

**WILDFIRE MESSAGES AND MEANINGS IN THE WILDLAND-URBAN  
INTERFACE**

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ABSTRACT: Wildfire can be an extremely destructive force, especially when it reaches our nation's ever-increasing wildland-urban interface (WUI) area. To address this issue, state and federal agencies and cooperative education programs have begun to promote homeowner responsibility and wildfire vulnerability minimization practices as a means for WUI residents to take a proactive approach to protecting their homes from wildfire. This research provides resource managers with a new understanding of the processes through which WUI residents receive, interpret, and reconstruct wildfire messages, which will allow them to better assess their wildfire education programs. Results from this study suggest that WUI residents negotiate meanings for wildfire messages by externalizing and/or internalizing the hazard and its solution, and that these interpretations are strongly related to residents' behavioral response. This study also reveals significant discrepancies between WUI residents' central values and program goals; whereas fire programs generally highlight risk to homes and structures in the WUI, residents were typically far more concerned with their homes' contents and the environments within which their homes are situated. The insights provided by this study will increase program managers' ability to remedy these discrepancies and improve the effectiveness of wildfire vulnerability minimization programs and messages.

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## **CHAPTER I.**

### **INTRODUCTION TO THE RESEARCH**

The United States is experiencing considerable losses of resources and structures due to the frequent wildfires that sweep through its forested lands. While much of the nation's attention is focused on the West, where fires can burn unimpeded for hundreds of miles, there is an increasingly significant fire hazard developing in the Southeast as well. Here, as in the West, the results of a drastic restriction of low-intensity fire cycles are a considerable buildup of fuel-loads in forest ecosystems (Chambers, 1987; Pyne, Andrews, and Laven, 1996) and a resulting increase in the frequency and intensity of wildland fires (Carle, 2002; Pyne, 1997).

Not only are today's resource professionals faced with a dangerous wildland fire hazard, they are also confronted by new challenges of urban expansion and development patterns that place people and structures in the line of fire (Ewert, Chavez, and Magill, 1993). The increasing danger, difficulty, and cost of wildfire suppression and the unique complications added by the intermingling of wildland and private structures (Sampson, 1996) have forced new emphasis to be placed on homeowner vulnerability minimization practices. The education programs and messages designed to encourage voluntary vulnerability minimization behavior in wildfire hazard areas are the focus of this research.

The first paper in this two-part thesis is a discovery of the identity processes through which residents living in wildfire hazard areas assign and negotiate meanings for wildfire messages and hazards. This is followed by a second paper that looks at these same residents' meanings for wildfire risk and how they are related to the goals of

wildfire vulnerability minimization education programs. The overall objective of this research is to further understanding of the ways in which these residents interpret and understand wildfire messages within their unique social and environmental contexts.

### **The Wildland-Urban Interface**

The wildland-urban interface (WUI) can be described as “the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels” (Machlis, Kaplan, Tuler, Bagby, and McKendry, 2002, p. 6). The nation-wide rapid expansion of urban communities into wildlands can be traced to population growth, increased mobility, and changes in lifestyle preferences (Sampson, 1996). It is suggested that in the future, the rural counties of the South will experience about 11.5 percent population growth over a decade, and according to U.S. Department of Agriculture national resources inventory data for 1992-1997, the South loses 3.2 acres of rural land to development for every new rural resident (Macie and Hermansen, 2002, p. 18). Between 1982 and 1992, the area in the South converted from its rural condition amounted to 6.5 million acres.

The Review and Update of the 1995 Federal Wildland Fire Management Policy (2001) claims that “Explosive growth in the Wildland Urban Interface now puts entire communities and associated infrastructure, and the socioeconomic fabric that holds communities together, at risk from wildland fire”(p. 11). WUI factors that contribute to the fire hazard include not only population growth, but also development characteristics (NW/UFPC, 1987), the use of combustible construction materials, lack of fire protection maintenance around structures, poor access, land-use regulations, and tax incentives

(Machlis et al., 2002). There is an ongoing debate of how to manage the increasing fire hazard in the WUI to reduce the risk of destructive fires, for as Gardner, Cortner and Widaman (1987) suggest: “If population pressures continue to press urban developments into wildland areas – and all signs point to a continuation of the trend – damage from wildfires can be expected to increase”(p. 164).

### **Wildfire Management Programs**

Policy strategies to deal with the WUI fire hazard include hazard mitigation, vulnerability minimization, and education (Gardner & Cortner, 1985). Hazard mitigation, such as manipulating the wildland vegetation structure and improved suppression technology, has historically been the predominate approach to fire management (Chambers, 1987). However, the increasing danger, difficulty, and cost of wildfire suppression and the unique complications added by the intermingling of wildland and private structures (Sampson, 1996) have led to a new emphasis on vulnerability minimization efforts. This type of risk management involves practices such as maintaining “defensible space” around WUI structures, keeping roofs and gutters free of leaves and debris, and using fire resistant building materials.

In the Southeastern U.S., most vulnerability minimization is being encouraged on a volunteer basis by state and federal agencies and cooperative education programs. These programs are designed to communicate the wildfire risk and offer recommendations and instructions for protecting structures from wildfire damage. Firewise is an example of a national program designed to encourage and support community efforts to minimize wildfire vulnerability by providing safety information and

educational resources. The vulnerability minimization concept provides a means for WUI residents to share responsibility in protecting their home and community from the wildfire threat.

### **Risk, Meanings, and Identity**

Wildfire vulnerability minimization education programs designed to encourage voluntary participation in these precautionary practices are faced with the challenge of an emerging new audience and context for risk management and policy. WUI communities and individuals interpret and respond to program messages according to residents' varied perceptions of their individual wildfire risk, different personal meanings for the wildfire hazard, and an assortment of unique backgrounds and identities. The complexity of the WUI context forces successful messages to negotiate not only personal indifference, but also outright resistance. In many cases, homeowners feel that “the amenities offered by fire-prone aspects of landscaping and building materials (e.g., aesthetics of a wooded lot or shake roof) are worth more than the safety they would enjoy in a more fire-resistant house and yard”(Winter and Fried, 2000, p. 40).

The limited success of these wildfire programs has shown that motivating residents to take significant wildfire protection precautions is no easy task. The development of the WUI, with its unique social and physical environment, presents an opportunity for “develop[ing]...a better definition....[of] the social and technical *constitution* of risk” (Wynne, 1992, p. 284) that will help managers design program messages that will address the central values of residents of WUI wildfire hazard areas.

### **Significance of this Research**

In spite of the increased state and federal funding of wildfire education programs and the continual growth of the WUI, program managers and agency officials lack an understanding of the processes through which people's beliefs, values, and preferences regarding fire management and prevention are acquired and/or negotiated. This study was designed as a means to further our understanding of residents' responses to program messages by looking at the processes through which WUI residents receive, interpret, and reconstruct wildfire messages. Our research was guided by symbolic interaction, which allowed us access to resource professionals' and WUI residents' personal narratives and descriptions through in-depth interviews, while still maintaining a strong connection with context. This qualitative approach was essential to our study because of its descriptive nature and our pursuit of the interactive processes through which residents negotiate program messages and develop wildfire meanings. Knowing more about how WUI residents are interpreting wildfire vulnerability minimization messages and uncovering the differences between residents' and professionals' meanings for wildfire and definitions of wildfire risk will increase program managers' abilities to address disparities in residents' wildfire meanings versus program goals and create effective fire prevention programs and messages.

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## **CHAPTER II.**

### **Processes Through Which Residents Assign Meanings to Wildfire in the Wildland-Urban Interface**

## INTRODUCTION

The wildland-urban interface (WUI) can be described as “the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels” (Machlis, Kaplan, Tuler, Bagby, and McKendry, 2002, p. 6). The nation-wide rapid encroachment of urban areas into wildlands can be traced to population growth, increased mobility, and changes in lifestyle preferences (Sampson, 1996). Homeowners moving into the WUI generally prefer the privacy, a healthier environment, the opportunity to enjoy nature, and the lower cost of rural living.

Years of fire suppression combined with increased population size and concomitant suburban sprawl have created a significant problem of fire danger at the WUI in recent years. The results of an era of forest management that emphasized extensive fire prevention are a massive buildup of fuel-loads in forest ecosystems (Chambers, 1987; Pyne, Andrews, and Laven, 1996) and a resulting increase in the frequency and intensity of wildland fires (Carle, 2002; Pyne, 1997). At the same time, there has been a sharp increase in development of the WUI as subdivisions, resorts, industrial parks, etc., have been built adjacent to forested areas (Ewert, Chavez, and Magill, 1993). Within WUI developments, the use of combustible construction materials, lack of fire protection maintenance around structures, and poor access have combined to intensify existing fire hazards (FWFMP, 2001).

Most wildfire vulnerability minimization, specifically homeowner maintenance of fire protection around structures, is being encouraged on a volunteer basis by state and federal agencies and cooperative education programs. These emerging educational programs are designed to inform residents in fire-prone areas of wildfire risk and

methods of protection. *Firewise*, a typical WUI wildfire education program, makes recommendations on preferable building site locations and materials, maintaining non-flammable zones around structures, landscaping choices such as plant selection and desired spacing, and safety response measures in the event of a direct wildfire threat (Firewise, 2002). These messages are generally presented through community workshops and a user-friendly web-site in a manner that does not discourage living in the WUI and emphasizes the ability to safely satisfy aesthetic preferences.

Education and regulation, with today's constrained budgets, both "rel[y] primarily upon voluntary compliance for...effective application" (Bradshaw, 1988, p. 201). This is the underlying significance of much of the prior research that was designed to assess residents' beliefs, attitudes, values, and preferences in regard to the threat of wildfire and corresponding policy options within WUI settings. In spite of the increased state and federal funding of these education programs and the continual growth of the WUI, program managers and agency officials lack an understanding of the processes through which people's beliefs, values, and preferences regarding fire management and prevention are acquired and/or negotiated. While an understanding of the state of knowledge among those affected by fire management practices is certainly valuable, it is equally important to understand how residents develop meanings for messages regarding fire management. The establishment of wildfire vulnerability minimization education programs in the WUI provides an ideal situation for studying "The way in which context and 'history' [inform] the actors' definitions and strategies for effective interaction" with other WUI residents and their wildland-urban environment (Altheide, 2000, p. 5). This

continuous interactive process also forms the context through which WUI residents form and negotiate meanings for wildfire messages and education programs.

This study was designed to build upon previous research to discover the narratives and behaviors that take us beyond a causal assessment of beliefs, attitudes, values, and preferences into a deeper understanding of how WUI residents receive, interpret, and reconstruct wildfire messages and either are or are not convinced of a wildfire problem within their interface community. The purpose of this paper is to identify processes through which WUI residents assign and negotiate meanings for wildfire messages and hazards. By incorporating the influence of social and environmental inputs into the understanding of individual psychological motives emphasized in previous research, we hope to expand the body of knowledge available to fire professionals for their use in creating effective fire prevention programs.

### **WUI FIRE MESSAGES AND MEANINGS**

A significant amount of research has been conducted to assess the values, preferences, and attitudes of WUI residents, with the goal of improving management decisions and policy recommendations in the WUI. These studies were typically looking at causal factors in relationship to WUI residents' behaviors, and their results illustrate social and intrapersonal factors that are significant to this research because they suggest a cultural context within which this study's questions of process are located. This context is part of "the framework of meaning, of concepts and ideas, within which different aspects of a person's life can be related to each other" (Cohen, 1994, p. 96), and their interpretive processes discovered.

Previous research suggests that people generally tend to deny the threat of disaster occurring or recurring (Plevel, 1997) and WUI residents have been shown to underestimate the danger of forest fire (Hulbert, 1972). This is likely the result of many complex and interrelated factors. Residents' willingness to take precautions in regard to wildfire appears "to be related to proximity to recent fires, the time elapsed since recent fires, fire hazard awareness, hazard information, hazard experience, and risk perception" (Fried, Winter, and Gilles, 1999, p. 10; see also McKay, 1985; Gardner, Cortner, and Widaman, 1987). Several socio-economic variables also seem to be closely related with hazard comprehension (Baker, 1977; Bridges, 1983; Burton, Kates, and White, 1993; Mileti, 1975).

Some WUI residents have demonstrated they perceive forest fires as uncontrollable, which may lead to the conclusion that personal precautions are irrelevant and community-based protection is more favorable (Burton, Kates, and White, 1993). Even if residents do perceive the risk of wildfire, their awareness may be dampened by the actual occurrence of a fire (Gardner and Cortner, 1988). This suggests an often incorrect assumption, based on a lack of knowledge, that wildfire will not strike again (Cortner, Gardner, and Taylor, 1990).

Landscape design that is characteristic of a natural setting is common in WUI communities and may frequently come into conflict with precautionary practices in spite of the perceived risk of wildfire. It has been shown that residents unwilling to take certain steps to protect their homes from fire may actually be "quite willing to trade off higher risk of fire losses for...aesthetic and practical values" (Fried, Winter, and Gilles, 1999, p. 18). This is especially true when the perceived probability of a wildfire threat is

low (Rossi, Wright, and Weber-Burdin, 1982). This acceptance of additional risk may be determined by personal preference or community standards that are sometimes enforced by covenants.

In addition to residents' environmental values, an expectation of individual freedom and responsibility may shape efforts to protect WUI communities (Sampson, 1996). Although residents generally prefer that land-use decisions be made locally (Cortner, 1991), studies have shown there is little support in the WUI for zoning restrictions on development or ordinances based on the fire hazard (Winter and Fried, 2000; Cortner, Gardner, and Taylor, 1990). Rather than the implementation of coercive strategies that would restrict property rights, WUI homeowners typically prefer a voluntary approach such as an education campaign, and place the responsibility for this education on the government (Winter and Fried, 2000). In a 1970 Colorado survey, it was found that over 90% of the WUI residents interviewed "indicated they would take necessary precautions to reduce fire hazards if someone would convince them of the problem and show them what to do" (Hulbert, 1972, p. 27).

### **The Interpretive Process**

Our research approach requires that "cause...be conceived as a process not as a thing, a force, a condition, or a variable" (Lindesmith, Strauss, and Denzin, 1975, p. 41) such as in the previous research outlined above. Exploring how WUI residents receive, interpret, and reconstruct wildfire messages requires an understanding of the relationships between interpretive concepts of identity and self, meanings and the processes through which they develop, and the expression of narratives. It is readily recognized that

“identity...[is one of the] critical concepts for the investigation and analysis of social behavior” (Altheide, 2000, p. 2). At the origin of identity is the development of self through social experience and interaction (Mead, 1934). In other words, “The self is an organization or integration of behavior imposed upon the individual by him- or herself and by societal expectations and demands” (Lindesmith, Strauss, and Denzin, 1999, p. 233). Identity can also be described as a product of the interactive “process by which the person seeks to integrate his [sic] various statuses and roles, as well as his [sic] diverse experiences, into a coherent image of self” (Epstein, 1978, p. 101).

Mead’s focus in describing the influences upon identity is the interactive social process whereby an individual’s community “gives to the individual his [sic] unity of self” and influences the individual’s behavior (Mead, 1934, p.154). This process “of self-interaction, as the individual views the factors in his situation and takes into account the activities of others” defines the individual’s behavior (Blumer, 1969, p. 97). It is also evident that “people find self-fulfillment, self-expression, and a sense of identity and personal worth” through group participation and commitment to organized standards (Lindesmith, Strauss, and Denzin, 1999, p. 326). This may be seen in WUI residents’ shared environmental and social values, as well as in their adherence to restrictive community covenants. Self-control and voluntary behavior are often the result of the influence of an individual’s community (Lindesmith, Strauss, and Denzin, 1999); however, individual identity is neither entirely bound nor solely determined by society (Mead, 1934; Cohen 1994). The self is both social and cultural, “But the self is not passive as a subject of society and culture; it has agency, is active, proactive and creative.

Constituted by society and made competent by culture, individuals make their worlds through their acts of perception and interpretation” (Cohen, 1994, p. 115).

Individuals’ perceptions and interpretations form their identity as a collection of meanings, or symbols. In its most general sense, “*Meaning* refers to that which is in the mind or the thoughts of a person” (Denzin, 2001, p. 119). Throughout the processes of social and situational interaction, as well as internal interpretation, individuals are continuously constructing and reconstructing meanings. Meanings, as the building blocks of identity, are determined by an individual’s past experiences as well as the present, and vary according to changing definitions of the situation: “a context of other experiences and assumptions that all actors bring to bear in defining ‘what we have here’” (Altheide, 2000, p. 5). Social and situational factors such as new information received through fire messages, interaction with other WUI residents and agency personnel, and the unique urban-wildland setting in which they reside, may influence residents’ meanings for wildfire and their definition of the WUI wildfire situation.

It is important to emphasize that an individual’s developing meanings are the result of a complex social and intrapersonal *process* whereby messages are received, interpreted, and reconstructed. According to Denzin, “This interpretive process brings the event or object into the person’s field of experience, where it is acted upon and defined” (2001, p. 80). The process through which meanings develop begins in the early years of life and “continu[es] throughout the life course, as individuals reconstruct their biographies in light of changing information about their pasts and futures” (Silver, 1996, p. 3).

We use the term “internalization” to describe a process of meaning development whereby new meanings are received, subjected to individual interpretation, and result in a change in individuals’ perceptions of their world such that the object of meaning is considered central to their situation. A couple of ways this process can be observed is in feelings of personal responsibility conveyed through narratives and the individual’s behavior such as vulnerability minimization actions taken. The process of internalization is a significant response to social influence because it encourages both voluntary behavior and social control (Lindesmith, Strauss, and Denzin, 1975). “Externalization”, on the other hand, refers to a process we observed whereby individuals assign meanings that place the object of meaning outside of the individual’s concern or control. This process of externalization through which individuals assign meanings is significant to our discussion of the interpretation of wildfire vulnerability minimization messages because it guides “a selective inattention to information and interpretations not in harmony with the person’s basic social and political assumptions” (Lindesmith, Strauss, and Denzin, 1999, p. 328). Revealing those interpretive processes through which WUI residents assign meanings to their wildfire situation is the goal of this research.

Identity and meanings are revealed through their expression in both narratives (stories) and performance (behavior) (Denzin, 2001; Goffman, 1973). These are the “ways [in which] people represent their experiences to themselves and to others” (Denzin, 2001, p. x). According to Ezzy, “Lived experience precedes a narrative, and narrative shapes practical action” (1998, p. 246).

For an understanding of the meanings presented in narratives and behavior to support meaningful analysis, an individual’s identity and central meanings must maintain

some level of consistency. Although narratives are continuously evolving, the authenticity of self requires “the existence of a transituational and somewhat stable aspect of self” (Erickson, 1995, p. 122) that may be characterized by “a persistent unity of preferences, inclinations and motivations” (Pucci, 1992, p. 193). In general, WUI residents’ changes in identity are “prescribed or at least permitted within the person’s established universes of discourse” (Travisano, 1981, p. 244). Goffman explains this coordination of meaning and “involvement” (pg. 345) in terms of “frame”: or those “principles of organization which govern events—at least social ones—and our subjective involvement in them” and direct the development of “the definitions of a situation” (1974, pgs. 10-11). According to Ezzy, “Narrative identity is coherent but fluid and changeable, historically grounded but ‘fictively’ reinterpreted, constructed by an individual but constructed in interaction and dialogue with other people” (1998, p. 246). This general stability of identity and meanings allows us to gain understanding of the dynamic processes through which WUI residents interpret and develop meanings for the wildfire hazard through acquiring and analyzing their contextual narratives and behavior.

## **METHODS AND ANALYSIS**

This research focuses on communities in two areas in the Southeast that were selected with the help of the Southern Urban Wildland Interface Council and chosen because they had active fire vulnerability minimization education programs and significant WUI populations. The first study area is located in northeast Georgia and includes White County and part of Habersham County. White County was originally an

agricultural area; currently, approximately 27% of White County is USDA Forest Service (USFS) land. As this WUI area began to serve as a setting for weekend cabins, new development moved up into the mountains and ridges as landowners pursued a beautiful view. Today, many of these WUI communities are composed of retirees, second homes and homes whose residents commute daily to nearby Gainesville or Atlanta, which is approximately 90 minutes away. White County had a population of approximately 20,000 in 2000 (U.S. Census Bureau, 2000). Between 1990 and 2000, the county experienced 53% population growth (U.S. Census Bureau, 1990, 2000).

There have been few large, destructive fires in the White County area in recent years, but none with significant structural damage. However, there have been several smaller wildfires consistent with Georgia's history of a large quantity of fires averaging about four and a half acres in size. In 2000, a federal pilot project designed to encourage wildfire hazard vulnerability minimization in local communities was instituted through the Georgia Forestry Commission. Its focus is on the White County area, and its goal has been to educate community leaders, local professionals, and homeowners according to the recommendations of the Firewise program.

Most of the White County study area homeowner interviews were conducted in the Skylake community, which was established in 1972 and consists of about 475 houses. This community has had very little experience with the threat of wildfire. We chose to work predominantly in this subdivision because it was viewed by fire professionals as problematic in terms of fire prevention/protection. Built in the hills and along ridges, Skylake homes are exposed to the wildland fire hazard and the road system limits emergency vehicle access. This community has strict ordinances prohibiting burning of

litter or debris and restricting the removal of tree cover from around homes. These restrictions are designed to protect the natural aesthetic qualities that residents find appealing. The homeowners' association is currently in the process of installing new fire hydrants throughout the community.

The second study area is located in central Virginia and focuses on Shenandoah County and parts of Augusta and Nelson Counties. This is also predominately an agricultural area, and the WUI communities include residents originating locally, as well as weekend cabin retreats and retirees from more urban areas. Shenandoah County had approximately 35,000 people in 2000, and between 1990 and 2000, the county experienced almost 11% population growth (U.S. Census Bureau, 1990, 2000).

The Virginia study area appears to have had comparatively greater exposure to large and/or destructive fires. Efforts to educate the area's homeowners on wildfire risk and vulnerability minimization strategies began with a federally funded WUI education project for Shenandoah County in 1991, which focused on community hazard rating and organization of local workshops. Since then, there have been several overlapping interagency fire prevention/education programs and considerable emphasis placed on fire prevention.

About half of the Shenandoah County study area homeowner interviews were conducted in Sundance Retreat, an area established as a weekend destination with many small cabins. It currently consists of about 90 cabins and modest homes. This area has experienced nearby wildfires, though none that caused any residential damage in Sundance Retreat. The road system is very poor, and access for emergency vehicles is limited by steep grades. There are no community restrictions on open burning or tree

removal. The community is currently in the process of increasing their available water supply in preparation for the threat of future fires by making improvements to a local pond. The Afton mountain area just south of Shenandoah County was the second site for Virginia homeowner interviews. There are multiple subdivisions in this area, and it was chosen because its communities have a recent fire history, and thus allowed some insight into the role of immediacy in shaping landowners' perceptions of fire and fire prevention.

In-depth, semi-structured interviews as described by Rubin & Rubin (1995) were used because their interpretive approach emphasizes the contextual meaning of text. Using interviews enabled us to maintain a conversational tone conducive to the sharing of personal narratives while still guiding the focus of the discussion. Most interviews lasted approximately one hour and took place in either an agency office or the WUI resident's home. In both study areas, we first interviewed selected local and agency professionals with direct involvement in community fire vulnerability minimization programs, WUI fire hazard experience, and/or knowledge of local community development and planning. We conducted 17 interviews with local and agency professionals. Among those interviewed in either area were USFS and state agency personnel, local government employees, and local fire department officials. The purpose of these interviews was to collect program materials and to determine the source, extent, and content of fire messages communicated to the community. These interviews also provided insight into community demographics, local fire history, fire-related messages and policies advocated by local government and agencies, and initial contacts for our snowball sample of WUI community residents.

Based on the information gathered in the interviews previously described, we completed an additional 15 interviews with WUI community residents in which they were asked to address: (1) the types of programs and fire prevention messages being used in their areas; (2) the degree to which individual landowners have chosen to adopt hazard mitigation techniques suggested by Firewise and similar programs; and (3) their perceptions of risk and the role of fire in their choices of where they live and what they do with their landscaping. Combined, these issues (along with questions of context) allowed us insight into the deeper meanings individuals hold for the threat of fire in their area. Many of the WUI residents we interviewed were at some point officers in their respective homeowners' association.

The interviews were transcribed and the analysis in this study was driven by interpretation of events within the context in which they took place. A review of the program structure and document analysis helped determine how the risk messages fit into the general understanding of the education strategies and the fire hazard in the WUI (Hodder, 2000). Most of the analysis was derived from narrative texts in interview transcripts. This provided the necessary “detailed thick description of associations and contexts that allows the material practices [risk messages] to be set within specific historical situations and the particular evocations to be understood” (Hodder, 2000, p. 711). The interview data was analyzed according to the methods proposed by Denzin (2001). Once data were collected, this interpretive process provided three main steps to guide the researcher: (1) bracket the data into its individual features or elements; (2) reconstruct the phenomenon by piecing data back together; and (3) relocating the constructed phenomenon in its original context. QSR N6 software for qualitative data

analysis was used to guide the first step. Individual interviews were coded into several main categories and the resulting node system used to guide the rest of the analysis process.

Through this process, the texts were analyzed at multiple levels. During the bracketing phase, each interview was removed from any broader context in order to locate key phrases or statements that speak directly to the negotiation and construction of meanings of wildfire risk. These constituent components were reassembled across interviews in the construction phase of analysis. At this point, common elements among texts were brought together in order to form a coherent image of residents' articulation of wildfire risk meanings. Contextualization, as the name implies, involves locating the heretofore-constructed phenomenon back into the social world. This was accomplished not only by analyzing social contexts within and among interview texts, but also by comparing and contrasting perceptions of risk to those presented in the literature. In the end, this process allowed us the room to interpret interview texts while requiring checks against interviewee perspectives and existing literature. The appeal of Denzin's approach is in its emphasis on context and revealing the interactive process necessary to seeking out the essential meanings of wildfire messages. This made it possible for us to locate differences between residents' issues of emphasis within their individual and social contexts.

## **RESULTS**

Our results address the processes through which residents are constructing meanings for the wildfire threat and their role in the development of WUI residents'

identities. Acceptance is one of the first steps among many. Most residents acknowledged that their wildland environment exposed them to a wildfire hazard, although along varying degrees. Through this acceptance, residents acknowledged that conditions were present for a wildfire to occur. However, this acceptance is not dependent upon residents perceiving any significant personal risk from that hazard. Residents acknowledged the existence of the wildfire hazard by pointing out the drought conditions, the fuel levels on the ground, past lightning strikes, or past fires. They generally reached this acceptance through actually seeing or experiencing the fire threat or by being exposed to agency messages. According to one Skylake resident: “So, [fire is] by far our greatest risk, and it’s on my mind not every day, but I think about it often, especially, I mean, when I get in my truck later this week and go down to Gainesville and I see Lake Lanier and it’s always, it’s always low. It just, it’s always a reminder-” (GAR4).

However, acceptance does not mean action. The resident previously quoted had not attempted to minimize his wildfire vulnerability other than having lots of spigots around his house and keeping his lawn wet during the summer. While almost all the residents acknowledged at least some level of wildfire danger and had been exposed to some level of fire program messages, only about half had done something to directly minimize their wildfire vulnerability—even something as simple as just keeping the leaves away from the house. When asked if he thought about fire much, one Virginia resident replied, “It’s not a constant thing, no. Obviously, it’s always in the back of your mind, but you...but do we do anything different because of it? No” (VAR2). There is a strong indication that even with an acceptance of a fire hazard, the meanings many residents hold for wildfire in the WUI are not perceived as central to their situation or

identity, nor do these meanings suggest personal precautionary action. The results suggest that this apparent inconsistency can be explained by residents' use of the interpretive processes of internalization and externalization to assign wildfire meanings.

The results imply that even after reaching an acceptance of a wildfire hazard, WUI residents often externalize both the wildfire hazard and possible solutions, and it is this perspective, or frame, through which they interpret vulnerability minimization messages. They tend to see outsiders as the cause of the hazard and do not feel a personal responsibility to minimize their risk. For these reasons, less than half of the residents appeared to have internalized the wildfire hazard and less than half had internalized wildfire vulnerability minimization suggestions to exhibit an accordant behavioral response.

### **Externalizing the Hazard and Solution**

Many WUI residents assigned meanings to the wildfire threat through a process of externalization. This was most often in terms of characterizing the source of the hazard. For many, the wildfire threat was defined by the carelessness and unsafe practices of someone from outside the community. This could be hunters with matches, drivers with cigarettes, or smoking sub-contractors. One Virginia resident explained:

We have national park land all around us. And some people come up in here. We pretty well have it posted, but... And then the other one is throwing out cigarettes along the road. And then a lot of, a lot of construction, a lot of construction people coming in and out, trades people

and so forth....That's, that's the main concern. Hunters and trades people.

(VAR3)

In any case, perceiving fire in this way places much of the fire threat out of the residents' control. In some cases, this sense of a lack of control may increase residents' motivation to minimize their vulnerability through landscape manipulation such as raking leaves, but most often it seems that it doesn't:

"...what I've done is what I think are reasonable things I can control. I can't control somebody driving into Sky Lake, or near Sky Lake - is doesn't have to be in Sky Lake. It could be adjacent to Sky Lake. And uh, uh, throwing a lit cigarette out into the woods and starting a fire. Uh, and I can't control somebody from, uh, you know, fire bombing, uh, their ex-wife's house, you know, they're upset about something. But, there are certain things that, that all of us as individual homeowners can do. And I think that is to have at least enough hoses outside, fire extinguishers inside, so that if something happens in or around your home, that you, you do have at least the wherewithal, uh, to take some immediate action, uh - hopefully would prevent it from spreading." (GAR4)

Residents also frequently externalized fire meanings in terms of the solution to the threat. This can be seen in the confidence residents had in the local roads to serve as fire-breaks and especially the ability of volunteer fire department and agency fire-fighters to handle the threat of a fire. When asked if fire was something she was still concerned about, one Virginia resident presented the wildfire hazard and its solution as someone else's responsibility: "Uh, last summer when it was very, very dry. And our property,

above it's the National Forest, which means hunters. Which could be careless, cigarette smoke, you know, matches and stuff. So, it is a concern, but we're very grateful that we have Wilson [volunteer fire department]" (VAR5).

Other forms of externalized fire meanings include the perception that the conditions of an individual resident's high exposure are consistent with the community norm and the down-grading of the local threat by citing other areas, like the West, where conditions are more hazardous in terms of the wildfire threat. One Virginia resident explained: "Yeah, in the back of my yard across the creek, though, you know, I've got trees down all over the place. And I'm, you know, that's just typical. It's not any different, than any of the other lots out there" (VAR2). When we asked a Georgia couple if they had worried about fire before they were exposed to more recent USFS efforts to do a prescribed burn adjacent to their property, one replied: "No, I don't think so. I think we were, you know, that was something out west" (GAR1).

Regardless of the manner through which residents externalize wildfire meanings, this process discourages the internalization of wildfire vulnerability minimization messages into individual identities. Rather, because these meanings of wildfire are not central to residents' identities, they allow the burden of any responsibility and response to be placed on someone else. According to fire personnel, residents' confidence in others to protect them is frequently misplaced. One fire professional suggested: "...try to explain to them what the danger is. The difficulty of fighting the fire to start with, the difficulty of water to the fire, equipment to the fire. Just really the danger of that they really are in. A lot of folks don't really realize the danger that they really are in, in this mountainous area" (VAP5).

### **Internalizing the Wildfire Hazard**

Through behavior and narratives, we have been able to recognize the internalization of some wildfire meanings among WUI residents. Two forms are most obvious. The first is internalizing the hazard. By framing the issue in this way, the meanings residents hold for the wildfire threat include themselves as part of the hazard. These residents understand that their community's residents present an internal fire hazard and sometimes even that they themselves must be careful not to cause a wildfire through their own behavior such as burning leaves and releasing sparks from their chimneys. One Virginia resident, when referring to her husband, declared: "And he's always saying, 'Get me the matches. I'm gonna burn.' I said, 'No, you're not burning now.' You know. Because I'm scared to death of fire" (VAR7). Another Virginia resident explained: "Oh yeah. It just takes your whole house like that. I'm even cautious when I grill out because I use charcoal. I don't use the fancy stuff. I am very careful with that" (VAR10).

Only about one third of the residents seemed to have internalized the wildfire threat in such a manner, but it seems that through internalizing fire threats, residents are motivated to respond with some form of action. This does not necessarily mean individual wildfire vulnerability minimization. It only means residents' perspectives and meanings of wildfire hold them at least somewhat responsible for dealing with the wildfire threat. This can take the form of avoiding fire:

Now, insofar as how do we...I think you asked this question over the phone...how do we protect the, all these houses, some four-hundred and

twenty five houses, and the people in them and the forest around them.

How do we protect ourselves from fire? In my opinion, heaviest protection is in avoiding, avoiding fire. (GAR6)

Internalization of the wildfire threat can also be seen in planning an emergency response for when a wildfire actually does present a threat. Members of this Virginia resident's community met with the local volunteer fire department and discussed the use of foam and ATVs in the event of a wildfire:

Where I'm coming from, and I'm guessing, and I'm trying to put thoughts in other people's minds in our neighborhood – fire is not of a concern until they have to deal with it. Now, I think I'm kinda that way too. Yeah, I'll do, I'll do what is the obvious thing to be doing, but do I really get concerned to where I think about it all the time? No. (VAR2)

While avoiding fire and planning a fire-fighting response get us closer to the protection of WUI communities, the benefits of this form of protection still lack the safety afforded by direct manipulation of the communities' structures and landscaping.

### **Internalizing the Wildfire Vulnerability Minimization Response**

And finally, there are those who have assigned meanings to wildfire vulnerability minimization messages and ideas that has led to their internalization of personal vulnerability minimization solutions. This internalization definitely exists in varying degrees. Some focus only on keeping leaves and debris away from their house. A more risk averse frame of reference may motivate some to invest more into minimizing their risk. During an interview, one concerned Virginia resident mentioned using all of

the following wildfire vulnerability minimization practices (VAR3): lives in a brick house; cut down and removed trees; cleared the slope of debris; trimmed low branches; raked leaves and removed them from under the patio and around the house; and removed ladder fuels.

These residents accept that a wildfire threat exists, may or may not internalize the hazard, and at some degree have taken action to protect themselves from the wildfire hazard. For some, it is an understanding that wildfire is a natural part of the environment that they choose to live in, and that through choosing to live there, they are accepting that they have to deal with the threat as an inevitability. For others, wildfire has been internalized through the fear of having experienced it and realizing that once the fire is there, it could already be too late to protect their property. When asked why others in his community hadn't responded with vulnerability minimization practices like he had following a local wildfire scare, a Virginia resident explained: "They feel like they didn't have to. They didn't see what I saw. It didn't come through at the gap like it did with my house there" (VAR4). Residents whose understanding of the wildfire threat is central to their identity and places responsibility for the solution on themselves will likely interpret and reconstruct wildfire vulnerability minimization messages according to the process of internalization which will often result in a voluntary precautionary response.

Of course, this is where fire professionals want WUI residents to be. That place where the wildfire threat is real to them and the solution has been internalized. Where residents are out there doing what they can to help protect themselves. Unfortunately, most WUI residents do not share the same central meanings for fire as the fire

professionals or those who have already internalized the messages and they are not motivated to take action to minimize their vulnerability.

## **CONCLUSION**

This research has provided unique insight into how WUI residents receive, interpret, and reconstruct wildfire messages. By identifying the processes of acceptance, externalization, and internalization, we now have a better understanding of the way in which WUI residents assign and negotiate meanings for wildfire vulnerability minimization messages and hazards. Awareness of these processes increases the value of our understanding of the context in which WUI research takes place and the values, preferences, and attitudes of interface residents.

When looking for the key to moving residents beyond accepting the threat and past externalizing the hazard and solution, it is important to realize that the construction of meaning for situationally relevant factors such as fire, risk, possessions, community, and the WUI is a long-term process that is a result of their whole life's experience. It began before they ever moved to the interface, before they ever experienced a wildfire threat, and before they ever got their first fire program messages. For wildfire vulnerability minimization education programs to continue with success, their messages must acknowledge the power of this constructive process and the many similar, yet unique frames of reference through which their own messages will be interpreted. In doing so, future messages need to address those things which residents hold meaning for so that vulnerability minimization practices are perceived as a means of protecting not just the structure of their house or even the possessions inside, but instead those values—

human safety, pets, and most of all, the trees and the beautiful environment for which many would sacrifice their home—that have really been internalized.

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## **CHAPTER III.**

### **Incorporating Locally Held Meanings of Wildfire Risk: Recommendations for Programs and Policies**

## INTRODUCTION

The fire hazard in the wildland-urban interface (WUI) is an increasingly important problem throughout the nation. One of the primary reasons for this is the increasing fire danger in the wildlands due to a buildup of fuel loads in forest ecosystems resulting from management emphasis on fire suppression (FWFMP, 2001). The current situation is such that small wildfires quickly become massive fires that are exceedingly difficult to control. A second primary factor in the WUI fire hazard is the rapid expansion of urban areas into wildlands due to population growth, increased mobility, and changes in lifestyle preferences (Sampson, 1996).

Policy strategies to deal with the WUI fire hazard include hazard mitigation, vulnerability minimization, and education (Gardner & Cortner, 1985). Historically, wildfire hazard reduction strategies have relied primarily on hazard mitigation techniques such as manipulating the wildland vegetation structure and improved suppression technology (Chambers, 1987). The increasing danger, difficulty, and cost of wildfire suppression and the unique complications added by the intermingling of wildland and private structures (Sampson, 1996) have required that new emphasis be placed on vulnerability minimization efforts, such as maintaining “defensible space,” using fire resistant building materials, and education. In response to devastating fires in California’s WUI, the state adopted a vulnerability minimization policy requiring the determination of fire hazard severity zones and the safe maintenance of firebreaks and flammable vegetation and removal of fuel from around structures within specific zones (CA code 51175-51189, 1992). This has yet to become a national trend due to the importance society places on protection of private property rights and the expectation of an intense

political response to behavioral regulation proposals (Cortner, 1991; Sampson, 1996). It seems that homeowners “would rather have the [wildland] environment modified for their needs than modify their behavior to live compatibly within the environment” (Gardner and Cortner, 1985, p. 163).

For these reasons most vulnerability minimization is being encouraged on a volunteer basis by state and federal agencies and cooperative education programs. These programs are designed to communicate the wildfire risk and provide recommendations and instructions for protecting structures from wildfire damage. While often overshadowed by the massive wildfire events in the western states, the southeastern U.S. is challenged by its own wildfire hazards and experiences frequent fires. The southeast also includes a considerable portion of the nation’s WUI, which is rapidly expanding (Pyne, 1982). The establishment of these vulnerability minimization education programs in the southeast, as well as the region’s visible fire hazard and significant WUI residential population, provide an ideal situation for studying locally held meanings of wildfire risk and their relationship to local program goals.

## **UNDERSTANDING RISK**

### **Wildfire Vulnerability Minimization Education in the WUI**

Wildfire vulnerability minimization education programs in the WUI emphasize three main goals: (1) communicating the risk of the occurrence of a damaging wildfire, (2) reducing the occurrence of human-caused wildfires, and (3) informing and teaching WUI residents how to reduce the risk of structural and property damage during a wildfire threat. While there has been significant study of interface residents’ attitudes and policy

preferences, there has been virtually no assessment of the effectiveness of wildfire messages in communicating risk and encouraging precautionary behavior, and the value of these voluntary strategies in reducing structural damage due to wildfire in the WUI is still unknown.

The growing WUI is an emerging new context for risk management and policy. This presents a challenge in “develop[ing]...a better definition...[of] the social and technical *constitution* of risk” (Wynne, 1992, p. 284). However, according to the NRC Committee on Risk Perception and Communication, “Only by better knowing how recipients conceptualize risks and their risk decisions can people create more effective messages (NRC, 1989, p. 181). Further audience analysis will likely serve to assist regional programs in promoting a behavioral response (Lundgren and McMakin, 1998). Based on a case study of two WUI wildfire education programs in the southeastern U.S., this article will address the pressing need to incorporate audience perspectives into risk communication (NRC, 1989) in its response to two primary questions:

1. How do WUI residents articulate the meaning of wildfire risk in their lives?
2. How do these meanings of risk compare with the goals of wildfire education programs?

This research was undertaken with the goal of expanding the body of knowledge available to fire professionals for their use in creating effective fire prevention programs. Based on the study’s findings in response to these research questions, this article will discuss program and policy recommendations for rectifying any disparities in residents’ meanings of risk versus program goals.

## Perceptions of Risk

The management of risk is generally a response to the threat of technological or natural hazards with the goal of “reduc[ing] undesirable effects through appropriate modification of the causes or, though less desirable, mitigation of the consequences” (Renn, 1992a, p. 58). The most obvious risk factors in the case of the wildfire hazard in the southeast include the region’s unique topography, vegetative cover, and weather patterns. However, the risk presented by wildfire is defined not only by environmental issues, but also its economic, psychological, cultural, and social components. These may include forest fragmentation, past and present land management practices, and urbanization patterns such as the expansion of the WUI.

Managing the wildfire hazard in the WUI, by directly modifying the wildland landscape or, more importantly, through encouraging residents to voluntarily participate in vulnerability minimization efforts, requires an understanding of the varied definitions of the wildfire risk among all those involved, expert and layperson, and recognition that those perceptions of risk are created and continuously negotiated through social interaction (Renn, 1992a; Douglas, 1985). Through this process of symbolic interaction, individuals are continuously constructing and reconstructing meanings, or symbols. In its most general sense, “*Meaning* refers to that which is in the mind or the thoughts of a person” (Denzin, 2001, p. 119). WUI residents have each developed their own unique meanings of the local wildfire hazard and what is threatened by that hazard (risk). Interpretation of the wildfire hazard and risk within the WUI is influenced by the “Knowledge of physical consequences, the handling of risk by individuals and social groups, the social and cultural meanings of risk causes and effects, as well as structural

and organizational factors, [which] shape the social experience of risk” (Renn, 1992b, p. 179).

### **Risk Communication and Social Learning**

According to the National Research Council (NRC) Committee on Risk Perception and Communication, risk communication is “an interactive process of exchange of information and opinion among individuals, groups, and institutions” (NRC, 1989). While it is useful to evaluate risk messages according to such criteria as audience comprehension, agreement, and evaluation (Weinstein and Sandman, 1993), the true success of risk communication is not just in providing information. Risk communication should also support a social relationship of “mutual trust and respect” (Otway, 1992, p. 227). This requires building upon the NRC approach to risk communication, and operating under the theory that values, beliefs, emotions, and technical knowledge actually move in both directions: expert to stakeholder and vice versa (Lundgren and McMakin, 1998).

This two-way communication is important. Because risk perceptions are both technical and experiential, the process of risk communication involves both “mutual understanding and mutual learning” (Plough and Krimsky, 1990, p. 229). Fire professionals hold valuable knowledge about preventing and protecting against wildfire. On the other hand, WUI residents may possess a deeper understanding of the local fire history, the success of past management techniques, and what role wildfire currently plays in the community.

In addition to their technical knowledge, resource managers and residents each hold a unique understanding of what it means to live in the WUI. To communicate effectively, a manager must understand what wildfire means to WUI community members according to their personal goals, preferences, and values. Risk analysis that ignores the role values play in risk perception and response will hinder risk management efforts (Plough and Krimsky, 1990) as a result of the audience's "selective inattention to information and interpretations not in harmony with the person's basic social and political assumptions" (Lindesmith, Strauss, and Denzin, 1999, p. 328). Through a process of social learning, managers and stakeholders may reach an understanding of the wildfire risk as it is defined through continuous social interaction, development of meanings, and identity negotiation (Wynne, 1992), thereby supporting a sustained relationship and fostering future risk communications.

## **METHODS AND ANALYSIS**

This research focuses on communities in two areas in the Southeast that were selected with the help of the Southern Urban Wildland Interface Council and chosen because they had active fire vulnerability minimization education programs and significant WUI populations. The first study area is located in northeast Georgia and includes White County and part of Habersham County. White County was originally an agricultural area; currently, approximately 27% of White County is USDA Forest Service (USFS) land. As this WUI area began to serve as a setting for weekend cabins, new development moved up into the mountains and ridges as landowners pursued a beautiful view. Today, many of these WUI communities are composed of retirees, second homes

and homes whose residents commute daily to nearby Gainesville or Atlanta, which is approximately 90 minutes away. White County had a population of approximately 20,000 in 2000 (U.S. Census Bureau, 2000). Between 1990 and 2000, the county experienced 53% population growth (U.S. Census Bureau, 1990, 2000).

There have been few large, destructive fires in the White County area in recent years, but none with significant structural damage. However, there have been several smaller wildfires consistent with Georgia's history of a large quantity of fires averaging about four and a half acres in size. In 2000, a federal pilot project designed to encourage wildfire hazard vulnerability minimization in local communities was instituted through the Georgia Forestry Commission. Its focus is on the White County area, and its goal has been to educate community leaders, local professionals, and homeowners according to the recommendations of the Firewise program.

Most of the White County study area homeowner interviews were conducted in the Skylake community, which was established in 1972 and consists of about 475 houses. This community has had very little experience with the threat of wildfire. We chose to work predominantly in this subdivision because it was viewed by fire professionals as problematic in terms of fire prevention/protection. Built in the hills and along ridges, Skylake homes are exposed to the wildland fire hazard and the road system limits emergency vehicle access. This community has strict ordinances prohibiting burning of litter or debris and restricting the removal of tree cover from around homes. These restrictions are designed to protect the natural aesthetic qualities that residents find appealing. The homeowners' association is currently in the process of installing new fire hydrants throughout the community.

The second study area is located in central Virginia and focuses on Shenandoah County and parts of Augusta and Nelson Counties. This is also predominately an agricultural area, and the WUI communities include residents originating locally, as well as weekend cabin retreats and retirees from more urban areas. Shenandoah County had approximately 35,000 people in 2000, and between 1990 and 2000, the county experienced almost 11% population growth (U.S. Census Bureau, 1990, 2000).

The Virginia study area appears to have had comparatively greater exposure to large and/or destructive fires. Efforts to educate the area's homeowners on wildfire risk and vulnerability minimization strategies began with a federally funded WUI education project for Shenandoah County in 1991, which focused on community hazard rating and organization of local workshops. Since then, there have been several overlapping interagency fire prevention/education programs and considerable emphasis placed on fire prevention.

About half of the Shenandoah County study area homeowner interviews were conducted in Sundance Retreat, an area established as a weekend destination with many small cabins. It currently consists of about 90 cabins and modest homes. This area has experienced nearby wildfires, though none that caused any residential damage in Sundance Retreat. The road system is very poor, and access for emergency vehicles is limited by steep grades. There are no community restrictions on open burning or tree removal. The community is currently in the process of increasing their available water supply in preparation for the threat of future fires by making improvements to a local pond. The Afton Mountain area just south of Shenandoah County was the second site for Virginia site for homeowner interviews. There are multiple subdivisions in this area, and

it was chosen because its communities have a recent fire history, and thus allowed some insight into the role of immediacy in shaping landowners' perceptions of fire and fire prevention.

In-depth, semi-structured interviews as described by Rubin & Rubin (1995) were used because their interpretive approach emphasizes the contextual meaning of text. Using interviews enabled us to maintain a conversational tone conducive to the sharing of personal narratives while still guiding the focus of the discussion. Most interviews lasted approximately one hour and took place in either an agency office or the WUI resident's home. In both study areas, we first interviewed selected local and agency professionals with direct involvement in community fire vulnerability minimization programs, WUI fire hazard experience, and/or knowledge of local community development and planning. We conducted 17 interviews with local and agency professionals. Among those interviewed in either area were USFS and state agency personnel, local government employees, and local fire department officials. The purpose of these interviews was to collect program materials and to determine the source, extent, and content of fire messages communicated to the community. These interviews also provided insight into community demographics, local fire history, fire-related messages and policies advocated by local government and agencies, and initial contacts for our snowball sample of WUI community residents.

Based on the information gathered in the interviews previously described, we completed an additional 15 interviews with community members in which they were asked to address: (1) the types of programs and fire prevention messages being used in their areas; (2) the degree to which individual land owners have chosen to adopt hazard

mitigation techniques suggested by Firewise and similar programs; and (3) their perceptions of risk and the role of fire in their choices of where they live and what they do with their landscaping. Combined, these issues (along with questions of context) allowed us insight into the deeper meanings individuals hold for their homes and for the threat of fire in their area. Many of the WUI residents we interviewed were at some point officers in their respective homeowner's association.

The interviews were transcribed and the analysis in this study was driven by interpretation of events within the context in which they took place. A review of the program structure and document analysis helped determine how the risk messages fit into the general understanding of the education strategies and the fire hazard in the WUI (Hodder, 2000). Most of the analysis was derived from narrative texts in interview transcripts. This provided the necessary "detailed thick description of associations and contexts that allows the material practices [risk messages] to be set within specific historical situations and the particular evocations to be understood" (Hodder, 2000, p. 711). The interview data was analyzed according to the methods proposed by Denzin (2001). Once data were collected, this interpretive process provided three main steps to guide the researcher: (1) bracket the data into its individual features or elements; (2) reconstruct the phenomenon by piecing data back together; and (3) relocating the constructed phenomenon in its original context. QSR N6 software for qualitative data analysis was used to guide the first step. Individual interviews were coded into several main categories and the resulting node system used to guide the rest of the analysis process.

Through this process, the texts were analyzed at multiple levels. During the bracketing phase, each interview was removed from any broader context in order to locate key phrases or statements that speak directly to the negotiation and construction of meanings of wildfire risk. These constituent components were reassembled across interviews in the construction phase of analysis. At this point, common elements among texts were brought together in order to form a coherent image of residents' articulation of wildfire risk meanings. Contextualization, as the name implies, involves locating the heretofore-constructed phenomenon back into the social world. This was accomplished not only by analyzing social contexts within and among interview texts, but also by comparing and contrasting perceptions of risk to those presented in the literature. In the end, this process allowed us the room to interpret interview texts while requiring checks against interviewee perspectives and existing literature. The appeal of Denzin's approach is in its emphasis on context and revealing the interactive process necessary to seeking out the essential meanings of wildfire messages. This made it possible for us to locate differences between agency professionals' and residents' issues of emphasis within their individual and social contexts.

## **RESULTS**

In both study areas, agency personnel and fire professionals expressed concern about the local wildfire hazard and the safety of WUI communities. Several residents had been exposed to program messages, however, most WUI residents interviewed were doing very little or nothing at all in a direct attempt to minimize their vulnerability to the wildfire hazard. Most residents accepted that conditions were present for a wildfire to occur. This does not mean, however, that they share the same meanings of wildfire risk

as program managers, and the results suggest that program messages often neither changed nor addressed the meanings WUI residents hold for wildfire risk.

Discrepancies between the meanings fire professionals held for wildfire, the meanings held by WUI residents, and the education program messages fall into three primary themes. The first discrepancy is a concern for the safety of both residents and firefighters in the event of a wildfire threat. The second discrepancy is the value placed on protecting possessions such as structures, family heirlooms, and pets. The third discrepancy is in the value placed on WUI amenities: specifically, the trees. These suggest areas for improving the messages of wildfire vulnerability minimization education programs.

### **Human Safety**

One of the primary concerns with wildfire that agency and fire professionals emphasized is the threat to the lives of homeowners and firefighters. In the WUI communities we visited, not only were homes located in wildfire hazard areas, but there were also significant limitations on access that could hinder evacuation and emergency response efforts. Also, homeowners may receive enough prior warning to get out of the fire's path unharmed, but wildland firefighters may be left to deal with the unfamiliar danger of a burning home. Fire professionals view homeowner wildfire vulnerability minimization practices as a way to protect homeowner and firefighter lives:

Well, the interagency team wanted to put up a sign 'Firefighter Safety' ....

Really focusing on well, 'You may not care about your house, and you

might care about your family...' I don't know. 'But you should also care about the firefighters who are responding' (VAP2).

While human safety in the event of a wildfire was a primary concern of agency and fire professionals, mention of wildfire's threat to personal safety or firefighters was conspicuously absent from most residents' expressed concerns. Problems with the safe evacuation of residents was rarely mentioned, and usually concern was for those with limited physical mobility such as the elderly:

I think the only thing that really concerns me so much about a fire, as far as Sky Lake concerned, if you've interviewed other people as well, if there were a fire on the lower gap, our best bet would just be to walk out. I think there would be, it concerns me from my community point of view, but Brian and I could walk out, but there are people here that couldn't walk out. I think that's one reason we have to be so adamant and so unforgiving on fires because there are people who could conceivably be closed off from getting out. That to me would be a tragedy. Houses, you know, we could build another house. (GAR8)

It seems that this difference in the meaning of wildfire risk between residents and those professionals within wildfire vulnerability minimization education programs is the result of both a common underestimation of the possible severity of local wildfire among WUI residents and a gap in residents' assessment of fire risk stemming from many agency personnel's stated preference for avoiding motivation through fear. Many residents seemed unconcerned about any serious wildfire threat, which is consistent with the findings of several studies that people are "disinclin[ed] to worry about low-

probability hazards” (Slovic, Fischhoff, and Lichtenstein, 2000, p. 76). Although the western fire phenomenon was frequently mentioned, it was sometimes used by residents as a comparison for downgrading the local hazard. When asked if he worried about fire before prescribed burning became a local issue, one resident replied “No, I don’t think so. I think we were, you know, that was something out west” (GAR1). The Skylake community’s general manager suggested:

We’ve never had anything like what California experiences. I guess some of the terrain would be similar, but there just, evidently, a lot of the factors are not there that would make it the same as out there. The high, high winds, and real extremely dry conditions, and whatever. (GAR3)

Many fire personnel, however, expressed the belief that the conditions existed for a serious local fire to occur. According to a district forester: “We’ve come close to losing multiple homes a time or two but we’ve gotten by. Um, and I sincerely believe before I retire we will have a catastrophic loss home-wise in these hills” (GAP4).

That the professionals’ concern with the high severity of the local wildfire hazard is not expressed in residents’ own risk analysis is also consistent with some program personnel’s hesitancy to exploit fear with warnings of imminent danger in their messages. According to a Virginia Interpretive Specialist with the USFS, “You know, our house burning down is a consequence we can live with, but danger to our families is a consequence we cannot live with. And so, but you don’t want to scare people”(VAP1 – later acknowledged some fear was needed). The GA Department of Forestry Wildland/Urban Interface Coordinator commented:

So that probably the second thing is just, you know, making them aware of the risk. And, it's not scaring them, I, you know, the deputy last night was talking a little bit about scaring folks and insurance and all that kind of stuff. It's not that at all. And that hasn't been our goal. Like I pointed out yesterday, we don't use pictures of the chimney, you know, the Oakland Hills fire aftermath and all that kind of stuff. Not gonna do that. (GAP9).

While some professionals mentioned avoiding scaring residents, there was also the opinion that it would take a bad local fire for residents to be motivated to protect themselves from the hazard. According to a Georgia Department of Forestry (GDF) employee who was responding to the lack of concern of residents and insurance companies:

That's the mentality about it. I'm sorry, but it's going to have to take some kind of major conflagration. I mean, a southern California catch the pavement on fire and burn it up too kind of fire. One of those all hands in the cook kind of fire to really do some destruction and to get the people, I guess you would just say, interested. (GAP10).

It seems that wildfire vulnerability minimization education programs would benefit from directing messages to residents that impressed upon them the threat to human safety while not causing an undesirable response of fear.

### **Personal Property**

Discrepancies between agency message emphases and residents' perceptions involve the definition of what is threatened by wildfire and the value of what is

threatened. A primary example of this are the distinctions made among residents' possessions. The apparent goal of vulnerability minimization messages is protection of structures and personal property, with primary emphasis being on protecting structures. Some professionals emphasized reducing the number of human-caused wildfire starts in addition to protecting structures when addressing their program goals:

And we're also doing the wildland-urban interface stuff, the woodland homes stuff, because that's National Fire Plan money. That's their focus, mitigation projects in woodland communities, and the Potomac Watershed Partnership emphasis is reducing size and number of fires, so you have two completely different strategies and prevention planning for those two things. And so we're having to do all of that. (VAP2)

Vulnerability minimization education materials distributed to homeowners stress primarily the protection of "homes and possessions" (U.S., 2001).

While most residents seemed to consider these positive goals, when articulating the meaning of wildfire risk in their lives they tended to place more emphasis on saving specific types of possessions such as family pictures and pets. For some, it appears that the actual house is considered a replaceable possession and good insurance coverage is adequate protection. In response to the local fire hazard and plans for prescribed burning, one Georgia resident explained: "I don't really have a concern about it. If this house goes, I'll build what I want" (GAR2). It is the irreplaceable pieces of their home that defines the threat of fire. When previously posed with a question from her granddaughter about what she would take if she had to evacuate her house in a matter of minutes, one Georgia resident said her answer was that "I would strip the pictures off our stairwell and

we'd go over the hill. Yeah, you know, it is insured” (GAR8). A Virginia resident indicated what wildfire meant to her when she recalled her experience of wildfire threatening her home:

Like I told you over the phone, the worst part was that I was out of town and my daughter called me and I thought, 'oh my gosh.' I had some, one of the girls up the street was cat sitting for me. She'd go down and take care of the cats or whatever. I called her and I said, 'I don't care if the house burns down.' I said, 'Please get my cats out of there and take them to your house.' I really didn't care. (VAR10)

There were several homeowners who expressed more concern over losing pets or special possessions to wildfire than losing their house, however, program messages rarely acknowledged these meanings of risk. Some program materials designed for community professionals acknowledge the complexity of communities such as “relationships, partnerships, attitudes, and values that bind people, businesses, organizations and agencies together and motivate them to achieve common goals” (NWUIFP, 2001, p. 4). Education materials distributed to homeowners occasionally mention protecting specific possessions such as pets, but these values are not emphasized.

### **Natural Amenities**

Finally, residents of the WUI cite many advantages to living in such an environment. These natural amenities, especially the tree cover, are what residents expressed they were most protective of and their value is enough that removing trees from within the Skylake community without approval can net a substantial fine.

According to a Skylake resident, one homeowner was fined \$13,000 for inappropriately cutting down trees on his property (GAR6). Their desire for privacy and an almost entirely natural setting makes many vulnerability minimization practices such as clearing defensible space and eliminating ladder fuels seem to conflict with the very reasons they chose their home's current location. Part of the Skylake general manager's response to a Firewise presentation was that "There would not be a Skylake as we know it right now if you put that same set of rules into our community. So, you know, we have our rules, but they have to be different than maybe somebody else's idea, and trying to control, to keep the aesthetic value in consideration" (GAR3).

In the WUI, many residents have a very specific definition of attractive landscaping, and it includes lots of trees and leaves around the house. Resident after resident, we saw that removing some tree and leaf cover was not worth the added benefit of protecting their home. Their trees and their view hold a lot of meaning for them and are often considered more valuable than their house. They are what make their house their home. According to a Skylake resident and chairman of the community's natural resources committee:

So, our concern here, though, is trying to blend what we know is the way to practice forestry from the total standpoint into a desire on the owners to maintain as much beauty with the forest as they can. So, we keep, we keep the, uh, trees that are alive. Just put it that way. (GAR6)

As fiercely protective as residents are of their trees, very few acknowledged that a destructive wildfire could take not only their house, but their trees and view as well. The same resident that is cited earlier as saying that she isn't worried about the wildfire

hazard because she can rebuild her home also responded to a question of the advantages to living on a hill next to the national forest with: “I see it as an advantage. That I’ll always have this view” (GAR2). Like many others, she does not recognize that even if she can rebuild, a wildfire will have changed the landscape drastically.

Wildfire vulnerability minimization education messages do not acknowledge that without protection in the event of a wildfire threat, these natural amenities will likely burn as well. Agency personnel seem to view residents’ value of the natural environment and its amenities as a barrier to successful vulnerability minimization. A Virginia Interpretive Specialist with the USFS commented on communities “Like Bryce, where you can’t cut trees of a certain size or a certain distance from the house. Or they just have rules where you can’t go in and do Firewise activities. So you have to change the whole premise of why they moved there” (VAP1). These trees hold a lot of meaning for WUI residents and would be the first thing to burn, and yet, there was no obvious attempt on the part of education programs to focus on wildfire vulnerability minimization practices as a means of protecting these amenities from wildfire. Instead, messages are framed in such a way that vulnerability minimization practices appear to threaten the existence of these highly valued natural amenities and tend to discourage residents from finding them very meaningful.

## **CONCLUSION**

These results indicate significant gaps in the ways in which fire professionals and private landowners conceptualize the risks of damaging wildfires. This suggests possible improvements in fire programs’ risk communication. Several agency personnel

and fire professionals expressed a significant belief that WUI residents do not take the necessary steps to minimize their vulnerability to wildfire because they do not realize the true threat of the hazard. This is likely the result of a low visibility or infrequent occurrence of serious, destructive fires locally. However, if a serious, destructive fire occurred, for some the lesson came too late and for most the lesson would wear off too soon (Kates, 1976). While it is important for program messages to respect the line between providing information and emotional manipulation, it seems that to be effective, program vulnerability minimization messages need to be accompanied by a convincing expression of the seriousness of the hazard. One possible solution is that messages could emphasize threats to firefighters in a way that exposes residents to the real danger of wildfires while at the same time externalizing the negative imagery in a way that does not encourage an exaggerated response of fear for their own personal safety.

Messages that highlight risk to highly-valued possessions in addition to just general property and the protection of the structure itself, may help residents recognize all that may be saved through a wildfire vulnerability minimization response. By addressing wildfire's impact on residents' primary values, their perceptions of the significance of the wildfire hazard to their lives may change. Pets are a perfect example of this. Three residents expressed concerns about the safe evacuation of their pets. They, like many others, may find wildfire vulnerability minimization a more worthwhile effort if it is presented in terms of saving their cats or their family heirlooms.

In addition, it seems that incorporating the goal of protecting the amenity values of living in the WUI into program messages will resonate with residents. By focusing more on protecting those things that are most meaningful to the WUI residents,

specifically the natural setting for their home, program messages may better connect resident values with an appropriate vulnerability minimization response. For example, Skylake residents already accept restriction of their behavior, such as the rule against burning leaves and debris, to protect the natural environment (GAR3). Residents who value their trees more than their home may consider house insurance to be less adequate wildfire protection when presented with the burned landscape within which they can rebuild. The idea of protecting the community's trees from an individual house fire may make practices such as defensible space much more appealing to homeowners, as well as their neighbors who will likely also be affected.

By recognizing the different meanings of wildfire that exist among professionals and residents and by understanding the primary values of WUI residents, wildfire vulnerability minimization education messages can address those risks that are most meaningful to residents. This will help residents recognize the unique significance of the wildfire hazard in their lives (in their community, on their property, and in their home) and will more effectively promote program goals.

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## **CHAPTER IV.**

### **Conclusions**

This research has provided valuable insight for the evaluation and improvement of wildfire vulnerability minimization messages intended for residents of the WUI. The results within the first paper show that even though most residents accept that a wildfire hazard exists, few internalize a personal role in the danger of the wildfire hazard or a personal responsibility to make an effort to protect their own home from a possible future wildfire threat. By externalizing these meanings instead, residents do not perceive many of the vulnerability minimization messages as significant to their situation as they understand it. Rather than expend their resources taking personal precautions on their property, their efforts and concerns are instead directed toward others: those who are perceived as either capable of contributing to the wildfire danger or fighting one should it ignite. Those WUI residents who internalize either the wildfire hazard or a responsibility for protecting their property seem to find some relevant meaning in vulnerability minimization messages, whether it be additional evidence of a wildfire hazard or a relevant solution to a perceived risk. Internalization does seem to lead to some form of personal responsibility or action, and can be seen as a step in the right direction in terms of wildfire program goals.

The previous processes of internalization created during negotiation of wildfire messages and meanings illustrate a direction that program managers may take in improving the effectiveness of program messages. Internalization of wildfire meanings appears to be key in motivating residents to take personal responsibility and action. Those who internalize program messages seem to do so because they find some relevant

meaning in them. This suggests two possibilities. Managers can focus their energies on changing WUI residents' core values and preferences so that they find current program messages more relevant, or instead, future program messages can be designed to appeal to the core values and preferences that many WUI residents already hold (often very tightly).

The results presented in the second paper were surprising in that many WUI residents did consider their houses replaceable in comparison to certain possessions and their trees. They suggest a means for implementing this second alternative; design wildfire vulnerability minimization messages so that they address those meanings attached to living in the WUI and wildfire risk which residents strongly value or believe in. This means that rather than focusing on protecting the house, messages should focus instead on things held most dear by residents, such as their photos, pets, and trees. By presenting wildfire vulnerability minimization practices as a means for protecting residents' preferences and the things they strongly value will most effectively incite a protective behavioral response. This is because residents will be much more likely to internalize these more "relevant" messages and suggestions, and internalization is key to motivated action.

### **Other Considerations**

Traditionally, in the positivist arena, scientific research is evaluated according to criteria of generalizability, reliability, and validity to determine the vigor or the results. Reliability is an indicator of the repeatability of the results and generalizability suggests reliability across a population. Demonstrating reliability in interpretivist research, such

as this study, would require a measurement of inter-rater reliability during analysis. Inter-rater reliability, a comparison of the consistency of the interpretations among multiple analysts, can provide some indication of the repeatability of the results when dealing with consistent data. Generalizability of the results is a delimitation of interpretivist research because it is only achieved by leaving behind the uniqueness of individual responses. Strength in this area of scientific interpretation is best left to subsequent survey research that is based on prior exploratory findings and can reasonably pursue repeated measurement.

One of the strengths of interpretivist , or post-structuralist, research is its ability to achieve high validity. This is because of its emphasis on situating the research within context and its method of collecting data in the form of narratives, or thick description (Geertz, 1973), and preserve its uniqueness in the interviewees' own words. The use of member checks can provide some indication of the strength of interpretivist research's validity. Member checks involve taking the researcher's translation of the subjects' narrative texts back to them and allowing them to confirm or disconfirm the accuracy of the stories portrayed. This is a way to let those whose stories are being represented determine the validity of the results.

While criteria of generalizability, reliability, and validity are important to consider in all research and are essential for judging the quality of some research, this study takes an interpretivist approach that requires the use of different quality indicators. These criteria are all based on the interpretivist paradigm's emphasis on the idea that there exists neither a value-neutral subject nor observer. This allows the researcher's focus to move away from objectivity into an exploration of multiple subjectivities. In other

words, a strength of interpretivist research is its allowance for the co-construction of knowledge, between researcher and subject, so that the momentary piece of the world that is of interest can be recreated and displayed as authentically as possible.

To provide the reader with all of the necessary context requires that the researcher clearly indicate his or her own goals and biases. This is especially important in presenting results, because the interpretivist approach relies on a reflexive audience to judge the value of the research for themselves. For the audience to make a qualified determination of any research's validity, they must be able to compare their own biases to those of the researcher. Interpretivist research distinguishes a quality product by its ability to resonate with the audience and prove meaningful to them based on their individual meanings and frames of reference. It can also be judged on its success in achieving social action, which in the case of this study would mean improving fire professionals' ability to encourage voluntary compliance with wildfire vulnerability minimization suggestions.

Because interpretivist research accepts the subjectivity inevitable in its analysis as an important source of context, it is safe to say that there are an infinite number of possible interpretations of our results. Simply changing the research's goals from, in this case, assisting program managers, to something more along the lines of reducing agencies' interference in private affairs would result in different biases in the interview interactions and lead to an exposure of different meanings in the narrative text.

This research has built upon previous research to discover the narratives and behaviors that take us beyond assessment of beliefs, attitudes, values, and preferences into a deeper understanding of how WUI residents receive, interpret, and reconstruct

wildfire messages. By identifying these processes, we now have a better understanding of the ways in which WUI residents assign and negotiate meanings for wildfire vulnerability minimization messages and respond to the wildfire hazard within their interface community. This study's results significantly improve our current understanding of the context in which WUI wildfire research takes place, and will improve resource managers' ability to create effective wildfire education programs and messages.

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APPENDIX

**Participant's Informed Consent Form**

## Participant's Informed Consent: Fire Meanings and Messages

### Investigator:

This study is being conducted by Amanda Grau and Kevin Larkin of the Department of Forestry at Virginia Polytechnic Institute and State University. Amanda can be reached at (540) 231-3596. Faculty advisor, Kevin Larkin, can be reached at (540) 231-1621.

### I. Study Purpose

- The purpose of this study is to capture the meanings private landowners and government representatives hold for fire prevention messages, as well as meanings held for Smokey Bear. The research is funded through the USDA Forest Service Pacific Southwest Research Station.

### II. What Will I Have to Do?

- Fill out this Informed Consent Form and return it to the researcher before the interview begins.
- Participate in an interview, answer questions about your experiences with fire prevention practices, and tell the interviewer the stories surrounding those experiences.
- The interview will take about one to two hours.
- The interview will be audio-recorded and transcribed for analysis.
- You will be contacted to see if you would like to review a summary of the findings.

### III. Benefits of this project

- You will help the researchers understand critical gaps in communication regarding fire management practices; rectifying these gaps will help minimize property and personal damages should a wildfire occur. Your participation will also help a principal investigator complete a master's of science degree.

### IV. Is It Private?

- If you so choose, your name will be removed from all forms and data collected and will be replaced with a fictitious name to be used throughout the study and in any reports, theses, or manuscripts associated with it. At no time will your name be associated with your responses.

### V. Risks

- You may decline to answer any question.

### VI. Compensation

- When the project is complete, you may request a summary of the studies' findings.

### VII. Freedom to Withdraw

- If at any time you change your mind about participating in this study, you are encouraged to withdraw your consent and to cancel your participation.

### VIII. Approval of Research

- This research project has been approved, as required, for projects involving human subjects by the Institutional Review Board of Virginia Polytechnic Institute and State University and by the Department of Forestry.

### IX. Participant's Agreement and Responsibilities

- I have read and understand what my participation in this study consists of. I know of no reason that I cannot participate in this study. I have had all my questions answered and hereby give my voluntary consent for participation in this project.
- If I participate, I may withdraw at any time without penalty. I agree to abide by the rules of this project.
- Should I have questions about this research I will contact:  
Amanda Grau (540) 231-3596 Researcher/Interviewer  
Kevin Larkin (540) 231-1621 Faculty Advisor  
H. T. Hurd (540) 231-5281 Chair of the Virginia Tech IRB

Participant's Signature

Date

## VITA

Amanda Lynn Grau, the daughter of Timothy and Debra Grau, and sister of Timothy and Erin Grau, was born on October 24, 1979 in Lake Wales, Florida. She graduated from Crittenden County High School, in Marion, Kentucky in May 1998. She attended Mississippi State University in Starkville, Mississippi and graduated *summa cum laude* in May 2002 with a B.S. degree in Forestry. Amanda graduated from Virginia Polytechnic and State University in August 2004. This thesis completed her M.S. degree in Forestry at Virginia Tech.