

Perceptions of Wildfire Risk and Responsibility in Management: A Comparative Analysis of Fairbanks, Alaska and Los Angeles, California

Jacob Graham & Charlene Burns

An important consideration for government and wildfire management officials is understanding the factors that influence individuals' perceptions of risk and risk management responsibility and their risk mitigation behaviors. An understudied factor is that of the social, cultural, and political environments in which individuals live. This study explores how the unique social, cultural, and political environments in the Alaskan Arctic influence individuals' perceptions of risk and mitigation behaviors. The research was conducted through a comparative survey of residents of Fairbanks, Alaska and Los Angeles, California to investigate how perceptions of wildfire risk and individual/governmental responsibility varied between the American Arctic and continental U.S. The results of this study found that differences between Fairbanks and L.A. residents were apparent across how they perceived responsibility in their risk mitigation behaviors.

Introduction

In 2019, record high temperatures in Alaska set the stage for a particularly devastating wildfire season during which 719 fires burned nearly 2.6 million acres of land (Alaska Department of Natural Resources, 2019). While this falls short of the 2015 wildfire season when 5.1 million acres burned, experts are confident that Alaska's wildfire seasons are getting worse, and that climate change is to blame. Not only have recent years' fires been more frequent and more severe, but the wildfire season is getting longer, stretching into late August (Law, 2019). Clearly, learning to manage these fires and mitigate risk will be an existential challenge for emergency managers and public officials in the state in future years. Understanding public perceptions of risk and responsibility will be a critical part of the success of these efforts. Does the public perceive the risk of wildfires to be high or low? Is the government perceived as responsible for wildfire management and mitigation or do individuals accept responsibility? And where do these perceptions come from? Answers to these questions can heavily influence the success of wildfire mitigation programs and should be thoroughly studied (Agrawal, 2018).

The main goal of this paper is to explore Alaskan perceptions of wildfire risk and of responsibility in management and how they impact individual behaviors. We are especially interested in how these Alaskan Arctic¹ perceptions and behaviors may differ from those in “the lower 48.” We begin with a brief synthesis of relevant literature on risk and perceptions before introducing our framework of analysis. We then present our methods, a comparative survey of two cities, Fairbanks, Alaska and Los Angeles (L.A.), California. Finally, we turn to the analysis and discussion of our survey results and conclude with further research questions.

Literature Review

Literature on disaster risk has explored the relationship between perceived risk and mitigation behaviors at the wildland-urban interface. Much of this literature is focused on how risk perception influences individual mitigation behaviors (e.g., removing vegetative fuel around the home or using heat-resistant construction) rather than government-level wildfire mitigation efforts. Some of these studies have found a connection between perceptions and behavior (Whitehead et al., 2001; Baker et al., 2009; McFarlane et al., 2011; Dupey & Smith, 2018; Warziniack et al., 2019). For example, Winter and Fried (2000) determined that if homeowners view wildfires as uncontrollable and random, they are unlikely to safeguard their properties. Martin et al. (2009) surveyed how a number of perceptions concerning risk affect the actions individuals take to address natural hazards. Their survey of western U.S. residents found that perceived self-efficacy, or the belief that one can effectively mitigate risk, positively influences risk reduction behaviors. McCaffrey (2002) found that homeowners with high risk perceptions were more likely to take risk mitigation measures such as reducing fuels on their property. A study of the wildland-urban interface (WUI) in California found a number of factors influenced homeowners' likelihood of adopting wildfire risk mitigation actions, including past experience, home attachment, and risk perception (Ghasemi et al., 2020).

However, the connection between risk perception and individual risk mitigation behavior is not conclusive. Several studies suggest there are no connections between risk perceptions and behavior (Lindell & Perry, 2000). Hall and Slothower (2009) aimed to model the connections between perceptions of risk and homeowners' attitudes towards implementing defensible space, but ultimately found that there was too much variation to make such connections. Sims and Baumann (1983) conducted a literature review, finding that “available evidence is weak on the relationship between awareness or knowledge and the consequent adoption of damage mitigation measures.” Meldrum et al. (2015) found that although there is a risk perception gap between wildfire professionals and the public in the U.S., the factors contributing to these perceptions were uncertain.

The inconclusivity of studies on the connections between risk perception and risk mitigation behavior leads to the question of what factors *do* affect risk mitigation behavior? An understudied factor is perceptions of responsibility, also known as locus of responsibility (Martin et al. 2009). If individuals perceive the responsibility of mitigating risk to be that of the government, they may exhibit less individual risk mitigation behaviors. A literature review conducted on fire management articles found that most research shows higher trust in wildfire management institutions increased individuals' support for government-level wildfire management (McCaffrey et al. 2012). On the other hand, if people view risk mitigation as an individual responsibility, they may exhibit more risk mitigation behaviors. For example, individuals who are more resistant to government actions may be less open to government mitigation efforts on their property and take more individual

ownership for risk reduction (Mileti & Sorensen 1987). Similarly, Ghasemi et al. (2020) found that factors that increase homeowners' trust in wildfire agencies and institutions will subsequently affect their perceptions of wildfire risk and management.

As the previous section demonstrates, perceptions of risk and responsibility are often tied to behavioral outcomes. Less commonly considered are the sources of individuals' perceptions. Tierney (1999) writes, "such perceptions might more usefully be studied as dependent variables, that is, by focusing on where ideas about risk come from in the first place." Tierney continues, "the public's judgments about risk and safety do not develop in a vacuum; rather, the public is influenced by organizational strategies that seek to frame risks in ways that benefit corporate and institutional actors." The "organizational strategies" Tierney refers to are the social, political, and cultural environments that influence individuals' perceptions. In other words, individuals' perceptions of risk and perceptions of responsibility for managing risk are necessarily products of their social, political, and cultural environments.

A number of empirical studies of risk and responsibility perceptions fit within this understanding of risk. Gierlach et. al (2010) document the cross-cultural risk perceptions of disasters in Japan, Argentina, and North America, finding "a significant difference among cultures in levels of perceived risk." Oven and Bankoff (2020) unpack the political and cultural Soviet legacy in rural Kazakhstan, exploring implications for responsibility in earthquake disaster risk reduction. These studies, and others, provide strong evidence supporting an understanding of perceptions of risk and responsibility as dependent on the social, cultural, and political environments of individuals (Bankoff and Hilhorst, 2009; Park and Reisinger, 2010; Agrawal, 2018). Overall, the literature offers evidence of a relationship between an individual's social, cultural, and political environments and their perceptions; there are also tentative relationships between perceptions of risk and responsibility and individual behaviors. The next section will synthesize these findings into our framework of analysis.

Framework of Analysis

Understanding the relationship between social, cultural, and political environments, perceptions of risk and responsibility, and risk mitigation and preparedness behaviors requires a framework that accounts for each factor. One commonly used approach is the mediation model, developed by Baron and Kenny (1986). In their model, they test how a variable M (the mediating variable) affects the relationship between the independent variables X and the dependent variables Y . Many studies on wildfire risk have used the mediation model (Dickinson et al., 2015; Vaske et al., 2007). Martin et al. (2009) adapt this model to measure how risk perceptions (M) influence the relationship between explanatory factors like subjective knowledge, locus of responsibility, self-efficacy, full-time/seasonal status, and fire experience (X) and risk reduction behaviors (Y).

Our study reconsiders this analysis of perceptions of risk as a mediating variable in a new context with social, cultural, and political environments positioned as the explanatory factor. As discussed in the literature review above, studies have found that social, cultural, and political environments influence how individuals perceive risk, how individuals determine responsibilities for managing and mitigating those risks, and how those individuals act to mitigate or prepare for those risks. Therefore, using the mediation model, we will explore whether the X variable (social, cultural, and political environments) equally influences the M variable (perceptions of risk and responsibility)

and the Y variable (behaviors) or whether perceptions of risk and responsibility act as a mediating variable.

The aim of this study is to understand not how perceptions of risks and responsibilities mediate the relationship between social, cultural, and political environments and behaviors, but, instead, how perceptions of risk and responsibility are actually one step in the linear relationship from the environments to the behaviors. To understand perceptions of risk and responsibility as a consequence of individuals' environments, we developed a model that demonstrates our expectations for how social, cultural, and political environments influence public perceptions and how those perceptions, in turn, influence behaviors (Figure 1). Because this model is more linear, rather than describing these components as variables, they are described as “steps,” demonstrating how one leads to the next.



Figure 1: Adapted Model of Perception Development

Based on this model, our primary hypothesis is that the unique social, cultural, and political environments of the Alaskan Arctic develop distinct perceptions of wildfire risk and responsibility and influence mitigation behaviors. Key elements of the Alaskan social, cultural, and political environments are well established in literature. Hogan and Pursell (2008) discuss the “cultural symbol” of the “real Alaskan.” The imagined “real Alaskan” is a masculinist figure rooted in the “pioneer spirit” and predicated on the dominance of man over nature (Hogan & Pursell, 2008). This idealized “real Alaskan” is celebrated as “tough, rugged, and outdoorsy” and informs Alaskan identities. Graham (2020) investigates the continued tradition of the Iditarod dog sled race as an artifact of this cultural phenomenon and documents its influence on Alaskan perceptions of wildfire risk and responsibility and individual mitigation behaviors. The Iditarod celebrates endurance, self-reliance, and brute strength. Graham (2020) argues that these characteristics, dominant in Alaskan culture, may lead Alaskans to perceive themselves as more responsible and capable in individual mitigation.

In addition to the Alaskan social and cultural environments, the Alaskan political environment is also influential. Hébert and Mincyte (2014) reveal how the gradual development of neoliberal policies of deregulation and government de-intervention in Alaska has created communities that value self-determination, or as Hébert and Mincyte coin it, “self-exploitation,” and dismiss government intervention. Graham (2020) traces this neoliberal political tradition in fire management practices in Fairbanks, finding that the area’s fire management efforts center

individual preparedness and mitigation initiatives and do little to address structural issues that create risk.

Given these social, cultural, and political environments in Alaska and our belief that these environments impact residents' perceptions of wildfire and their mitigation behaviors, we developed the following research questions:

1. How do the social, cultural, and political environments in Alaska impact residents' perceptions of wildfire risk and responsibility in management?
2. How do predominant perceptions of wildfire risk and responsibility impact individual mitigation behaviors?
3. How do U.S. Arctic perceptions and behaviors differ from continental U.S. perceptions?

Methods

To address these research questions, we employed a comparative and qualitative survey of perceptions and behaviors in Fairbanks, Alaska and Los Angeles (L.A.), California. While a solitary survey of Alaskan residents might provide insight into perceptions and behaviors there, comparison with the continental U.S. is necessary to understand how perceptions and behaviors vary in different social, cultural, and political environments. As Bartlett and Vavrus (2017) contend, there is “much we might achieve through comparison.” In this case, the comparison allows us to isolate the social, cultural, and political environments of Alaska as independent variables. This facilitates an analysis of how Alaskan environments may differently affect perceptions and behaviors from non-Alaskan environments. Metropolitan Fairbanks and L.A. were chosen as our subject cities. While there are certainly many differences between the cities—population size, to name one—they are comparable as urban centers threatened by wildfires with distinct social, cultural, and political environments.

Our survey design was guided by the steps represented in our model of perceptions (Figure 1). As such, the survey has two primary sections: the first is composed of questions asking how respondents perceive wildfire risk and responsibility (step II) and the second asks about individual mitigation behaviors (step III). Questions 1-3 ask the participant to consider their personal perception of the level of wildfire risk. Questions 4a-4e ask the participant to consider their perceptions of responsibility in managing wildfire risk. The second section of the survey includes two open-ended questions intended to capture individual behaviors.

The survey concludes with a series of demographic and screening questions which ensure that respondents meet the requirements to complete the survey (that they have lived in either city for a year or longer and are aged 18+) and to ensure that the sample groups are representative of their populations. The demographic questions cover age, race and ethnicity, gender identity, annual income as an indicator for socioeconomic status, and property ownership status. The survey was developed in Google Forms and distributed to residents of Fairbanks and L.A. through a number of means, including digital outreach to local groups and direct contacts in the two cities. The survey was randomly distributed in large, interest-based Facebook groups and sampling snowballed as group members shared the survey with their own “friends.” Direct contacts in both cities distributed the survey link within local groups. The researchers had no pre-existing relationship

with the respondents. The survey was actively distributed for two months. The full survey can be found in appendix A.

Finally, analysis of the survey data was conducted based on our model (Figure 1). With an understanding of the social, cultural, and political environments of Alaska as distinct from the continental U.S., we looked for variations in survey responses from Fairbanks and L.A. First, we analyzed the relationship between the social, cultural, and political environments and the perceptions of risks and responsibilities reported by respondents and considered if there was any correlation. Next, we analyzed the relationship between the perceptions of risks and responsibilities and the reported wildfire risk mitigation and preparedness behaviors exhibited. Here we considered whether those actions could be explained by predominant perceptions and if those perceptions could be tied to the Alaskan social, cultural, and political environments. In the event of no evident correlation between the Alaskan environments and perceptions, we reclassified those unexplained perceptions as mediating variables and considered whether they may be better explained by variables outside of the unique Alaskan environments.

Results and Discussion

The survey received 65 responses, 34 from Fairbanks and 31 from L.A. Discussed below are the notable findings from the survey. Responses were analyzed in Excel. The results and discussions are divided by the sections of our model described above: step II perceptions, and step III, behaviors. Overall, the survey results indicate mixed results. Perceptions of individual responsibility in risk management can be clearly tied back to Alaskan social, cultural, and political environments and forward to individual mitigation and preparedness behaviors. However, perceptions of risk were nearly identical between the two cities and could not be linked to the Alaskan social, cultural, and political environments. Further, consideration of risk perceptions as a mediating variable demonstrated that they are not predictive of any particular behavior.

Step II: Perceptions

The survey questions regarding perceptions were divided in two to explore the respondents' perceptions of risk and their perceptions of responsibility. Questions on risk perception delved into level or risk and the view of wildfires as "natural." Questions on perception of responsibility asked respondents' expectations of the government and themselves in addressing wildfire risk.

Perceptions of Risk

	Average level of risk	Yes, I am comfortable	No, I am not comfortable
Fairbanks	5.23	65%	35%
Los Angeles	5	61%	39%

Table 1: On a scale of 1-10, how do you view the severity of direct or indirect threat of wildfire to your household? Are you comfortable with this level of risk?

As the model suggests, given the unique social, cultural, and political environments in Fairbanks described above, we expected there may be different perceptions of risk levels in the two cities. However, the results revealed that there are no significant differences between L.A. and Fairbanks

in terms of how individuals perceive risk levels. The average level of risk was around 5 for both cities, and most respondents were comfortable with this level of risk.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Fairbanks	26%	41%	15%	15%	3%
Los Angeles	3%	39%	35%	23%	0%

Table 2: To what extent do you agree or disagree with the following statement: “Wildfires are natural and inevitable.”

The term *disaster* appears almost exclusively with the qualifier *natural*. Disaster researchers have argued that the term “natural disaster” obscures the social, political, and economic root causes of disaster, instead centering a fatalistic view of nature. As Chmutina and Meding (2019) argue, the phrase natural disaster “reinforces the status quo, avoiding responsibility for failures of development by ‘blaming nature.’” In the case of wildfires, interpreting the hazard as “natural” shifts responsibility away from policy failures (e.g., development into high-risk areas or poor mitigation planning) to an unaccountable nature. This can generate fatalistic perceptions of hazards and discourage individual mitigation behavior amongst the public (Winter & Fried, 2000). This survey question is intended to further explore perceptions of risk under part II of the model--do residents of one city embrace a more fatalistic perception of wildfire risk? The results are striking. Nearly 70% of surveyed Fairbanks residents agree or strongly agree that wildfires are natural and inevitable whereas only approximately 42% of respondents from L.A. agree or strongly agree.

Perceptions of Responsibility

	Fairbanks	Los Angeles
Strongly Agree	12%	23%
Agree	35%	52%
Neutral	29%	19%
Disagree	21%	0%
Strongly Disagree	3%	6%

Table 3a. To what extent do you agree or disagree with the following statement: “The government can reduce risk and prevent damage from wildfires.”

	Fairbanks	Los Angeles
Strongly Agree	15%	39%
Agree	53%	55%
Neutral	26%	6%
Disagree	9%	0%
Strongly Disagree	0%	0%

Table 3b. To what extent do you agree or disagree with the following statement: “The government can reduce risk and prevent damage from wildfires.”

	Fairbanks	Los Angeles
Strongly Agree	12%	0%
Agree	50%	10%
Neutral	29%	16%
Disagree	6%	58%
Strongly Disagree	3%	16%

Table 3c. To what extent do you agree or disagree with the following statement. “It is primarily my responsibility to protect myself and my household from wildfires

While the questions above explored perceptions of risk, these three questions focus on perceptions of responsibility. Specifically, these survey questions help determine whether the respondents are more likely to place wildfire risk reduction and mitigation responsibilities on the government or themselves. Across all three questions, the self-reliance of Fairbanks residents was apparent in contrast to the higher expectations L.A. residents had for government intervention. In response to the first question, around 75% of L.A. residents agreed or strongly agreed that the government should do more to mitigate wildfire risk, whereas only 47% of Fairbanks residents agreed or strongly agreed and 23% disagreed or strongly disagreed. Similarly, in the second question, L.A. residents demonstrated a higher level of confidence in the government's wildfire mitigation capacities—94% agreed/strongly agreed—while Fairbanks residents showed more uncertainty—32% felt neutral or disagreed. Finally, Fairbanks residents were more inclined to take on primary responsibility for protecting themselves and their households from wildfire risk (62% agree or strongly agree) while L.A. residents leaned in the opposite direction (74% disagree or strongly disagree.)

Discussion

The first section of our survey asks participants about their perceptions of wildfire risk and responsibility with the goal of identifying any relationships between the unique social, cultural, and political environments in Alaska (part I of the model) and Fairbanks residents' perceptions (part II of the model). In the case of perceptions of risk (level of risk and the view of wildfires as “natural”), the results were contradictory. Perspectives of the level of risk were almost identical in Fairbanks and L.A. residents. Contrastingly, residents of Fairbanks were much more likely to view wildfires as “natural and inevitable” than L.A. residents. This suggests that while Fairbanks residents' perceptions of the level of risk are not linked to uniquely Alaskan social, cultural, and political factors, the perceptions of wildfires as “natural” may be.

The results on the perceptions of responsibility more concretely reflect the social, cultural, and political uniqueness of Fairbanks and Alaska at-large. Fairbanks respondents were overwhelmingly more likely to perceive themselves as responsible for wildfire management. This reflects the Alaskan emphasis on self-reliance and distaste for government intervention.

The latter finding confirms our assumptions on the influence of social, cultural, and environmental environments as a determining factor in individuals' perceptions of responsibility. However, the finding that perceptions of risk were not impacted by the difference in environments between the Alaskan Arctic and continental U.S. suggests that other factors may be influencing individuals' perceptions of risk. Consequently, in our following analysis of behaviors, we evaluated perceptions of risk as a mediating variable to determine whether it impacted the linear relationship from social, cultural, and political environments to behaviors.

Step III: Behaviors

Two open-ended questions in the survey were intended to capture respondents' behaviors in response to their perceptions of wildfire risk and responsibility. The responses indicate that Fairbanks residents are more likely to engage in individual wildfire mitigation behaviors whereas L.A. residents depend more on government-led initiatives.

What steps do you take to prepare yourself and your household for potential wildfire threat?

This question is designed to solicit participants' behaviors in response to perceptions of wildfire risk and responsibility in wildfire management. Nearly every survey participant from Fairbanks (28 of 34 respondents) reported individual risk mitigation behaviors. The most prevalent behavior was creating a "defensible space" around one's home by trimming back or thinning out trees, bushes, and other fuels on one's property. Additionally, eight respondents reported retrofitting their homes (installing non-combustible exterior siding and fire-resistant roofing). Outside of individual mitigation efforts, many residents reported individual and/or family preparedness efforts. Approximately half of Fairbanks participants reported a heightened sense of awareness/caution and report making an evacuation plan and having supplies ready to go in the case of an emergency.

Responses from L.A. were notably different. Only two respondents reported individual mitigation behaviors: one reported clearing a defensible space around their property and another reported filling their gutters with water. Conversely, nearly every participant from L.A. (23 out of 25 respondents) reported personal and/or family preparedness efforts. These behaviors included making an evacuation plan, storing food, water, and other emergency supplies, creating "go bags" that can be taken during an evacuation, and putting all important documents in one place. Overall, the survey responses indicate that Fairbanks residents are more likely to undertake personal wildfire mitigation efforts than their Californian counterparts. On the other hand, L.A. residents are somewhat more likely to exhibit preparedness behaviors.

Do you have any ideas on how wildfires could be managed better/more effectively in your city?

This question is designed to solicit participants' perspectives on *ideal* wildfire management behaviors. While the previous question asked about *actually existing* behaviors, this question asks participants to think hypothetically and, considering their perceptions of wildfire risk/responsibility, propose their own wildfire management strategies. One of the most significant findings from this survey question is that Fairbanks residents are much more likely to have an opinion on how wildfires could be managed more effectively. Only half of L.A. respondents (16 of 31) identified an area for improvement; in Fairbanks, a large majority (27 of 34) provided a recommendation. This suggests that Fairbanks residents are more willing to be involved in the wildfire management process whereas L.A. residents have more faith in government institutions to manage wildfires effectively.

All of the responses to this survey question from L.A. recommended some form of government intervention. These interventions include more regular brush-clearing, prescribed fires, fire breaks, and zoning restrictions to stop development in high-risk areas. In Fairbanks, respondents suggested both government-led and individual initiatives. Notably, of the government-led initiatives recommended by Fairbanks residents, many of them were focused on influencing individual behavior, such as directing individuals to clear debris from their land. Fairbanks residents mentioned the same government-led initiatives as L.A. residents and clearing a defensible space as an additional individual mitigation behavior. As with the previous survey question, the responses to this question indicate that Fairbanks residents exhibit more individual mitigation behaviors and L.A. residents place more trust in government-led wildfire management and mitigation. Interestingly, 10 respondents in Fairbanks mentioned developing a community-wide plan to address climate change whereas no respondents from L.A. mentioned climate change as a factor in wildfires.

Perception of Risk as a Mediating Factor

In consideration of whether perception of risk was a mediating variable influencing behaviors, we analyzed the differences between high risk (those who rated their level of risk as a 5 and above) and low risk (those who rated their level of risk as 4 and below). There were 35 high risk respondents and 30 low risk respondents. With these two differentiated groups, we analyzed their responses to the two behavioral questions.

Of those who responded to the first behavioral question, 58% of high risk respondents and 56% of low risk respondents described individual risk mitigation behaviors such as creating a defensible space and clearing the land around their homes. Of those who responded to the second behavioral question, 30% of high risk respondents and 37% of low risk respondents either did not have a recommendation for how to address wildfire management or were content with the current state of wildfire management in their area.

Discussion

The second section of our survey concerns part III of our model: behaviors. Results from this section indicate that Fairbanks residents are much more likely to exhibit individual mitigation behaviors than their counterparts in L.A. This can be linked directly to the perceptions of responsibility unpacked in step II. Because Fairbanks residents are more likely to perceive themselves as responsible for wildfire management than L.A. residents, they are more likely to exhibit individual mitigation behaviors. In this case, our model clearly depicts the development of uniquely Alaskan social, cultural, and political environments into distinct perceptions, and eventually, behaviors (Figure 2). The Alaskan emphasis on self-reliance (step I) encourages public perceptions of individual responsibility in wildfire management (step II) which in turn leads to more individual wildfire mitigation behaviors (step III).

In the case of perceptions of risk level, our model demonstrates that some perceptions and behaviors cannot be linked to the Alaskan environment (Figure 2). Because there was no difference in the perceived level of risk by participants from Fairbanks and L.A., it is unlikely that the distinctively Arctic social, cultural, and political environments determine perceptions of risk. Consequently, we considered whether perception of risk acted as a mediating variable in the relationship between social, cultural, and political environments and behaviors. Based on the results discussed above, the level of risk perceived by individuals did not seem to affect how they conducted risk mitigation behavior. Given this, we proceeded with exploring the linear model without perceptions of risk.

In the case of perceptions of wildfire disasters as “natural”, our model is less conclusive (Figure 2). Our results found a strong relationship between the social, cultural, and political environments in Fairbanks (part I) and perceptions of wildfires as “natural” (part II). However, the relationship between this perception and behaviors (part III) is unclear. Previous studies suggest that fatalistic perceptions of hazards would lead to less individual management efforts. However, our results indicate that Fairbanks residents exhibit *more* individual mitigation efforts. One possible explanation for this is Fairbanks residents’ interest in addressing climate change. It is possible that while Fairbanks residents perceive wildfires as natural, they also perceive them to be affected by climate change. In this case, fatalistic views of wildfires as “natural” could be pushed aside by beliefs that an effective climate change plan could address the increasing risk of wildfires. Still, more research is necessary to understand how residents’ perceptions of climate change and its relationship with wildfires impacts their behaviors.

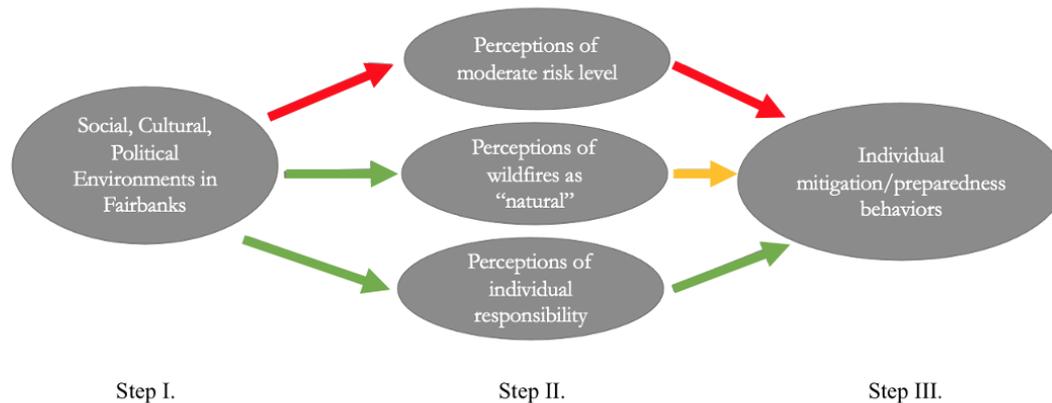


Figure 2: Modeled Results. The color-coded arrows between steps I and II and II and III represent the identified relationship between the steps. Green arrows represent an identified link (e.g. our research finds a link between the social, cultural, and political environments in Fairbanks and perceptions of individual responsibility). Yellow arrows represent a possible link that requires further research. Red arrows represent no identified relationship between steps (our research does not find a relationship between social, cultural, political environments in Fairbanks, perceptions of moderate risk level, and individual mitigation/preparedness behaviors).

Limitations

There are a few limitations to our study worth noting. Firstly, the sample sizes from Fairbanks and L.A. (34 and 31, respectively) are very small. While the detail provided in the survey responses allowed us to come to meaningful conclusions, there is the possibility that further studies with larger sample sizes could render conflicting results. The demographic make-up of our two sample populations is also worth considering. The age distribution of the two sample populations varies significantly. Fairbanks participants were significantly older than L.A. participants—approximately 90% of L.A. participants reported ages between 18 and 49 as compared to 65% in the same age bracket in Fairbanks. The distribution of property owners and renters in the two cities also varies significantly. In Fairbanks, approximately two-thirds of respondents were property owners; in L.A. approximately two-thirds of respondents were renters. Both of these variables, age and property ownership status, could impact a person's perceptions of wildfires and their behaviors. While we are confident that perceptions of responsibility in wildfire management significantly impact individual behaviors, more research is needed to determine relatively what impact other variables such as age and property ownership status have.

Conclusion

Studies on the variables that influence risk mitigation behaviors often focus on individual factors such as knowledge and exposure to risk, risk tolerance, and perceptions of risk. However, these studies rarely connect these factors back to the social, cultural, and political environments that may influence them. This study aimed to define the relationship between both the perceptions people hold of risks and the behaviors they take to mitigate or prepare for them in relation to the communities and environments they come from.

The results of the survey conducted of Fairbanks and L.A. residents explored whether the unique cultural and political environments in the Alaskan Arctic would cause residents to differ from residents in the continental U.S. in their perceptions and actions in response to wildfires. Ultimately, the findings supported the conclusion that these social, cultural, and political differences are significant and impact how individuals perceive and respond to wildfires.

The implications of this are great, as how individuals view wildfire risk and management likely impact how emergency managers and public officials address these issues. For instance, in the Alaskan Arctic where residents are more likely to take on individual responsibility in responding to wildfire risks, residents place less pressure on government agencies to improve wildfire mitigation practices or increase funding towards wildfire risk reduction agencies. On the other hand, residents of cities such as L.A. are more likely to expect their government to be primarily responsible for addressing wildfires. Therefore, if disaster occurs following wildfires, L.A. residents may demand improvements to government-led management practices. In Fairbanks, a similar disaster might lead to greater pressure on individuals to mitigate risk.

Consequently, this leads to the question of whether the risk mitigation behaviors individuals conduct influence the social, cultural, and political environments as it pertains to wildfire management. Would the model of perceptions presented here be better represented as a cycle with behaviors reinforcing the social, cultural, and political environments? And if so, what interventions in the cycle could lead to significant changes?

Acknowledgements

This research was funded in part by National Science Foundation Award #1545913, PIRE: Promoting Urban Sustainability in the Arctic.

Notes

1. This study adopts the definition of Arctic employed by Schaffner (2020). Noting that “there are numerous definitions of the term ‘Arctic’ based on a combination of geographical and climatic factors,” Schaffner defines the Arctic as “the largest possible area encompassed by this agglomeration of Arctic research organization borders.” Nearly the entire state of Alaska falls within this area, including Fairbanks.

References

- Alaska Department of Natural Resources (ADNR): Division of Forestry. (2019). *Alaska 2019 Fire Numbers*. Available at: <http://forestry.alaska.gov/Assets/pdfs/firestats/2019%20Alaska%20Fire%20Statistics.pdf>.
- Agrawal, N. (2018). Disaster Perceptions. *Natural Disasters and Risk Management in Canada*, Advances in Natural and Technological Research, 49. doi: https://doi.org/10.1007/978-94-024-1283-3_5.

- Baker J., Shaw W.D., Bell D., Brody S., Riddel M., Woodward R.T., and Neilson W. (2009). Explaining subjective risks of hurricanes and the role of risks in intended moving and location choice models. *Natural Hazards Review*, 10(3), 102–112. doi:10.1061/(ASCE)1527-6988(2009)10:3(102).
- Bankoff, G. and Hilhorst, D. (2009). The politics of risk in the Philippines: comparing state and NGO perceptions of disaster management. *Disasters*, 33(4), 686-704. doi: 10.1111/j.1467-7717.2009.01104.x.
- Baron R.M and Kenny D.A. (1986). The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations. *Journal of Personality and Social Psychology*, 51(6), 1173-1182. doi: 10.1037//0022-3514.51.6.1173.
- Bartlett, L. and Vavrus, F. (2016). *Rethinking Case Study Research*. Routledge: New York.
- Champ, P.A., Donovan, G.H., and Barth C.M. (2013). Living in a Tinderbox: Wildfire Risk Perceptions and Mitigating Behaviours. *International Journal of Wildland Fire*, 22, 832-840. doi:10.1071/WF12093.
- Dickinson K., Brenkert-Smith H., Champ. P., Flores N. (2015). Catching Fire? Social Interactions, Beliefs, and Wildfire Risk Mitigation Behaviors. *Society & Natural Resources*, 28, 807-824. doi: 10.1080/08941920.2015.1037034.
- Dupey L.N. and Smith J.W. (2018). An Integrative Review of Empirical Research on Perceptions and Behaviors Related to Prescribed Burning and Wildfire in the United States. *Environmental Management*, 61, 1002-1018. doi: 10.1007/s00267-018-1031-8.
- Ghasemi B., Kyle G.T., Absher J.D. (2020). An Examination of the Social-Psychological Drivers of Homeowner Wildfire Mitigation. *Journal of Environmental Psychology*, 70. doi: 10.1016/j.jenvp.2020.101442.
- Gierlach, E., Belsher, B.E., and Beutler, L.E. (2010). Cross-cultural differences in risk perceptions of disasters. *Risk Analysis*, 30(10), 1539-49. doi: 10.1111/j.1539-6924.2010.01451.x.
- Graham, J.D. (2020). *The Governmentality of Vulnerability, Resilience, and Disasters: A Case Study of Wildfire Management and The Iditarod in Fairbanks, Alaska* [unpublished master's dissertation]. The University of Manchester.
- Hall T.E. and Slothower M. (2009). Cognitive Factors Affecting Homeowners' Reactions to Defensible Space in the Oregon Coast Range. *Society & Natural Resources*, 22(2), 95-110. doi: 10.1080/08941920802392187.
- Hébert, K. and Mincyte, D. (2014). Self-Reliance beyond Neoliberalism: Rethinking Autonomy at the Edges of Empire. *Environment and Planning D: Society and Space*, 32(2), 206-222. doi: <https://doi.org/10.1068/d6312>.
- Hogan, M.P. & Pursell, T. (2008). The 'Real Alaskan': Nostalgia and Rural Masculinity in the 'Last Frontier.' *Men and Masculinities*, 11(1), pp.63-85. doi: <https://doi.org/10.1177/1097184X06291892>.
- Law, T. (2019). 'About 2.5 Million Acres in Alaska Have Burned. The State's Wildfire Seasons Are Getting Worse, Experts Say,' *TIME Magazine*, August 20. Available at: <https://time.com/5657188/alaska-fires-long-climate-change/>.
- Lindell, M.K. and Perry, R.W. (2000). Household Adjustment to Earthquake Hazard: A Review of Research. *Environment and Behavior*. doi:10.1177/00139160021972621.
- Martin W.E., Martin, I.M., and Kent B. (2009). The Role of Risk Perceptions in the Risk Mitigation Process: The Case of Wildfire in High Risk Communities. *Journal of Environmental Management*, 91(2), 489-498. doi:10.1016/j.jenvman.2009.09.007.

- McCaffrey S.M. (2002). For Want of Defensible Space a Forest is Lost: Homeowners and the Wildfire Hazard and Mitigation in Residential Wildland Intermix at Incline Village, Nebraska. PhD dissertation, University of California – Berkeley.
- McCaffrey S., Toman E., Stidham M., and Schindler B. (2012). Social Science Research Related to Wildfire Management: An Overview of Recent Findings and Future Research Needs. *International Journal of Wildland Fire*. doi:10.1071/WF111115.
- McFarlane B.L., McGee T.K., and Faulkner H. (2011). Complexity of homeowner wildfire risk mitigation: an integration of hazard theories. *International Journal of Wildland Fire*, 20, 921–931. doi:10.1071/WF10096.
- Meldrum J.R., Champ P.A., Brenkert-Smith, H., Warziniack T., Barth C.M., Falk L.C. (2015). Understanding Gaps Between the Risk Perceptions of Wildland-Urban Interface (WUI) Residents and Wildfire Professionals. *Risk Analysis*. doi: 10.1111/risa.12370.
- Mileti, D.S., and Sorensen J.H. (1987). Natural Hazards and Precautionary Behavior. *Taking Care: Understanding and Encouraging Self-Protective Behavior*, 189-207. doi:10.1017/CB09780511527760.012.
- Nelson, K.C. and Monroe, M. (2005). The Look of the Land: Homeowner Landscape Management and Wildfire Preparedness in Minnesota and Florida. *Society and Natural Resources*, 18(4), 321-336. doi:10.1080/08941920590915233.
- Nelson, K. C., M. C. Monroe, J. Fingerman Johnson, and A. Brower. (2005). Living with Fire: Homeowner Assessment of Landscape Values and Defensible Space in Minnesota and Florida, U.S.A. *International of Journal Wildland Fire*, 13(4), 413-425. doi:10.1071/WF03067.
- Oven, K. and Bankoff, G. (2020). The neglected country(side): Earthquake risk perceptions and disaster risk reduction in post-Soviet rural Kazakhstan. *Journal of Rural Studies*, 80, 171-184. doi: <https://doi.org/10.1016/j.jrurstud.2020.08.048>.
- Park, K. and Reisinger, Y. (2010). Differences in the Perceived Influence of Natural Disasters and Travel Risk on International Travel. *Tourism Geographies*, 12(1), 1-24. doi: 10.1080/14616680903493621.
- Sapiains R., Ugarte A.M., Aldunce P., Marchant G., Romero J.A., Gonzalez M.E., and Inostroza-Lazo V. (2020). *Sustainability*, 12(10), 4298. doi:10.3390/su12104298.
- Schaffner, C. (2020). 'Arctic Cities.' In: Orttung, R., (ed.), *Urban Sustainability in the Arctic: Measuring Progress in Circumpolar Cities*. New York: Berghahn, pp.22-46.
- Sims, J. H. and Baumann D.D. (1983). Educational Programs and Human Response to Natural Hazards. *Environment and Behavior*, 15, 165-189. doi:10.1177/0013916583152003.
- Tierney, K.J. (1999). Toward a Critical Sociology of Risk. *Sociological Forum*, 14(2), 215-242. Available at: <https://www.jstor.org/stable/684794>.
- Vaske J.J., Absher J.D., Bright A.D. (2007). Salient Value Similarity, Social Trust and Attitudes toward Wildland Fire Management Strategies. *Human Ecology Review*, 14, 223-232.
- Warziniack T., Champ P., Meldrum J., Brenkert-Smith H., Barth C.M., Falk L.C. (2019). Responding to Risky Neighbors: Testing for Spatial Spillover Effects for Defensible Space in a Fire-Prone WUI Community. *Environmental & Resource Economics*, 73, 1023-1047. doi: 10.1007/s10640-018-0286-0.
- Whitehead J.C., Edwards B., Van Willigen M., Maiolo J.R., Wilson K., and Smith K.T. (2001). Heading for Higher Ground: Factors Affecting Real and Hypothetical Hurricane Evacuation Behavior. *Environmental Hazards*, 2(4), 133–142. doi:10.3763/EHAZ.2000.0219.

Winter G. and Fried J.S. (2000). Homeowner Perspectives on Fire Hazard, Responsibility, and Management Strategies at the Wildland–Urban Interface. *Society & Natural Resources*, 13, 33–49. doi:10.1080/ 089419200279225.

Appendix A: Survey

Part 1

1. On a scale of 1-10, how do you view the severity of the direct or indirect threat of wildfire to your household? (With 1 being little to no threat and 10 being an imminent threat?)
2. Are you comfortable with this level of risk?
3. How often do you think about wildfires or the threat of wildfires?
4. To what extent do you agree or disagree with the following statement:
 - a. “The government should do more to prevent wildfires and protect citizens.”
 - b. “It is primarily my responsibility to protect myself and my household from wildfires.”
 - c. “Wildfires are natural and inevitable.”
 - d. “The government can reduce risk and prevent damage from wildfires.”
 - e. “Communities can take steps to reduce risk and prevent damage from wildfires.”
5. What steps do you take to prepare yourself and your household for potential wildfire threat?
6. Do you have any ideas on how wildfires could be managed better/more effectively in your city?

Part 2

1. What is your age?
2. Which best describes your gender identity?
3. Which best describes your race/ethnicity?
4. Do you own or rent property in Fairbanks, Alaska or Los Angeles, California?
5. What is your annual pre-tax income?