (McCaffrey, Toman, Stidham, & Shindler, 2013; Remenick, 2018). This study reinforces the importance of using demonstration plots to set WUI community expectations about fuel treatment scales and aesthetics. This is especially important since land managers and members of the public might hold different values for the landscape. However, due to the long duration of land management projects, residents might appreciate agencies providing a realistic visual simulation of the treatments at various stages of recovery. We recommend that land management agencies provide demonstration plots—exemplars of landscapes at various stages of

treatment recovery—so that residents are able to form realistic expectations about fuel treatments recovery time and stages of growth. Such efforts, however, would require long-term planning (i.e., starting the demonstration plots years before plans are enacted, or when the planning stages are initiated). As an alternative, visual, visceral simulations such as photographs, virtual reality, and computer-generated models could show such exemplars of the stages of vegetation treatment recovery. The bottom line is WUIs might require more hands-on community-involved approaches that help residents know what to expect because strong place attachments or ”social values” make these landscapes contentious places to manage.

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Appendix A

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Appendix B1

List of completed deliverables

Table 13. Planned Deliverables

Deliverable	Description/Citation
Workshop	*Preparing Today's Boulder Forests for Tomorrow's Wildfires*
White paper	Brenkert-Smith, H. B. P., Jahn, J. L. S., & Ahumada, J. I. (2018). Defining "resilient landscapes" from multiple stakeholder perspectives in a wildland urban interface (WUI) area, survey data report, funded project #: 16-3-01-37. United States Joint Fire Science Program.
Conference presentation	Jahn, J. L. S., & Ahumada, J. I. (2019). Choosing between community survival and protecting the scenery: Framing the role of place attachment in an intractable conflict over a community wildfire prevention project. Paper to be presented to the Organizational Communication division of the National Communication Association, Baltimore, MD
Peer reviewed article	Jahn, J. L. S., White, M. W., & Brenkert-Smith, H. B. P. (Under Review). My place or yours? Using spatial frames to understand the role of place in forest management conflicts.
Data visualization*	**See revised deliverable table (Table 15)*
Neighbor-to-neighbor conversation guide**	***This deliverable replaces the data visualization.*

Table 14. Additional Deliverables

Deliverable	Description/Citation
MA Thesis	White, M. (2017). Spatial sensemaking in wildland urban interfaces (WUIs): A framing perspective of multiparty land management decisions (Unpublished MA thesis). University of Colorado, Boulder, CO, USA.
Undergraduate Honor's Thesis	Stanbery, A. (2017). Trust and the wildland urban interface: How residents use sensemaking to understand fuel treatments (Unpublished BA Honor's thesis). University of Colorado, Boulder, CO, USA.
Conference presentation	Jahn, J. L. S., & Leslie, K. (May 2018). Tangled action nets: community voices collide over localized climate action. Paper presented to the Organizational Communication Division of the International Communication Association, Prague, CZ.

Appendix B2

Table 15. Revised Deliverable and Justification

Decision Process	Justifications
Planned deliverable	*Data visualization* depicting various perspectives about the Forsythe II treatment project, and fuel treatments in general.
Justification for omitting	Parties involved in the Forsythe II conflict understood each other's perspectives but decisively disagreed with them. We felt the visualization would reinforce disagreement rather than foster dialogue (as we had hoped).
Revised deliverable (approved by JFSP)	*Neighbor-to-neighbor conversation guide* providing WUI residents with information, and conversation starters and changers, they can draw from when talking with their WUI neighbors.
Justification for replacing planned deliverable	Our findings suggested that WUI community members would benefit from advice on how to talk with their neighbors about wildfire risk, defensible space, and fuel treatments (the purpose of this deliverable)

Appendix B3

Workshop Agenda

Preparing Today's Boulder Forests for Tomorrow's Wildfires

Workshop - Wednesday September 26, 2018, 5:30-8:00pm

SEEC Auditorium - East Campus, University of Colorado-Boulder

5:30 - 6:00pm -- Reception with light refreshments

- Please place a Sticker-dot on the map to show where you live, and complete the FRONT SIDE/BEFORE survey

6:00-6:45pm -- Welcome by Sharon Collinge, Faculty Director, Center for Sustainable Landscapes and Communities, and Chief Scientist, National Ecological Observatory Network (NEON)

LIVING WITH FIRE - Panel of Residents – Karen Hollweg, Moderator

- Randy Oxley -- Living adjacent to open space land in Jamestown
- Will Keeley – Wildlife ecologist comparing treated and untreated forests
- Cary Ludtke – Wildlife Partners
- Linda Martin – Getting neighbors together via Saws & Slaws
- Deb Martin – Sugarloaf homeowner impacted by fire
- Jason Lawhon – Neighbor to fuel treatments

6:45-6:50pm YOUR Questions ??

6:55-7:00pm Move to Breakout Group of Your Choice

7:00-7:50pm Break-out Group Discussions – 25-min. sessions (2 rounds)

1. City of Boulder Open Space and Mountain Parks forest & fire management – Chris Wanner, Forest Ecologist & Brian Oliver, Wildland Division Chief
2. Boulder County Parks and Open Space forest management – Stefan Reinold, Sr. Forestry Resource Specialist
3. Ecological Benefits of Prescribed Burns – Parker Titus, The Nature Conservancy
4. How forest management effects wildlife – Will Keeley, OSMP Wildlife Ecologist
5. How you can prepare your home for wildfires -- Carry Ludtke & Jim Webster, Boulder County's "Wildfire Partners"
6. How you can prepare your home for wildfires -- Jamie Carpenter, Wildland Fuels Specialist & Kim Scott, Outreach/education, City of Boulder Fire Dept. Station 8
7. How neighbors can help each other prepare for wildfire – Linda Martin, Saws and Slaws
8. Resident Perspective: Talk with Randy Oxley, County open space neighbor & Wildfire Partner
9. Resident Perspective: Talk with Deb Martin about first-hand experience with wildfire
10. The ecology & history of fire & forest management in Boulder's city & county forests –Jason Lawhon, USFS and Marin Chambers, CO Forest Restoration Institute

7:50-8:00pm Wrap-up – Please leave your completed survey to guide our future events.

Co-sponsored by the CU-Boulder Center for Sustainable Landscapes and Communities, City of Boulder Open Space and Mountain Parks, Boulder County Parks and Open Space, CU-Boulder's Office for Outreach and Engagement, CU and CSU faculty and staff

Appendix B4

Photographs

Photo 1: Photo of workshop panel and attendees (September 26, 2018).

Photo 2: Photograph of registration table with name tags, informal questionnaire and survey about attendees' level of interest in various fire mitigation and fuel treatment topics (for use in determining useful future workshops), and a map of Boulder, CO and surrounding areas on which attendees placed a sticker denoting where they live.

Photo 3: A photo of the southwestern corner of the Forsythe I fuel treatment site many study participants referenced in justifying their opposition to Forsythe II.

Appendix C

Metadata Description & Access

An anonymized version of this project's Phase 2 survey dataset is publicly available in the JFSP data repository on the firescience.gov website (URL: https://doi.org/10.2737/RDS-2019-0050) or by request to the PI. The data file is in .xlsx format and includes two tabs: the first tab includes the data; the second tab includes a codebook indicating the survey items and the meanings of the numeric and other coded values in the dataset.

A description of the sampling method and timeline for the Phase 2 survey can be found in this report on p. 23, and in Table 8.

A brief synthesis and analysis of key descriptive findings from the survey can be found among the products associated with this project on the JFSP website. This document is titled, "Survey Data report: Defining "Resilient Landscapes" From Multiple Stakeholder Perspectives in a Wildland Urban Interface (WUI) Area." URL: https://www.firescience.gov/projects/16-3-01-37/project/16-3-01-37_Survey_data_report_Resilient_Landscapes.pdf