

Forest as hazard, forest as victim: Community perspectives and disaster mitigation in the aftermath of Kelowna's 2003 wildfires

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Situated within the political ecology of hazard, this article is an extended case study of the devastating 2003 wildfires in and around Kelowna, British Columbia (also known as the Okanagan Mountain Park Fire). This article reveals how compliance (or lack thereof) with fire mitigation strategies recommended by provincial, regional, and municipal agencies is complicated by differing social constructions of what constitutes ecologically sustainable forest management and community safety. Three perspectives emerge regarding the urban forests: "nature as hazard"—a volatile force to be controlled; "nature as instrumentally valuable"—a contribution to the character of one's surroundings and subsequent sense of place; and "nature as intrinsically valuable"—a distinct entity to be preserved and protected for its own sake. The article also examines how experiences of disaster influence community perceptions and result in a greater willingness to engage in fire mitigation strategies due to perceptions of heightened vulnerability. Forestry and fire mitigation agencies need to determine multiple courses of action among the varied and valid range of residents' nature perspectives. The role of human agency in disaster mitigation must be examined, particularly as the risk of fire at the wildland-urban interface continues to be exacerbated by encroaching human settlements and climate change.

Keywords: community, hazard, political ecology, social nature

La forêt vue comme un risque ou une victime : les perspectives communautaires et l'atténuation des catastrophes au lendemain des feux de friches de 2003 à Kelowna

S'inscrivant dans le courant de l'écologie politique du risque, cet article a pour objet une étude de cas élargie portant sur les feux de friches de 2003 qui ont complètement détruit la région de Kelowna, Colombie-Britannique (aussi appelé le feu de forêt du Parc du Mont Okanagan). L'article met en évidence que la difficulté à se conformer aux stratégies d'atténuation des incendies proposées par tous les paliers gouvernementaux (provincial, régional et local) résulte du fait qu'il existe de nombreuses constructions sociales des pratiques de gestion forestière écologiquement viable et de la sécurité communautaire. Il se dégage trois conceptions des forêts urbaines : «la nature comme risque», une force imprévisible qu'il faut maîtriser ; «la nature comme valeur instrumentale», un apport aux particularités du milieu et ainsi à l'esprit du lieu ; et «la nature comme valeur intrinsèque», une entité distincte à conserver et à protéger en soi et pour elle-même. Il est question également de la façon dont les expériences vécues d'un désastre peuvent d'une part exercer une influence sur les perceptions des communautés, et d'autre part se traduire par une plus grande volonté de s'engager dans les stratégies d'atténuation des incendies en raison de la perception d'un sentiment de vulnérabilité plus élevée. Les instances responsables de l'exploitation des forêts et de l'atténuation des incendies ont l'obligation de définir toute une série d'actions parmi les conceptions nombreuses et valables que les

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résidents possèdent sur la nature. La part de l'intervention humaine dans l'atténuation des désastres doit être abordée, compte tenu du fait que le risque qu'un incendie se déclare au point de contact entre les milieux sauvage et urbain s'aggrave en raison de l'extension des périmètres urbanisés et des changements climatiques.

Mots clés : communauté, risque, écologie politique, nature sociale

Introduction

Large-scale disaster events such as the wildfires in Slave Lake, Alberta in 2011 and Los Angeles, California in 2008, and Hurricane Katrina in New Orleans in 2005 have accelerated an interest within hazards research in the social contributions to disaster vulnerability in North America. The scale of destruction to human lives and property resulting from natural events often stems from how settlements have been located and patterned, which can be attributed to a variety of social, political, economic, and ecological factors (El-Masri and Tipple 2002; Findlay 2002; Wisner et al. 2004; Etkin and Stefanovic 2005; Wisner and Walker 2005; La Point 2007).

Research on flooding and hurricane events has exposed the precarious nature of technocratic measures in reducing risk to lives and property (White 1945; Burton et al. 1993; Cigler 1996; Burby 1998). As a result of large-scale infrastructural failures that have often increased the vulnerability of communities to natural hazards (as demonstrated most dramatically in recent years in the failure of the levee system in New Orleans during Hurricane Katrina), researchers have explored the role of preserving natural features such as wetlands in order to reduce the effects of flooding within urban settings (La Point 2007). In these cases, disaster mitigation policy and ecologically sustainable planning facilitate progress towards the same, or at least complementary, goals: greater resilience to environmental change and concurrent progress towards ecological sustainability.

In the case of forest fires, forestry experts are increasingly exposing the drawbacks of previous forest fire management policies that relied on the almost complete suppression of wildfires as part of a strategy to protect residents within the wildland-urban interface (WUI). Forestry professionals now promote an understanding of the important role played by fire in forest ecosystem function. They also assert that the restriction of

natural cycles of burning that were once a part of forest ecosystems increases the risk of much larger wildfires that are more difficult to control within denser wooded areas, potentially threatening neighbouring communities (Weaver 1943; Martin et al. 1988; Keane et al. 1990; Arno and Allison-Bunnell 2002, 119–136; Pollet and Omi 2002; Hirsch 2005; NRCan 2007; Pyne 2007, 467–478).

The elevated risk of forest fires predicted as a result of climate change, in combination with increased levels of development, presents numerous challenges for sustainable community planning in forested environments across Canada (Dellasala et al. 2004; Reinhardt et al. 2008). The threat of fire is an additional dimension to community planning in forested areas that requires, in some cases, that trade-offs be made between preserving vegetation and providing increased safety from the potential threat of future fires. Due in part to the significant proportion of Canadian urban forest¹ that exists on privately held land, forest fire mitigation practitioners often advocate a holistic approach to urban forest management and fire mitigation that requires the active support and participation of all community members (Winter and Fried 2000; Kenney 2003; Hirsch 2005; Shindler 2007).

This article is an extended case study of the devastating wildfires that impacted the municipality of Kelowna, British Columbia in August 2003—part of a larger, anomalous event, coined Firestorm 2003, in which abnormally hot, dry weather sparked over 2500 wildfires in the interior of the province (Filmon 2004a). During the post-disaster reconstruction period, several recommendations were made by provincial, regional, and municipal agencies to revise fire mitigation strategies. While some of these

¹The Canadian Urban Forest Network (2010, 2–3) defines the urban forest as: “trees, forest, greenspace and related abiotic, biotic and cultural components in and around cities and communities. It includes trees, forest cover and related components in the surrounding rural areas (peri-urban forests).”

recommendations addressed changes to modify risk exposure (e.g., through perimeter roads and agricultural buffers [such as Kelowna's vineyards and orchards] or through changes to building codes to reduce the combustibility of structures), others, which this article focuses on, propose policy recommendations to modify the hazard: local forests. If adopted, these would require community members to implement and/or support land use practices that alter local forest ecosystems in order to reduce risk to their city from wildfire. Drawing on primary qualitative data, including semi-structured interviews and site visits, this article uncovers the ways in which the implementation of particular disaster mitigation recommendations is potentially complicated by differing interpretations of forest values among community members. More specifically, this article addresses the following questions: First, in the aftermath of the devastating effects of the 2003 Okanagan Mountain Park Fire, how are residents' perceptions of nature (in this case, urban forests) within the community influenced by disaster? And second, how is acceptance or rejection of forest fire mitigation recommendations in Kelowna influenced by the varied meanings and priorities placed on ecologically sustainable forest management and community safety by residents within the community?

The City of Kelowna, British Columbia and the Okanagan Mountain Park Fire

The City of Kelowna is located in the southeast interior of British Columbia. With 113 000 residents, Kelowna is an area of significant population growth, having expanded by 72 percent in the 20 years between 1986 and 2006 (Simmons and McCann 2006; City of Kelowna 2008; City of Kelowna 2009). Due in large part to its scenic location among provincial parks and sites of natural interest in the Okanagan Valley, as well as its moderate, semi-arid climate, Kelowna is a popular tourist and retirement destination. The city actively markets itself as an ideal location to enjoy outdoor activities such as hiking, mountain biking, and skiing within a forested setting (Aguilar et al. 2005).

The Okanagan Mountain Park Fire began on the night of August 16, 2003, ignited by a lightning strike during a period of prolonged hot and

dry weather conditions. Spurred by strong winds and dry forest vegetation, the blaze eventually grew into a Rank 6 crown fire, which, according to the British Columbia Ministry of Forests and Range (BCMFR) Fire Intensity Rank System, is the most damaging of this type of disturbance (BCMFR Wildfire Management Branch 2011). The fire moved across the whole area of Okanagan Mountain Park (approximately 13 000 hectares) within a period of four days. Over the course of the fire, 33 000 residents in and around Kelowna were evacuated, and 238 homes were significantly damaged or completely destroyed. By the time the fire was mostly contained in September 2003, almost 26 000 hectares of forested land surrounding Kelowna had burned and over \$200 million in damages had been incurred (Freake and Plant 2004; B. A. Blackwell & Associates Ltd. 2006; BCMFR Wildfire Management Branch 2008). The homes most vulnerable to the fire were located in the city sectors of North Mission-Crawford and Southwest Mission, two areas comprised of high value residential properties that had steadily encroached into the forested periphery of the city. In the five years prior to 2003, residential properties in these neighbourhoods represented an average of approximately 15 percent of Kelowna's new home construction, and median residential resale prices were up to 50 percent higher in these areas as compared to the median resale value for the wider Kelowna area (CMHC 1999, 2000, 2001, 2002, 2003; Stephen 2011).

The evolving science, politics, and policies of forest and forest fire management

There is relatively limited documented information about the fire disturbance history of the southern interior region of British Columbia. It is often suggested that, prior to large-scale settlement, five- to twenty-year cycles of low-intensity forest fires cleared excess brush while for the most part preserving older and larger-growth trees (Filmon 2004a; Freake and Plant 2004; Heyerdahl et al. 2007). Others have proposed that the area historically experienced more of a mixed-severity regime, in which both recurrent, low-intensity, and less frequent "stand-replacing" fires were known to occur (B. A. Blackwell & Associates 2007; Klenner et al. 2008). The

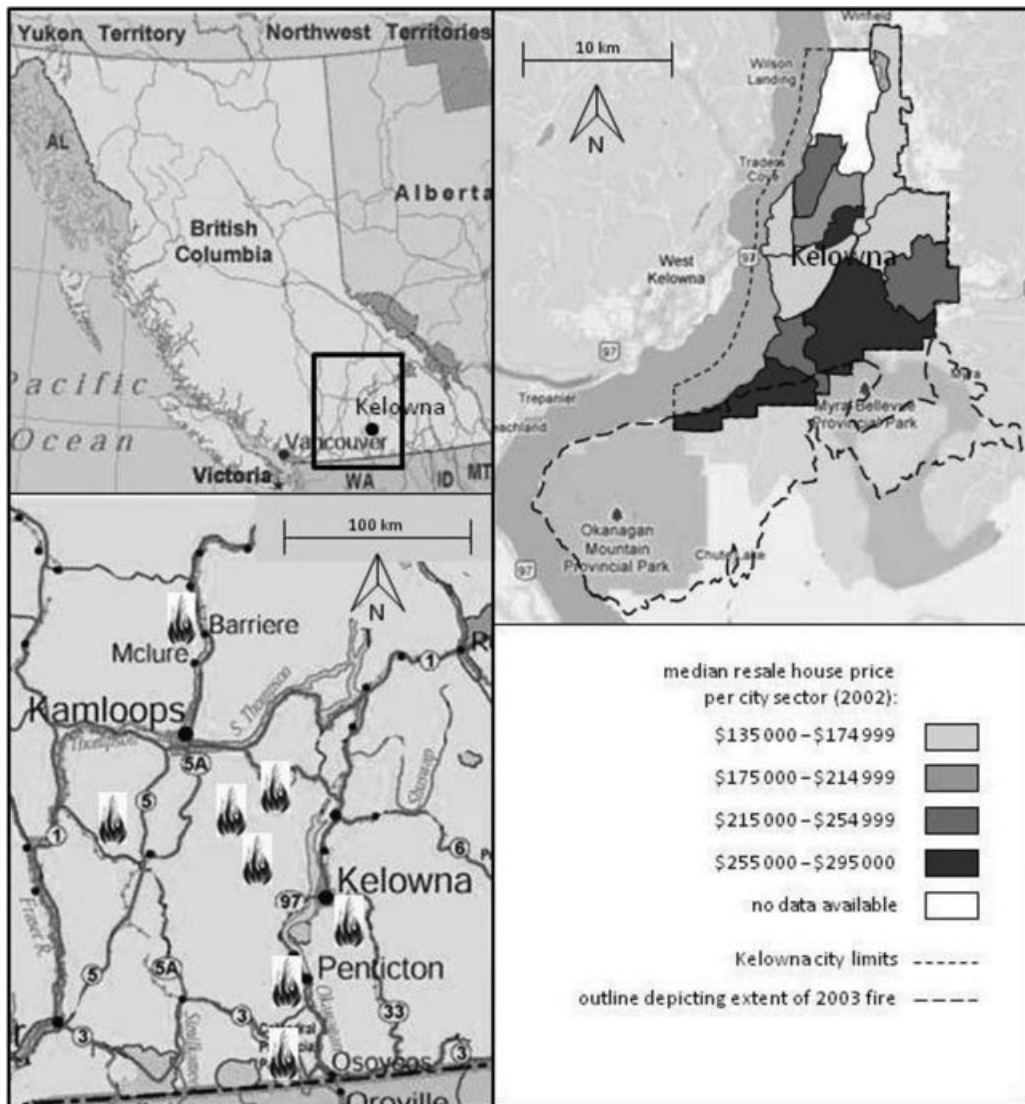


Figure 1

Top left: Map of Kelowna within British Columbia. Bottom left: Map of Kelowna within the Okanagan region, British Columbia, depicting the number of forest fires burning in the region on August 20, 2003. Fire icons indicate the approximate location (not size) of fires. Top right: Map of Kelowna depicting the intrusion of the 2003 fire on city sectors containing higher value properties at the forested southern edge of the city.

prevailing view is that currently, as the result of years of fire suppression policies, the species makeup of British Columbia's forests has been significantly altered and the understory vegetation that would have otherwise been removed has remained and increased in density over time.

As a result, forest fires have the potential to advance upward from lower levels of thick forest brush to the taller treetops (i.e., crowns) overhead; this is a process that then leads to more intense and damaging crown fires, similar to what occurred during the 2003 Okanagan

Mountain Park Fire (BCMFR Wildfire Management Branch 2004; NRCan 2007; Reinhardt et al. 2008). The current mountain pine beetle infestation also complicates fire management within British Columbia forests, as fires have the potential to ignite and spread more quickly among regions of dead forests within 15 years of an infestation (NRCan 2005; B. A. Blackwell & Associates 2007).

Varying perspectives have existed regarding the benefits and risks of forest fires since early North American settlement. During the early 1900s in Canada, support for more assertive approaches to forest fire suppression came from forested communities that suffered damage as a result of large-scale wildfires, as well as from the forest industry due to concerns about the potential loss of forest resources from fire (Filmon 2004a; Hirsch 2005; NRCan 2005). However, the last quarter of the twentieth century brought an increasing awareness of the prohibitive economic costs and risks of continued suppression, and the advancement of forest ecology since the late 1970s also promoted increased awareness of the potential benefits of fire disturbance for the healthy function of forest ecosystems (Hirsch 2005; NRCan 2005).

Today, forest fires continue to be suppressed in the vast majority of Canadian forests (Hirsch 2005) for several reasons: to protect neighbouring communities from fire damage and excess smoke, to protect timber resources, and to reduce potentially significant carbon emissions (that could contribute to climate change) that would be generated during large scale fire events (Hirsch 2005; NRCan 2005). However, several options now exist for forest fire mitigation in WUI areas with the primary purpose of removing excess vegetation, many of which “are the subjects of much debate” (Brown et al. 2004, 903). Specific mitigation strategies include: prescribed burns, set by forestry officials under strictly controlled conditions; mechanical tree removal; and the replacement of flammable vegetation such as conifers with less flammable species such as deciduous trees or shrubs (Brown et al. 2004; Kauffman 2004).

There is a diversity of social, economic, and ecological concerns to be addressed as part of forest management and fire mitigation across North America’s forested areas. The many stakeholders involved include forest practitioners,

representatives from various levels of government, community, and environmental groups, as well as other members of the general public. These stakeholders often hold differing opinions about how efforts towards environmental protection and community safety can and should be achieved.

The political ecology of hazard: Social vulnerability to natural disturbance

A mid-twentieth century analysis of approaches to flood mitigation by White and his colleagues within the Chicago School of natural hazards research marked a substantial movement away from the common reliance on imperfect structural approaches to subduing natural forces (e.g., through dams and levees), which had the additional unintended drawback of promoting settlement in areas prone to hazard. These researchers focused on behavioural analysis and the assumption that individuals and institutions could, for the most part, mediate their own exposure to risk by choosing from a selection of “adjustments,” which included disaster insurance and restrictions over land use and building construction. Choices made by communities and individuals regarding settlement in volatile areas were assumed to be the result of trade-offs made between the economic benefits or emotional appeal of an area and its disaster potential (White 1945; Kates 1962, 2007; Hewitt 1971; Burton et al. 1993).

Over the last few decades, other scholars have refined the concept of disaster vulnerability, especially as it relates to disadvantaged populations in the developing world (Hewitt 1980, 1983; Watts 1983; Blaikie and Brookfield 1987; Pelling 2001; Wisner et al. 2004). Moving away from analyses centred on individual choice or the management of ecological extremes, their study of disaster has involved a more subtle investigation into the social, economic, and political forces that have influenced differential exposure to natural events.

Among these differing approaches to disaster theory, the common assumption has been that, in general, more prosperous North American populations are better able to reduce the degree of vulnerability to natural disturbance to which they are exposed (Cronon 1996; Davis 1999;

Wisner et al. 2004). Though this assumption has been challenged by some scholars (Cigler 1996; Masozera et al. 2007; Collins 2008), it is often accepted that exposure to disaster among residents of many urban regions of North America results from a common desire to live embedded within environments that may experience periods of volatility. In many forested communities, for example, populations have expanded greatly due to the appeal of living within scenic locations; these areas often have accordingly higher property values due to their pleasing visual attributes, yet have considerably more exposure to the potential risk of property damage from forest fires (Cortner et al. 1990; Winter and Fried 2000; Dombeck et al. 2004). At the same time, technocratic engineering strategies continue to facilitate development in areas known for their potential instability, while entrenching a perspective of societal dominance over nature (Cigler 1996; Pelling 2001; Arno and Allison-Bunnell 2002, 11–26; Etkin and Stefanovic 2005; Hirsch 2005; NRCan 2005).

Social nature/social constructions of nature

The “social nature” concept acknowledges society’s inevitable influence on and interrelationship with other elements of the natural world (i.e., ecosystems in which we are embedded, and non-human populations), in contrast to the “nature-culture dualism” that is often perpetuated in modern Western society (Castree and Braun 1998; Castree 2001; Braun 2002). Social nature theorists have explored the ways in which differing (and sometimes conflicting) interpretations of ecological events, and the generation of solutions to ecological challenges, can reflect particular political agendas or societal trends (Harvey 1996, 176–204; Braun 2002; Keil 2003). Castree (2005) contends that the natural world cannot be experienced in any form that is free of bias or social construction.

This article adopts a poststructural lens to evaluate how nature is interpreted, valued, and controlled among populations in a modern Western context. Within this conceptual framework, the material existence of nature itself is not being denied, however, doubt is cast on sole reliance on “expert” advice or absolute definitions of what nature is or how ecological concerns

should be addressed; instead, there remain many possible means through which societies may interact with and attempt to preserve non-human environments (Escobar 1996; Castree and Braun 1998; Demeritt 1998; Castree 2005). To this end, our article draws on literature that demonstrates several ways in which nature is interpreted in a contemporary North American urban context: as *volatile*—a dynamic but unpredictable force to be controlled; as *instrumentally valuable*—a contribution to the aesthetic character of one’s surroundings and subsequent sense of place; and as *intrinsically valuable*—a distinct entity to be preserved and protected for its own sake.

The “nature as hazard” perspective: Hazard literature often stresses the negative impacts of natural forces without examining the societal conditions that influence disaster vulnerability (Tobin and Montz 1997; Bryant 2005). Disaster mitigation strategies that have emphasized control over nature have exacerbated residents’ somewhat fearful attitudes towards their surrounding natural areas (Cigler 1996; Burby 1998) and influenced reactions to particular fire mitigation methods. For example, the relatively recent shift in North American forest management policy from complete fire suppression to the implementation of controlled burns in order to emulate natural disturbance has faced significant resistance from some WUI residents who perceive a prescribed burn to be a potentially uncontrollable approach (Winter and Fried 2000; Shindler 2007).

The “nature as instrumentally valuable” perspective: Nature is often valued according to how it may benefit a society, for example by satisfying an aesthetic preference or providing an economic asset. An aesthetic appreciation of nature in urban environments is frequently linked to residents’ sense of place and cultural or individual identity (Hull IV et al. 1994; Swart et al. 2001; Etkin and Stefanovic 2005). Rapid and extensive urban development into forested areas can be the largest factor complicating ecologically sustainable practices of fire mitigation (Dombeck et al. 2004; Collins 2008). As well, emotional ties to particular landscapes have contributed in part to conflicts surrounding how urban ecologies should be restored (Helford 2000).

The perceived commodity potential of so-called “natural” environments is frequently centred on the promotion of tourism opportunities or a general increase in property values (Keil and Graham 1998; Wolch 2007). Residents may prioritize perceived private property rights over community disaster mitigation efforts or the conservation of urban ecologies (Cigler 1996; Winter and Fried 2000; Daniel et al. 2003; Collins 2005; Etkin and Stefanovic 2005; McGee 2005; La Point 2007; Collins 2008).

The “nature as intrinsically valuable” perspective: In this perspective, nature’s worth is measured beyond its benefit to society; there is a moral responsibility to gear individual actions towards the protection of vulnerable wilderness areas (Taylor 1986; Lynn 1998). Wilderness is not perceived as a pristine entity, but is simply allowed to thrive with minimal human intervention or interruption (Foreman 2008). Desfor and Keil (2004) and Wolch (2007) explore value systems among civic activists that are predicated on the concept of “eco-citizenship,” a fundamental relationship with and respect for nature that motivates actions towards environmental stewardship, in their analysis of river restoration projects in North American urban areas. In the case of urban forested areas, conflicts have sometimes arisen between disaster mitigation agencies and residents who prioritize the intrinsic value of forests (Nelson et al. 2005; Prather et al. 2008). The opposition to the 2002 *Healthy Forest Initiative* (US Office of the President 2002) in the United States demonstrated how environmentalists have linked aggressive tree thinning recommendations to logging strategies motivated primarily by commercial actors (Dellasala et al. 2004; Dombeck et al. 2004; Kauffman 2004; Reinhardt et al. 2008).

Methodology: A poststructural approach to discourse analysis

This study employs qualitative methods inspired by Castree’s (2005, 27) attempts “...to reveal the ‘symptomatic silences’ that lie within any given claim about what nature is, how it works, what it does and how it should be treated.” Social constructions of nature as expressed by residents in

and around Kelowna are explored through the methodology of Foucauldian discourse analysis. Discourse is described as “...a particular knowledge about the world which shapes how the world is understood and how things are done in it” (Rose 2001, 136). This analytical approach acknowledges the existence of multiple, sometimes competing discourses, originating from such factors as “...claims to truth, or to scientific certainty, or to the natural way of things” (Rose 2001, 154). The most powerful discourses become established as “normal” or “common-sense” (Waitt 2005, 165); however, several discourses surrounding an issue can co-exist and often compete, in a variety of forms that may all have some claim to validity (Hajer 2006). Discourses are not fixed in position, but instead respond to changing social influences (Shurmer-Smith 2002).

This article aims to uncover the discourses through which Kelowna residents place meaning on urban forests and forest fires, as well as the ways in which individuals make choices based upon these social constructions of nature. It employs a discursive analysis of public documents pertaining to the fire and its aftermath (including media accounts, transcripts from public meetings that formed the initial part of the *Firestorm 2003 Provincial Review*, resident surveys, and press releases). This analysis involved identifying subtle and repeated themes within a particular discourse, as well as the societal influences on their production. Identified themes became the starting point for a deeper and more detailed study of perspectives within the material as part of an iterative process between the sources and the researcher’s insights (Crang 1997).²

This rich body of primary data was then supplemented with semi-structured, in-depth interviews conducted in September 2008 with 11

²These more intensive methods of analysis of residents’ views were employed not with the purpose of applying findings across a wider population, but with the intent of providing a greater comprehension of selected “...rationalities, implications and meanings” (Hoggart et al. 2002, 204). Through an examination of each among the variety of perspectives that existed across this group, it became possible to understand *some* of the links that exist between nature perspectives and the actions taken or concerns voiced by residents that live within this forested environment. Interviews provided the opportunity for “...in-depth understanding that is best communicated through detailed examples and rich narratives” (Hoggart et al. 2002, 205).

community residents (a roughly equal number of women and men, ranging in age from their early twenties to just over sixty-five, all living in middle- or upper-income neighbourhoods, none of whom had lost their homes in the fire, but all of whom experienced the 2003 fire) and 3 directly relevant government officials from municipal, regional, and provincial bodies. These approximately 1.5 hour interviews, which documented the reactions of community members to forest fire mitigation and urban forest management in and around Kelowna, as well as personal connections to urban forests, were analyzed in order to explore the ways in which residents' personal interpretations of urban nature connect to larger discursive themes of sustainability and hazard. For example, forest fire can be interpreted within a range of views—as an extremely damaging force to lives and property, as a vital factor in maintaining ecosystem health, or possibly both—depending on the worldview through which fires are understood and the subject position of the interviewee.

These more intensive methods of analysis of residents' views were employed not with the purpose of applying findings across a wider population, but with the intent of providing a greater comprehension of selected "rationalities, implications and meanings" (Hoggart et al. 2002, 204). This article seeks to examine a variety of perspectives revealed during interviews and in the relevant literature, in order to better understand *some* of the links that exist between nature perspectives and the actions taken or concerns voiced by residents who live within this forested environment.

Contesting forest management and community safety

The "forest as hazard" perspective

Support for the removal of hazardous forested areas was often based on residents' fears for community safety that were associated with their experiences with the 2003 fire. Residents frequently and vividly described the immediacy of sights, sounds, and smells associated with the fire (WR³; WH; Freake and Plant 2004): "Driving

fifteen kilometres out of town on the Okanagan Connector, you could see black smoke in the distance. It was a beautiful sunny day until then. You descend into it, and you can't see 200 feet in front. It was choking" (Sindi Hawkins cited in Freake and Plant 2004, 187). Efforts to stop advancing flames from reaching developed areas of the city were frequently compared by residents to fighting a battle in war (HW; Mervyn Andrews cited in Freake and Plant 2004, 174; Kevin Brownlee cited in Freake and Plant 2004, 179). Many recalled the panic and disorientation that resulted from the suddenness with which they were required to evacuate their homes: "Flames were jumping down the hill. I felt like it was chasing us. I started to panic because there was a long line-up leaving the subdivision... As we crawled down Casorso Road, I felt trapped. If the traffic took too long, I'd park the car and run" (Naomi Winn cited in Freake and Plant 2004, 217).

Exposure to this disturbance provoked significant emotional reactions in some residents, including periods of helplessness, grief, and depression. By removing residents from their homes, whether temporarily or permanently, the fire had removed a primary place of security and memories (Harrington 2003; Kennedy 2003; Sindi Hawkins cited in Freake and Plant 2004, 187); the loss of this security was frequently compared to mourning the loss of a loved one (Freake and Plant 2004, 195). One nearby resident with dramatic and expansive views of Okanagan Mountain Park recounted how she watched the fire each day from her backyard, at times videotaping homes as they burned: "The night that... the many homes that were lost, I *knew* they were burning because the fireballs would just come out of the home and [pause] you know we knew people were evacuated but [pause] there's animals there and... lives lost. They weren't people, but they were animals" (WR).

Several residents who were interviewed expressed support for sacrificing some vegetation on their own properties to increase fire safety in their neighbourhoods (PI; SS; VR). Anecdotal evidence in the form of greater volumes of yard waste in the year immediately following the 2003

³References appearing in this form refer to testimony generated by interviewees during the research process. Individual

identities have been obscured through the random allocation of anonymous initials.

fire also suggests that many Kelowna residents in general were in support of the removal of excess vegetation from their properties to reduce future fire risk (Blanleil 2008; Wilson 2008).

Many residents now perceive area forests as volatile places that require increased management and control. Some residents stated that they became much more aware of the degree of risk involved with living near forested areas (Kevin and Alisa Brownlee cited in NRCan 2004). One interviewee voiced his concern about the risks of large-scale and sprawling development within the forested outskirts of the city, with homes in close proximity to treed areas (CK). Another Kelowna resident who had previously been against the removal of trees for the construction of infrastructure projects was now in support of this measure as part of making the community safer: "No houses were lost in our neighbourhood. The Gordon Drive road extension stopped the flames because there was no fuel. The extension wasn't supposed to go in for five years and we were so mad when it went in. We don't bitch about the road anymore" (Kim Watt-Senner cited in Freake and Plant 2004, 186).

Several interviewees expressed support for mechanical tree thinning programs in effect since the 2003 fire for municipal parks and other forested public spaces (DK; PI; ST; TG; WR) and these programs have also received positive feedback from the general public (Blanleil 2008; Wilson 2008):

Before 2003, I would say that there was general support for what we were doing, but they were concerned about us not being too aggressive in terms of thinning or reducing forest fuels. After the fire, the pendulum swung the other way, and we were getting calls. People almost wanted to have clear-cutting around their houses. They were very afraid of the fire hazard, and any kind of trees. (Wilson 2008)

However, more intense perceptions of fire risk among residents also resulted in the rejection of particular disaster mitigation methods such as prescribed burning. In the years following the 2003 fire, the City of Kelowna did not implement controlled burns in city parks due in part to negative resident feedback regarding concerns about the health effects of smoke and the "real fear of fire in some of these urbanized

areas where houses and people are very, very close by" (Wilson 2008). Enduring concerns have also been voiced among Kelowna's senior citizen population about the potential for smoke to be generated during controlled burning projects in provincial parks (Ladd 2008). Among interview participants, some voiced either cautious support for controlled burns or rejected the strategy entirely, citing either scepticism about their effectiveness, or concerns that controlled burns could potentially grow out of control (TR; DK).

For many Kelowna residents, the 2003 fire was experienced as an unusual and unnatural event, the result of inadequate suppression measures by provincial forestry officials. This perspective is potentially influenced by modernist views that were actively promoted by Canadian forestry agencies over most of the last century, in which the forest fire itself was the primary factor in disaster impacts and a destructive force to be arrested, without consideration or understanding of the risks involved with vulnerable patterns of settlement in WUI communities.

The "forest as instrumentally valuable" perspective

Residents who recognized the instrumental value of forests in and around Kelowna often viewed the preservation of forests, in particular the aesthetic appeal of expansive views of surrounding forested landscapes, as an important part of maintaining the character of the community (CK; SS; TG; WR). For some residents, the city's natural surroundings form part of their personal identities: easy access to nature for outdoor recreational activities was a major factor in drawing some interviewees to the city, as well as in encouraging permanent settlement in the area (DK; PI; RC; WH). For others, the forest environment provides a play space for children, making the area a desirable place to raise a family (ST; TG). One interviewee recounted the experiences of her children within Okanagan Mountain Park prior to the burn: "They would go off and play, and they would take a shovel (laughs) and I wouldn't see them, and then they'd come back out of the forest when it was getting dark... It was very nice. I'm so glad to have had it while it lasted" (ST).

Clearly, the Okanagan Mountain Park Fire altered the way in which some Kelowna residents

experience their surrounding landscape. The changes in appearance that resulted from the fire were difficult to accept for many residents, who in part were still grieving the loss of such a large number of trees. The forest had become a damaged, unfamiliar, and somewhat frightening place (DK; RC; ST; VR): "It looked like white with black sticks. I've never seen a forest fire before, so I was surprised how many trees still stood. And the forest was so full of trees that it was just black, and the ash was white, so that's what it looked like for a while. It was weird" (ST).

In general, residents who value the instrumental aspects of forests appeared willing to accept some degree of fire risk in order to maintain the natural surroundings on private properties according to visual priorities such as ensuring privacy or accessibility to views. Elements of their immediate landscape were at times valued over residents' own homes. Kelowna's Fire Chief noted that while many in the community have supported local fire mitigation efforts, "[the fire department does] meet with some resistance. They don't outright say they don't want to do it, they just simply give us 'this is my property, and I'll treat it how I like,' if you will" (Blanleil 2008). A significant minority of residents who took part in a community survey conducted after the fire also expressed some reluctance to alter landscaping on their own properties due to the character provided by existing vegetation; also, when asked about development practices within the city's forested areas, the majority stated they were against the complete removal of vegetation within new residential developments, preferring "the sensitive integration of housing into the landscape at the expense of some security from wildland fire" (B. A. Blackwell & Associates 2006, 19). Resistance to forest thinning in municipally-owned forested areas has increased in the years since the fire, in particular among residents whose homes border city parks (Wilson 2008): "Some people are very against...[the] loss of privacy, to the point where even after we explain what we're doing and why it needs to be done, that they're basically like 'Well, I don't care if my house burns down, that's what insurance is for'"

Residents who hold this perspective often resist disaster mitigation policies that do not correspond with familiar perceptions of local forested

areas. Concerns have been raised among a number of Kelowna residents that the aesthetic and recreational qualities of surrounding crown lands and provincial parks could be negatively affected by forest fuel modification projects. Some residents have voiced a preference for new trees to be planted in places within the park that were burned to replace the native grasslands that have grown in these areas following the fire. Others have voiced concerns that these changes in landscape alter what they consider to be the conventional attributes of area campgrounds (Ladd; NRCan 2004).

Braun (2002, 11) suggests that, in contemporary North American culture, "nature is increasingly remade in the image of the commodity," while Wolch (2007) observes that a predominant purpose for the preservation of urban nature is often its influence on property values and tourism. Kelowna residents live in a community in which economic prosperity (in particular, the large proportion of employment in the service industry) is closely linked to the area's forested environment, and surrounding landscapes are often shaped to suit the requirements of upper-income residents and visitors.

Some of the Kelowna residents who were interviewed tended at times to be less focused on the potential for future forest fires to affect the community, prioritizing instead, as Castree (2005, 21) describes, their "emotional attachments to particular landscapes." As a result, some residents appear to have grown increasingly complacent about disaster risk in the years since the fire.

The "forest as intrinsically valuable" perspective

For some Kelowna residents, the most painful losses experienced after the 2003 fire were those of neighbourhood trees and the associated damage to wildlife habitats (Freake and Plant 2004, Plant 2008). However, residents also acknowledged fire as an inevitable and natural event, a source of regeneration for the forest and an opportunity for new growth (*Vancouver Sun* 2003). Despite some initial fear and hesitancy to re-enter the provincial parks in the months immediately following the fire, some of the residents who were interviewed recalled witnessing what they described as the beauty of regrowth resulting from natural disturbance:

After it [the fire] first went through, we said, "oh, I don't know if we want to go back out there." So we started taking in little doses... Then we started to notice that little leaves and branches were starting to come in the fall. That quickly. It was amazing. And sometimes the ash would actually be six inches deep in some of those places. And you'd think, well nothing is ever going to grow in there, but you'd see little shoots coming up... And it's lovely. Again, it had a fully different beauty than it had before. (PI)

No doubt this focus on the regenerative aspects of disturbance has been influenced in part by increased ecological awareness within contemporary society in general, as well as the growing acknowledgement among Canadian forestry agencies of the negative ecological effects of complete fire suppression.

Residents who prioritized forest ecosystem health demonstrated greater acceptance of the potential for risk to personal properties from forest fires. Some interviewees voiced opposition to what they considered to be excessive tree thinning: concerns noted in this respect included the potential depletion of soil nutrients or loss of wildlife habitat on forested properties (RC; WH). Residents who stressed the intrinsic value of forest ecosystems frequently expressed preconceptions of how they thought nature should exist (for example, as untouched "wilderness"), though sometimes associating what was "natural" with what had been affected by human activity for some time. Many interviewees who expressed support for mechanical tree thinning in municipal parks linked this type of approach with the protection of more established trees from future large-scale fires (CK; HW; TR). However, Ian Wilson, then Kelowna's Urban Forestry Supervisor, described how other residents have expressed resistance based on their visual assessments of what constitutes the "natural" state of the forest: "people want those areas to be left alone. But the challenge of course, in an urban area like this, where people consider it to be natural, it really isn't... so we're now in a situation where we have to go in and physically do some of the treatments that Mother Nature would have taken care of by herself" (Wilson 2008). Residents often expressed concern about the motivations for (and methods through which) fuel reduction ef-

forts were implemented. Regarding regional park forests, one interviewee asserted that prescribed burning was a more beneficial approach for local forest wildlife species over mechanical thinning (WH).

Regarding surrounding provincial parks, community members offered conflicting views about how best to preserve forest ecosystems; some local naturalist groups supported the Class A designation in these parks that restricts forest alteration, in particular with regard to commercial logging, mining, and hydro-electric development (John Woodworth cited in Filmon 2004b, 21-26; BC Parks 2012), and some residents similarly resisted selective tree harvesting as linked to commercial logging strategies (Carver 2003; RC; SJ; WH; Ladd 2008). One resident expressed concern that if the methods of tree removal employed by forestry agencies for fire mitigation were followed incorrectly, it could upset the forest's natural pattern of regrowth, and potentially have negative effects on the wilderness attributes of these areas, stating "we should try to let [the provincial park] manage itself as nature would have managed it, because if you start managing everything, do we want our parks to look like downtown Kelowna? Or like Kelowna city parks?" (PI). However, mitigation strategies emphasizing the preservation of trees within these forests have also gained in popularity in the years since the fire, as some residents advocated selective tree harvesting as a measure which provides "... short-term pain for long-term gain" (CK) and a more sustainable approach to fire mitigation than clear-cutting (Palmer 2007; Ladd 2008; TR).

Several residents who expressed support for prescribed burning also linked this approach with an ultimate improvement in forest ecosystem conditions (SJ; WR); one interviewee described how the 2003 fire changed her views on the role of burns (natural or prescribed) in maintaining forest health:

What I learned was that at the time in Okanagan Mountain Park, they didn't do the selective... controlled burns, which I see now are a good idea, because there's three hundred years of pine bark built up and they don't break down, and leaves, and other things like that, so it's just dry and waiting to happen... And honestly the first time

we were driving back up the road, and I was looking at the landscape, I said, "It looks like Mother Nature came here with a big broom, and swept all that debris and crap away, and it was clean as a whistle." (ST)

In general, these residents often perceived forested landscapes as victims of human intervention, and, similar to the "eco-citizenship" model described by Desfor and Keil (2004) and Wolch (2007), the care of these forests was frequently linked to residents' personal identities as protectors of wilderness areas.

Conclusion

Of the many wildland-urban interface (WUI) communities across Canada, Kelowna is one of the few that has been significantly impacted by a large-scale, damaging wildfire (notwithstanding the devastation wrought by wildfire in May of 2011 in the town of Slave Lake, Alberta). The Okanagan Mountain Park Fire was the largest fire disturbance in British Columbia's recorded history, and had great physical and emotional impacts on many community residents. This difference between wildfire threat and wildfire experience has had a substantial influence on residents' perceptions of their natural surroundings.

Residents presented three general perspectives about Kelowna's forests: forests as hazardous, forests as instrumentally valuable, and forests as intrinsically valuable—each of which were influenced by residents' experience with disaster and, in turn, influenced residents' varied reactions to fire mitigation policies in and around the city. Residents who focused on the hazardous potential of surrounding forests reported experiencing an even greater sense of vulnerability to natural forces following the fire; this heightened awareness of risk was reflected in residents' increased support for mechanical fuel thinning activities, but also influenced the rejection of controlled burning measures due to concerns about the volatile effects of out-of-control burns and smoke. As a result of their experience with the Okanagan Mountain Park Fire, residents who emphasized the aesthetic or economic benefits of living in a forested environ-

ment frequently expressed a more enlightened perspective on the risks of this pattern of settlement, but still resisted mitigation strategies that significantly changed the look or recreational qualities of surrounding landscapes. And among residents who emphasized the intrinsic value of Kelowna area forests, the 2003 fire enhanced their awareness of the ecological value of disturbance, but also influenced varied reactions to particular mitigation methods, as some residents voiced caution about the potential commercial benefits of mechanical thinning and others asserted the ecological benefits of controlled burning.

Kelowna residents' views regarding area forests were often quite complex; individual interview participants sometimes expressed a range of perspectives, depending on various contextual factors. Some residents displayed differing perspectives of forests (and expressed differing opinions about fire mitigation efforts) depending on the scale at which mitigation measures were employed (e.g., individual properties vs. provincial parks), while others had varied reactions based on who would be implementing a particular mitigation strategy (e.g., homeowners vs. government agencies). In addition, individuals' responses to forest fire mitigation did not necessarily reflect the degree of devastation they experienced during the 2003 fire, as some of the residents who lost homes or suffered severe damage as a result of the Okanagan Mountain Park Fire also acknowledged the benefits of fire disturbance in maintaining forest health.

Vulnerability to disaster risk results from a complex mix of political, social, economic, and ecological influences. In contrast to poorer socio-economic classes, who are obviously more constrained in their choices, there are many ways in which more prosperous socio-economic classes may voluntarily expose themselves to higher disaster risk in order to be close to the natural surroundings that they most value. Forest fires will continue to impact WUI communities in the southern interior of British Columbia, resulting in part from the increasing expansion of settlements within the dry forested and fire-maintained ecosystems that are a part of this area of the province. This reality was demonstrated most dramatically during large fire events that occurred within areas north and west of

Kelowna during the summer of 2009 and across other areas of British Columbia during the summer of 2010.

Community responses presented in this study highlight persistent challenges in educating Kelowna residents about the risks involved with living in a dry, forested environment, while at the same time addressing a perceived futility among some residents regarding individual mitigation efforts in the face of large-scale fires. The forestry officials who were interviewed for this article displayed a clear commitment to providing effective public education programs. Existing public outreach efforts, which have included community open houses as well as visits to individual properties to address residents' concerns, have already garnered positive responses from many residents. Public education programs could further address residents' multiple perspectives on and priorities for area forests by more fully stressing the potentially recurring nature of forest fires; by providing increased public outreach prior to the implementation of specific mitigation practices such as controlled burns, to ease concerns and help residents prepare for the effects of the burn (i.e., smoke); and by conducting more frequent and detailed workshops that highlight appropriate mitigation methods to be undertaken by residents on their own properties (to reduce fire risk as well as maintain healthy local forests).

A more nuanced understanding of varied social constructions of urban forests could also help officials to effectively harness other potential sources of public support for mitigation efforts. The City of Kelowna's existing public education programs draw on residents' concerns about the pine beetle threat to motivate support for forest fuels management (Wilson 2008). Tree thinning strategies could be presented in ways that highlight other benefits such as the maintenance of neat and ordered landscaping. Exposing residents through field tours to the aesthetic appeal of native vegetation (e.g., grasslands) that returns to park forests following a fire disturbance may help to increase support for prescribed burns (Shindler 2007). And the potential for controlled burns to benefit overall forest ecosystem health (e.g., through the regeneration of forest soils and the reduction of large stand-replacing fires which could otherwise

devastate wildlife habitats) could also be emphasized. An examination of forest ecosystems at a broader, landscape scale may reveal that there are many possibilities within the range of fuel thinning options available to address residents' concerns (Prather et al. 2008); as a result, multiple mitigation strategies could be implemented across this larger landscape in accordance with residents' nature perspectives as well as the unique features or requirements of each area of forest.

Interviews with Kelowna residents also revealed a need for greater communication and trust-building between forest fire mitigation agencies and community residents, as residents voiced fears about the risks of controlled burns and concerns that the implementation of fuel management strategies may be guided mainly by commercial motives. Government agencies have already begun to address issues of trust-building with local residents: provincial park officials have worked with local recreation groups to incorporate community perspectives about fire management and forest restoration in provincial parks and are working to make more transparent the agency's practice of directing funds received from the sale of thinned trees solely toward future restoration activities in park forests (Ladd 2008). Similarly, open houses also proved successful in generating support for prescribed burns in a local regional park (Kopp 2008). A further invigorated process of adaptive management may help to foster increased trust between forestry agencies and other community members, to more fully reflect the range of understandings of what constitutes the natural or preferred state of local landscapes (Hull IV et al. 1994). This type of approach would accord similar consideration to wildlife species-at-risk (as prioritized by local naturalist groups), as well as to other residents' valued emotional connections to natural landscapes. It would also provide an opportunity for forest management agencies to re-examine their own assumptions and biases about appropriate disaster mitigation strategies (assumptions that may have been influenced by somewhat conflicting scientific perspectives). The discussion of these concerns on-site, through field tours of local forested areas (Shindler 2007), would allow for increased insight into the visible effects of differing forest management strategies.

An application of the acknowledgement of multiple perceptions of nature to the development of disaster mitigation strategies for the community requires that forestry and fire mitigation agencies determine multiple courses of action among the varied and valid range of residents' nature perspectives. As Castree (2001, 17) acknowledges, "We must live with this inability to know nature 'as it really is,' while still remaining committed to the idea that some knowledges of, and practices on, nature are better or worse than others." Clearly, WUI residents may be required to accept a degree of compromise as participants in the development of disaster mitigation strategies that address the diverse needs of the entire community. For the residents of these communities, their participation in the development of these strategies may allow them to more fully understand the assorted safety, ecological, and aesthetic implications of their actions (or inaction) towards the effective mitigation of forest fire hazard.

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