

HARNESSING INNOVATION THROUGH WORK AND ORGANIZATIONAL STRUCTURE:
A STUDY OF THE FOREST FIRE FIGHTING SECTOR IN NEW BRUNSWICK, CANADA.

BY

ERIK OLIVER

A thesis submitted to the Department of Commerce
Mount Allison University in partial fulfilment of the
requirements for the Bachelor of Commerce degree
with Honours April 18th 2019

Abstract:

This thesis conceptualises the conditions that facilitate innovative and extra-role responsive work behaviour in the context of organizational structure and job design. It explores the idea that innovative work behaviour is largely a result of the facilitation of responsiveness and adaptation to internal and external influences acting on the organization and institutional actors. This study examines the intersection and overlap of proceduralism and innovation and investigates the dichotomy of structure and adaptability.

This research considers innovation as the intentional creation, introduction and application of new ideas for the purpose of problem solving and increasing the efficiency of means to ends decision making. The study comprises an in-depth investigation into New Brunswick forest fire management to better understand opportunities to harness innovation. Ten semi-structured interviews of experts and stakeholders were conducted throughout New Brunswick's forest fire management network to determine the extent that organizational arrangements support innovative work behaviour amongst the responders. These interviews targeted publicly employed managers and Forest Rangers, volunteer fire fighters and private forestry industry partners.

This research argues that facilitating adaptation through flexibility, open communication and joint initiatives, can increase the likelihood of responders deciding to exhibit discretionary effort and extra role innovative behaviours. Through practices like inter-organizational training initiatives and joint after action reviews, innovation can be promoted at an individual level for the benefit of the entire organization and the forest fire fighting network.

Conceptually, this research contributes to an under-researched region of Canadian forest fire management, and provides a conceptual base for future comparative projects amongst Canadian provinces to better understand network working within and between provinces.

Acknowledgements:

I would like to take this opportunity to especially thank my supervisor and mentor Dr. Rachelle Pascoe-Deslauriers for having inspired me to write my Undergraduate Honours Thesis about a topic that I find immensely interesting and that I am deeply invested in myself. Her support and enthusiasm during the research and writing process has not only helped me finalize this research but has inspired a deeper passion for the field of research moving forward. I would also like to thank my family for consistently supporting me through this process and always showing interest in my work. Thank you to all my invaluable participants who shall remain anonymous for lending me their time and expertise, without you this project wouldn't be possible. I have learned more along this journey than I could have ever imagined and I look forward to any and all future endeavours regarding research. A special thanks goes to all those who have motivated me to continue even when I was ready to quit and for all of the countless hours you have all spent helping me edit and make revisions. Thank you to the Mount Allison Commerce Department for giving me this amazing opportunity and investing your time into helping me succeed and bring this thesis to life in the form of presentations. Lastly thank you to Mount Allison University and the New Brunswick Experiential Learning Fund for their generous financial support involved in this research.

Table of Contents

Chapter 1. Introduction: Organizational structure and Job Design.....	1
1.1 Introduction	1
1.2 Why innovation matters in an organization.....	2
1.3 Organizational structure	4
1.4 Job design.....	9
1.5 Job and organizational structure in emergency response organizations.....	17
1.6 Research problematic	22
Chapter 2. Methodology	24
2.1 Research rational	24
2.2 Research approach.....	24
2.3 Participants and how they were selected	26
2.4 Procedure.....	28
2.5 Limitations	28
Chapter 3. Findings from New Brunswick, Canada forest fire management	29
3.1 Introduction	29
3.2 Environmental pressures and their effect on the industry	29
3.3 Job and work design.....	34
3.4 Inter-organizational cooperation and communication	39
3.5 Management control systems	49
Chapter 4. Discussion	57
4.1 Introduction	57
4.2 Organizational structure and inter-organizational cooperation	57
4.3 Job and work design.....	63
4.4 Inter-organizational cooperation and innovation	68
Chapter 5. Conclusions and Implications for the Field.....	75
References	78
Appendices.....	82
Appendix A: Energy and Resource Development Regions.....	82
Appendix B: Ethical Considerations and Approval	83
Appendix C: Semi-Structured Interview Questions.....	84

Chapter 1. Introduction: Organizational structure and Job Design

1.1 Introduction

This thesis aims to conceptualize innovation in the workplace by examining the conditions of organizational and job structures in emergency response workers. This is examined in the context of forest fire management in New Brunswick Canada. These organizations are largely operated based on the processes related to the organization's structure and subsequently by the facilitation of responsiveness within that structure. More specifically, the research seeks to analyze the complex arrangements within an organization that harness innovation. The goal is to better understand to what extent those arrangements support innovative activities in the responders. This is done by reviewing the existing literature and research from three main areas related to organizational structure, innovation and job design.

Conceptually, although variation in an organization's arrangement can result in different influences acting on that organization, it is its ability to receive and interpret those influences that allow for innovation to occur (McGrath, 2013; Barreto, 2009). This allows for a connected understanding of how organizational structure and practices, regardless of context, have or have not allowed for the implementation of procedures for harnessing innovative work behaviour. Empirically, this research examined existing literature in the field of emergency response that suggests there are trade-offs made between existing structures and practices, and change and adaptation (Stark 2014). These trade-offs are put on display when harnessing innovation (Stark, 2014).

This thesis is organized as follows. First a review of the literature on innovation was conducted to gain a broad understanding of past research. Then a review of explicit literature relating to the emergency response sector was completed, in order to apply the broader literature to a specific context. Research questions were then created and explored through semi structured interviews to determine the implications for emergency response organizations. Lastly, those implications were discussed and presented in the context of forest fire management in New Brunswick, Canada. The following sections outline the research problem in greater depth in order to understand influences that either facilitate or hinder innovative work behaviour and the receptiveness of organizations to innovate.

1.2 Why innovation matters in an organization

Today's organizational landscape is constantly changing in a complex and often abstract way. To meet these changing demands, organizations have become equally complex (Snowden and Boone, 2007). The issue with mainstream literature on the subject of popular organizational and management structure is that it has not adjusted for this complexity. Much of the literature emphasizes a "one formula fits all" approach, in the search of a perfect system (Snowden and Boone, 2007). Snowden and Boone (2007) explain, there cannot be a solution to fit all circumstances anymore because of the volatility in the landscapes in which organizations operate. When operating in such volatility, there are continuously shifting variables that require adaptation in order to compete with new disruptive innovations (Snowden and Boone, 2007). Due to this, it is increasingly evident that organizational arrangements need to be viewed as the outcomes of means to end decisions (Bryman, 1984, pg. 11 of Thompson and

McHugh, 2009). These means to end decisions are made based on innovation resulting from situational circumstance which are used to enhance efficiency within the context of the operating environment (Bryman, 1984, pg. 11 of Thompson and McHugh, 2009).

These situational circumstances are why innovation is so important for organizations to understand and practice. In this context, it is helpful to think of innovation as an, “intentional creation, introduction and application of new ideas within a work role, group or organization, in order to benefit role performance, the group, or the organization” (Janssen, 2000, pg. 288). In other words, innovation can be viewed as the process of bringing together problem-solving ideas (Kanter, 1985). Innovation involves a diverse set of practices, skills and actors in order to properly be implemented in an organization.

An organization is able to implement innovation through a balance of idea generation and idea realization (Scott and Bruce, 1994; Janssen, 2000). Janssen (2000) reiterates that the foundation of innovation implementation is ideas. There are three different behavioural tasks that facilitate ideas and thus innovation. The first, idea generation, is used to describe the production of novel and useful ideas in any domain (Janssen, 2000). Once an idea is created the second stage, idea promotion occurs (Janssen, 2000). This stage involves sharing the idea with allies by engaging in social activities to find friends, backers and sponsors to build a coalition of supporters (Janssen, 2000). When an idea gains support the third and final stage is idea realization, which is the physical manifestation of a prototype or model of the innovation that can be experienced and ultimately applied within a work role (Janssen, 2000). These stages are not conclusive, but may be interactive and individuals can find themselves in any one of these three behavioural tasks at any time (Jansson, 2000; Scott and Bruce, 1994).

For that reason, it is important for all of the independent actors within the organization to focus on both creating and increasing innovative behaviour. When this occurs and an organization focuses on the interactions between individuals and the workplace, Kanter's (1985) problem solving ideas are more likely to occur. When problem solving ideas do occur it has the effect of benefiting role performance which turns barriers into opportunities (Barreto, 2009) and ultimately facilitates more effective means to end decisions. These means to end decision are known to increase efficiency and help mitigate the increasingly volatile landscape (Thompson and McHugh, 2009).

1.3 Organizational structure

According to the Business Dictionary (2018), an organization is, "a social unit of people that is structured and managed to meet a need or to pursue collective goals". This is echoed by Thompson and McHugh (2009) who argue that organizations are crucial meeting places of opposing social forces which generate and reflect contradiction and change in order to seek profit by forming a purposeful system of coordinated actions towards an objective or goal. They further argue that it is impossible to understand and study organizational structure and hierarchical groups in organizations without first understanding the broader social division of labour and power structures which work together to create the end goal (Thompson and McHugh, 2009). By identifying organizations use of goal achievement parameters or identifying organizations who use goal achievement parameters allows research to be conducted emphasizing systematic structures for controlling relations between means and ends.

To put this into a contextual setting, organizations formulate goals based on the external demands placed upon them, and from those goals policies and objectives are created

which in turn implement activities. These activities lead to the production of outputs that allow for the realization of the created goals (Thompson and McHugh, 2009). Therefore, in practice, organizations can be better understood as consciously created arrangements to achieve goals by collective means (Thompson and McHugh, 2009). These collective arrangements are formulated and relied upon to operate efficiently and to reach the desired goals. It is important to note that, at any given time, there are always wider economic and political influences acting on the goals. This reiterates the importance of understanding innovation and how innovative work behaviour can be used to operate more efficiently, given the demands placed on organizations from influencing factors. Even within an organization there are various stakeholders acting in their own self-interest. Fredrickson (1989) argues that this inherent ideology of self-interest is a result of various stakeholders having different preferences and motivational drivers. Goals can therefore be viewed less as clear cut structures but rather, as trade-offs between the preferences of competing yet cooperative groups (Fredrickson, 1986). The trade-offs being made will directly affect the logic used in the choice of managerial mechanisms and governing systems in order to increase efficiency and enable successful realization of goals.

Trade-offs in decision making pull managers in two opposing directions: structure versus adaptation (Stark, 2014). Stark (2014) argues that while the first direction, structure, leads managers towards the safety and reassurance of procedure, the other direction, adaptation, pulls them towards the more risky and speculative domain of agency, innovation, and spontaneity. This creates a paradoxical dynamic between innovation and efficiency that researchers often struggle to evaluate (Storey and Salaman, 2009).

Stark (2014), Fredrickson (1989) and Damanpour (1991) all argue that some form of structure is required for organizations to operate. Efficiently to these researchers, there has to be some form of procedure for employees to understand organizational guidelines, job roles, organizational objectives and how to act in certain situations (Damanpour, 1991; Fredrickson, 1989). Without an end in mind and governing systems, organizations would not be able to function. In contrast to this, however, those same studies have also argued that proceduralism places limitations on employees ability to reflect, deliberate and consider context (Stark, 2014). Furthermore, Damanpour (1991) and Fredrickson (1989) suggest that proceduralism can hinder employee's ability to capitalize on strategic choice. The dichotomy of innovation/efficiency or structure/adaptability is important to understand when reviewing innovation studies as it clearly establishes that innovation is important for performance and effectiveness of the adopting organization.

Child (1997) argues that if organizational structure is not adapted to its context then opportunities are lost, costs rise, and the maintenance of the organization is threatened. This ability to adapt is at the heart of innovative behaviour. Restricting this ability, however, is the reality that organizational agents who are involved in the decision making processes, often have a collective mental programming and institutionalized norms for socially approved actions which can restrict individual choice (Hofstede in Child,1997; Thompson and McHugh, 2009). Child (1997) refers to this phenomena as "action determinism" which is used to describe the current scenario in organizations where top management teams exert influence to the extent that the organizations internal mechanisms deny any genuine choice between alternatives (Child,1997). This becomes relevant when paired with the concepts developed through a

resource based view (RBV) (Barretto, 2009). A RBV intends to explain the conditions under which firms may achieve a sustained competitive advantage based on their bundles of resources and capabilities (Barretto, 2009).

Analyzing the market through a resource based view (RBV) contingency theory, suggests that there is no universal system of control but that the choice of appropriate control techniques will depend on the circumstances surrounding a specific organization (Thompson and McHugh, 2009). Essentially, organizations need to find a functional fit between environmental settings and the internal organizational structures required to maximize their efficiency (Thompson and McHugh, 2009). The concept of dynamic capabilities as discussed by Barreto (2009) aims to address the question, how do organizations cope with changing environments. Barreto (2009) highlights that organizations operate in hyper-competitive environments which cause shocks in competitive, technological, social and regulatory domains (Barreto, 2009). An organization's dynamic capabilities are its abilities to integrate, build and reconfigure internal and external competences to address rapidly changing environments (Barreto, 2009). When implemented correctly organizations maximize their ability to respond to these environmental shocks by developing sustainable, innovative practices of adaptation (Barreto, 2009). Given that the environment is volatile, building long term competitive advantage is harder to achieve, but dynamic capabilities can provide short term successive advantages (Barreto, 2009).

McGrath (2013) describes these short term competitive advantages as transient advantages which occur through the reconfiguration of assets, people and capabilities making it possible to transition from one advantage to another. These transient advantages combined

with a RBV approach suggest that organizations who can routinely change internal components and reallocate resources are able to solve problems by sensing potential opportunities and threats in order to make timely decisions (Barreto, 2009). This is relevant to viewing innovation as a problem solving process. Organizations making these changes respond to internally and externally motivated problems or as pre-emptive actions to influence the environment (Damanpour, 1991). When an organization becomes efficient at creating dynamic capabilities they are presented with the opportunity to make strategic choices that make them disruptive innovators and give them first mover advantages which can result in higher rates of success and goal achievement (Barney, 1991).

Since it is established that an organization needs to adapt to gain competitive advantage, it is imperative to address how an organization can apply frameworks based on scale and position to innovate. Since organizations operate in unpredictable environments with large amounts of changing information, managers often struggle to select which signals to respond to (Reeves and Deimler, 2011). Reeves and Deimler (2011) suggest the solution is that, “in a world of constant change, the spoils go to the nimble” (p.137). In today’s society, organizations must be good at not only doing one thing but also learning to do new things (Reeves and Deimler, 2011). Reeves and Deimler (2011) argue that sustainable competitive advantage comes from four organizational capabilities for rapid adaptation. Organizations must be able to read and act on signals, have the ability to experiment rapidly and frequently, have the ability to manage complex and interconnected systems of multiple stakeholders, and lastly have the ability to motivate employees and partners (Reeves and Deimler, 2011).

This ability to quickly respond and act proactively when dealing with uncertainty and organizational change directly relates to McGrath's (2013) topic of transient advantage discussed above. McGrath (2013) argues that this advantage occurs when there is balance between stability and agility. Stability is created from a common identity, culture and commitment to leadership development within an organization (McGrath, 2013). Creating stability is accomplished by paying attention to values, cultural alignment and, above all, training to up-skill workers in the organization (McGrath, 2013). The other side of this balance, agility, occurs when an organization can spark change routinely and consistently (McGrath, 2013).

The benefit to organizations using strategies are that such organizations are able to utilize contingency theory to focus on all members of the organization. In doing so front-line decision makers may be able detect change and bypass slow moving decision hierarchies created by action determinism that are often associated with top down control management styles. Thus organizations can respond more quickly and proactively because the organization is unified, diligently trained and ready to adapt on demand.

1.4 Job design

Organizational resilience refers to an organization's ability to adapt to new and upcoming obstacles (Stark, 2014). Stark (2014) argues that true resilience occurs when an organization is capable of taking on new obstacles by deviating from the business plan in a way that can quickly return the business to a stable equilibrium (Stark, 2014). When an organization can quickly return to stable equilibrium, it is operating at its highest efficiency through the optimization of best practice (Stark, 2014). These best practices consist of having inter-

organizational flexibility, network management, flexible command structures and developing the right collaborative interpersonal skills to create a mix between hierarchy and collaboration (Stark, 2014).

Similarly, Damanpour (1991) argues that innovation is viewed as a means of changing an organization, either in response to changes in its internal or external environment or as a pre-emptive action to influence the environment. The extent of these changes, however, is not equal for all innovations (Damanpour, 1991). This is why trade-offs are so important to analyze when discussing decision making processes. Depending on the innovation and the decision that is made to adopt that innovation, the organization will be subject to different categories of influences (Damanpour, 1991; Stark, 2014).

These influences can have both negative and positive aspects for various processes in the organization (Damanpour, 1991). While best practices are initiated to mitigate the effects of change and to reduce the time to return to stable equilibrium after major adaptations, different innovations require different levels of organizational adjustment and thus different practices (Damanpour, 1991). Reorientation, non-routine or ultimate innovations require a clear departure from existing hierarchies, practices and routines while leaning heavily towards the side of agency (Damanpour, 1991). These types of innovations may rely heavily on best practices, such as collaboration and inter-organizational flexibility, but discard practices such as a hierarchical command structures. In contrast, instrumental innovations lean towards structure and result in little departure or change from existing practices and thus may discard flexibility in favour of hierarchical command (Damanpour, 1991).

Past research has found that the formalization of structure can have a negative relationship with innovation (Damanpour, 1991). Damanpour (1991), however, found that, “the association of formalization with initiation [of innovation] is barely significant and its association with implementation [of innovation] is nonsignificant” (Damanpour, 1991, pg.369). Damanpour’s (1991) meta-analysis did, however, suggest that, “new executives with different perspectives, new ideas and few obligations to internal constituencies” (pg. 369) would be more successful in harnessing and creating innovation.

Organizational climate may also be important to the creation and harnessing of innovation. Organizational climate refers to a cluster of attitudes, feelings, and behaviours which moderate the relationship between job demands and innovative work behaviour (Chen and Huang, 2007; Ekvall, 1996; Janssen 2000). Organizational climate can play an important role in fostering innovative ideas to overcome new challenges and obstacles. An organization’s climate can facilitate overcoming obstacles in innovative ways which inevitably is needed for a organization’s success and long term survival (Janssen, 2000). At the level of the organization, climate is described as the collaboration in established routines, practices, shared beliefs and existing mutual value systems (Chen and Haung, 2007). These value systems work in tandem to create a multistage innovative construct in an attempt to harness innovative practices. Innovation, however, cannot only be considered an outcome of organizational activities as it effects all levels of the organization. Thus an increased amount of attention has been paid to job structure and its effects on the innovative process.

Past research found that innovative work behaviour at an employee level is an important component of keeping pace with the competitive market and is imperative for the

creation of a competitive advantage (Imran and Anis-ul-Haque, 2011). This highlights that innovation is not necessarily limited to specialists, scientists and other research and development professionals but is relevant for all employees (Findlay et al., 2016). Therefore, it is imperative to develop the innovative potential of all employees (Imran and Anis-ul-Haque, 2011). To do this organizations may build upon exchange theories, which suggests that employee behaviour can be captured in terms of either economic or social exchanges (Janssen, 2000). Economic exchange refers to the formal transactional contract designed to specify the job demands of employment and is rigidly calculated. In contrast, social exchange refers to less specified future obligations based on a trust that the organization involved will fairly follow through with their obligations in the long run. This is done in return for employees' reciprocal discretionary efforts (Janssen 2000). In positive work environments which are conducive to innovation activities, employees prefer defining their relationship with employers as social exchanges, which if done properly, result in employees willing to perform actions like innovative activities (Janssen 2000). That being said, an organization's workplace climate will vastly determine any reciprocal actions conducted by employees. This can be seen in terms of fairness perceptions of the ratio between effort spent and reward received. (Janssen 2000).

Ekvall (1996) proposes a framework of 10 different internal conditions that will effect an individual's creative behaviour and performance. These 10 internal conditions are; challenge, freedom, idea support, trust/openness, dynamism/liveliness, playfulness/humor, debates, conflicts, risk taking, and idea time (Ekvall, 1996). Ekvall (1996) considers these dimensions as determining whether or not an organization facilitates creativity, and thus innovation, in the job demands placed on its employees. According to Ekvall (1996) the three behavioural tasks: idea

creation, promotion and realization mentioned require varying dimensions of an innovative climate which can be achieved through proactive job and organizational design (Ekvall, 1996; Scott and Bruce; 1994; Janssen 2000).

Workers in an organization are expected to undertake certain prescribed work behaviour in order to meet expected goals and performance standards. When identifying the prescribed work behaviour required from employees, this constitutes the procedural/ structural direction managers pull their employees towards (Stark, 2014). These job demands act as 'blueprints' for organizational structure, as they are advocated to be the most efficient known route to the end goal. These job demands, however, rarely request workers to perform innovative work behaviours (Janssen, 2000). As a result, Ekvall (1996) argues in favour of choice and innovation which managers can choose to promote amongst their employees. Ekvall's (1996) research argues that it is important to provide these climate dimensions for each phase of innovative work behaviour to ensure that within the demands of the job employees are still able to act innovatively.

Ekvall's (1996) first nine dimensions discussed below are positively associated with creativity and innovation, the last dimension, conflict, however, was negatively correlated to creativity (Ekvall, 1996). The first dimension, *challenge* stipulates the degree to which members of the organization are involved in its operations and goals (Ekvall, 1996). In a highly challenging climate people are intrinsically motivated to make contributions and invest their energy into work tasks which leads them to find joy and meaningfulness in their job (Ekvall, 1996). The second dimension, *freedom* involves the independence of behaviour exerted by workers in the organization while performing their tasks (Ekvall, 1996). With much freedom people are given

autonomy to define their own work and exercise discretion in their activities (Ekvall, 1996). The third dimension, *idea support* looks at how, in a supportive climate, new ideas are received in an attentive and kind way by bosses and coworkers, creating a constructive and positive workspace (Ekvall, 1996). The fourth dimension of *trust and openness*, relates to the emotional safety in work-related relationships (Ekvall, 1996). When there is a strong level of trust, communication is open and employees dare to share ideas and support opinions, and subsequently take on initiatives which allow for idea realization (Jansson, 2000) without fearing punishment if the idea fails (Ekvall, 1996).

Dynamism and liveliness are the fifth dimension and illustrate the eventfulness of the life of the organization (Ekvall, 1996). This entails the ability to alternate between ways of thinking when new ideas/obstacles occur (Ekvall, 1996). *Playfulness and humour*, the sixth dimension, addresses the spontaneity and ease displayed by the organization. This creates a relaxed atmosphere which allows for laughter (Ekvall, 1996). The seventh dimension, *risk taking*, is concerned with the tolerance of uncertainty and ambiguity in the workplace (Ekvall, 1996). In high risk taking climates, actions are rapid and opportunities are taken on gambles even when outcomes are unknown (Ekvall, 1996). *Idea time*, the eighth dimension, depicts the amount of time workers can use/do use for the creation of new ideas (Ekvall, 1996). If idea time is high, it creates the possibility of adopting new ideas and suggestions (Ekvall, 1996). The ninth dimension, *debates*, includes the exchange and clash of differing viewpoints and ideas which leads to constructive questions of structure and patterns which allow for stronger ideas to be put forward (Ekvall, 1996). Lastly, the tenth dimension, which was negatively correlated to creativity, is *conflict*. This dimension suggests that the presence of both personal and

interpersonal emotional tensions can create dissent and a 'warfare' climate in which innovation can be harmed (Ekvall, 1996).

Ekvall (1996) argues that the effect of job design and structure on an innovative climate is exponential. When organizations score high in the nine positively correlated dimensions and low in the 10th negatively correlated dimension, employees operate in an environment which is more conducive to innovation (Ekvall, 1996). Workers in an innovative climate work in a more conducive and supportive environment which can add more meaning to their jobs and positively affect their perceived effort-reward fairness ratio. It has the added benefit of reducing the stress of job demands and increasing team morale (Ekvall, 1996). Furthermore, when an environment is conducive to innovation, employees are more likely to, 'develop, carry, react to, and modify ideas' (Van de Ven, 1986, p. 592) which leads to increased productivity and a stronger competitive advantage in the long run.

Despite the positive effect on an organization's innovative climate, completion of jobs in a way that facilitates innovation and problem solving roles is not necessarily an explicit demand contractually required of workers in their jobs. Thus, as mentioned above innovation in the workplace occurs through successful adoption of carefully crafted social exchanges. Since innovation is not contractually required or inherent in job demands, it can be considered as discretionary effort by an employee. Janssen (2000) refers to this discretionary effort as extra-role behaviours (Janssen, 2000). These discretionary employee actions go beyond the prescribed role expectations and may not be directly or explicitly recognized by the formal reward system (Janssen, 2000). Thus innovative activities become regulated by the effort-reward fairness element of social exchange from the employee's perspective.

This effort-reward ratio is relevant to Janssen's (2000) three stages of innovation: idea creation, promotion and realization, because these behaviours go beyond the parameters of a normal job description. Without discretionary effort and a positive workplace climate to harness this extra role behaviour, these stages would be non-existent. Creating new ideas and propelling them forward to better the work environment is only likely to occur when organizational employees perceive their objectives and assignments as noteworthy (Porzse et al., 2012). These employees pay attention to the development and survival of the organization and want to see it succeed (Porzse et al., 2012). By reinforcing Ekvall's ten earlier discussed dimensions, employees may be more likely to exhibit discretionary effort when they can freely suggest ideas, collect information, interact with colleagues inside or outside the organization, and take advantage of operational freedoms if they so choose (Porzse et al., 2012; Ekvall, 1996).

Herein lies a problem organizations face. Discretionary effort at an individual level is optional for employees, and thus can be chosen to be ignored if the organizational climate and job demands are not perceived to be favourable. Knowing that organizations formulate goals to control the relations between means and ends, organizational climate can be viewed as the moderator between the means and the end. Contextually, this is important because an organization's climate can impact the direction an organization chooses to follow when completing tasks, shifting either towards structure through proceduralism or innovation through agency (Stark's, 2014). This choice will be made through the context of employees' organizational and working life. Processes such as: task fairness, problem solving, decision making, communication, cooperation, controlling and other internal psychological processes,

such as individual learning, creation, motivation or commitment will be the deciding factors for individual employees (Porzse et al., 2012; Thompson and McHugh, 2009).

1.5 Job and organizational structure in emergency response organizations

This literature review has argued that there is a need to understand the interaction between organizational structure and job demand. It is also important for organizations to consider the various resources and assets at their disposal. These assets are the tangible resources such as capital, equipment and materials which play a vital role in determining job structure and organizational outcomes (Porzse et al., 2012). Emergency response agencies exemplify the importance of proper resource allocation and organizational processes, as their work involves taking responsibility for the preservation of life, property and forests. The influences acting on these forest fire management agencies are exacerbated by the increasing scale and frequency of disasters (Flanagan, 2018). Turestky (Flanagan, 2018) argues that, “[forest] fires are now burning larger than they ever have before. They’re getting more intense... [and it] is only projected to get worse” (Flanagan, 2018). Among the provinces of Canada, Ontario alone has experienced an increase in fire activity by more than 70 per cent of the province’s 10 year average (Flanagan, 2018). It is projected that because of climate change, there will be an increase in forest fires in the future (Climate Atlas, 2018). This places increased pressures on the organizations operating within the industry, and reinforces the need for forest fire management organizations to be highly adaptive and performance oriented. Damanpour (1991) categorizes organizations who exhibit this highly adaptive and performance oriented nature as intermittently innovative, and argues that these organizations have not been adequately explored in past research and warrant further study (Damanpour, 1991).

Furthermore, many response organizations utilize a more rigid approach to management which can provide insight into the tensions between proceduralism and innovation (Hayes, 2012; Townsell, 2016). Since many emergency response organizations use an Incident Command System (ICS) that relies on rigidity and strict chain of command (Townsell, 2016), these organizations may sit in tension with the need for more extreme forms of adaption (Stark, 2014). While ICS' are designed to be adaptable, flexible and encourage networking and information sharing, they often fall short (Townsell, 2016). It relies heavily on vertical command structures that may not provide adequate flexibility for timely communications and adaptability (Townsell, 2016). Furthermore, Townsell (2016) observed that as emergencies grow and response organizations become overwhelmed, other organizations, both public and private, initiate their own individual activities in an attempt to deal with their specific tasks (Townsell, 2016). This has the result, however, of further hindering open communication which can lead to the duplication of efforts (Townsell, 2016).

Firefighting organizations are also interesting given their potential impact of the work on employee well-being. Emergency response workers face potential stressors due to the nature of the work environment. Job demands such as work overload, time pressure, and emotional demands are associated with reduced well-being (Wolter et al, 2018). It is also established that job resources such as social support, procedural fairness, and trust in management have a positive effect on well-being (Wolter et al., 2018). These job resources, however, may be compromised in high pressure, time sensitive response activities which can lead to a higher rate of exhaustion and burn out (Saijo et al., 2007). This is a highly relevant

topic for emergency responders and can cause considerable damage to an organization's effectiveness.

In a study of Japanese fire fighters, Saijo et al. (2007) found that of 1,672 fire fighters, 22.3% had symptoms of depression. A high variance in workload, high inter-group conflict and high role conflict combined with low self-esteem were all significantly related to depressive symptoms amongst Japanese fire fighters (Saijo et al., 2007). The study argued that variance in workload was significantly related to the fire fighters depressive symptoms and that measures to improve workload variance should be taken (Saijo et al., 2007). It was further found that there is a relationship between high role conflict and low job satisfaction with emotional exhaustion and burnout (Saijo et al., 2007). While initially most fire fighters do enjoy the prospect of their work, those who do not receive role clarity, become dissatisfied with the non-firefighting tasks (Saijo et al., 2007). This dissatisfaction is strengthened when sectionalism and workload imbalance occurs between individuals working within the same setting (Saijo et al., 2007). This is relevant when considering extra role behaviours as a value added activities. Since discretionary effort is not required from everyone, individuals participating in extra efforts can create these workload imbalances discussed in the study. To prevent this occurrence, Saijo et al. (2007) argues that it is important to facilitate an adequately cooperative structure when fighting fire.

Saijo et al. (2007) raise an even bigger issue within the parameters of firefighting structure when it is considered that fire fighters have to adhere to strict discipline and guidelines to operate. Given those strict guidelines, conflict between regulations and appropriate measures for life saving must exist (Saijo et al., 2007). This raises an important

topic of employee support and the demands of the job, which should be further investigated. Stark's (2010) research highlights this contradiction between regulation and adaptability and stresses that response workers, have to innovate, adapt and improvise because plans, regardless of how well done, seldom fit circumstances. Hayes (2012) found that for disaster relief providers, organizational culture and organizational climate impact the providers ability to receive environmental cues and adapt accordingly. These environmental cues which appear to be effected by organizational structure are what could make the difference between life and death (Hayes, 2012). The ability to interpret environmental cues is impacted by personal characteristics, such as confidence, experience and training (Hayes, 2012). The other impacting factor in receiving cues is the organizational influences acting on the individual (Hayes, 2012). As mentioned by Barreto (2009) at any given time individuals need to be able to interpret internal and external influences and reconfigure competencies accordingly to positively impact the decision making process. These influences are why it is important to consider the 10 dimension research done by Ekvall (1996). Hayes (2012) found that the ability to interpret environment cues and adapt accordingly is increased when operating in an organizational environment that is supportive and empowering to individuals.

Hayes (2012) study also found that segregation of response organizations emerged as a theme. Responders felt more secure in their small working groups bound by their roles (Hayes, 2012). This is at odds with traditional service culture since it is often expected to have a strong focus on mission and unified goals. This creates a fundamental problem which occurs especially in hierarchical structures, where Incident Command Systems are used. In any given ICS there can be sectional headquarters referred to as Incident Command Posts (ICP) all of which control

their own individual sub group and or section of the fire (Townsell, 2016). For proper coordination, Incident Command Systems require all groups coming together and partnering in the execution of the plan (Townsell, 2016). This process can be greatly hindered by the fact that individual ICP's may place emphasis on different values and practices which can negatively impact communication and response time.

Response efforts to forest fires demand multiple basic elements to interact with each other to establish coherent processes for success (Townsell, 2016). This wildfire response can be understood as a complex system where there are tensions that rise between the varying groups. Catts and Chamings (2010) emphasize social capital as the solution to this problem. Social capital refers to the ability to create links between people and form mechanisms for prompting trust and enforcing reciprocal behaviour (Catts and Chamings, 2010). One method of mitigating the risks associated with tensions that can form in an Incident Command System is the successful implantation of energy, creativity and openness to change in job demands (Townsell, 2016). This mentality facilitates, "cooperation on the part of disparate shareholders to achieve common goals, a shared vision, shared ownership and leadership, and a willingness to expand the scope of activity and to build on success" (Townsell, 2016. Pg. 24).

This has led to a push for wildfire management to adapt the traditionally bureaucratic hierarchal structure into a networked approach to management (Townsell, 2016). This approach allows for more de-centralization, relationships, collaboration, and creativity (Townsell, 2016). The de-centralized nature places a high value on efficiency and rapid reactions to problems (Townsell, 2016). The argument implies that there exists a need for a more fluid and flexible system in emergency response. With the implementation of these types

of fluid systems it provides a structural example of Stark's (2010) concept of resilience. Stark (2010) stresses the ability for response organizations to deviate from business plans by adapting in a way that solves the issue while also returning to stable operational equilibrium (Stark, 2010). Two elements are necessary for this to happen; coordination and collaboration (Townsell, 2016). Coordination is achieved through the organization of groups into an agreed upon plan, while collaboration occurs by coming together and partnering in the execution of the plan (Townsell, 2016).

This concept closely aligns with the segregation of idea creation and idea implementation discussed by Damanpour's (1991) study. Damanpour (1991) found that in manufacturing industries, formalized structure was not significant to the initiation or implementation of innovation. However, amongst studies completed on the California wildfire response and management of the Cedar and Rim fires, Townsell (2016) found that some element of coordinated control and management structure was in fact needed. The study suggested that moving forward, ICS would remain in place, however, "the use of and capitalization upon network relationships will be focused upon within and outside of the ICS structure" (Townsell,2016) to increase flexibility.

1.6 Research problematic

Through a review of the literature on organizational structure, job demand and innovation. This thesis argues that these three concepts play an important role in supporting individuals' discretionary effort. Congruently, the analysis of literature pertaining directly to emergency response suggested that the implementation of proper organizational structure, job

demand and innovation may also address many of the current issues that the emergency response sector faces.

This thesis explores the association of major topics such as; trade-offs between proceduralism and innovation, successive competitive advantage through adaptability and change, flexible job structures, organizational climate and perceived job fairness, to determine the effects of innovative work behaviour on the emergency response sector. This is done in the context of forest fire management, because of the pressures associated with the preservation of life, property and lumber as well as the exacerbated pressures of climate change.

To consider the importance of the connection between past literature and the emergency response sector, this thesis explores the two research questions:

- To what extent do organizational structures support innovative behaviour and consequently to what extent do workers engage in innovative behaviour?
- To what extent do current hierarchical chains of command aid and/or hinder innovation in the workplace?

Chapter 2. Methodology

2.1 Research rationale

This research seeks to better understand the organizational structures and processes that support front-line, emergency workers to engage in innovative work behaviours. This project seeks to answer the following two research questions “To what extent do organizational structures support innovative behaviour and, consequently, to what extent do workers engage in innovative behaviour?” and “To what extent do current hierarchical chains of command aid and/or hinder innovation in the workplace?”.

New Brunswick, Canada was chosen as the region for this study because of the constraint and pressures placed on the public sector. As a small province, it does not have the same resources or funding at its disposal. Since the region is smaller and has fewer fires than other provinces in Canada, their operations are different than other provinces (Officer 1). Furthermore the province does not have the same structure for fighting fire as other provinces (Officer 1). Any and all information regarding forest fire management is found through the Department of Energy and Resource Development (ERD) which is a diverse and multi-skilled organization (Government of New Brunswick, 2018) . Lastly, because of its size and lower fire activity, New Brunswick is relatively under researched in the area of fire management and workplace innovation.

2.2 Research approach

Empirically, this research investigated the two research questions through the use of semi-structured expert respondent and managerial interviews with senior stakeholders and

managers in forest fire fighting and disaster relief organizations in New Brunswick. It utilized semi-structured interviews with front-line emergency response workers in the province of New Brunswick. The study interviewed 10 participants of which six were managers two were industry employees and two were first responders. The purpose of using semi-structured interviews with expert and managerial respondents was to obtain insight into the organization's structures, processes, ways of working and ways of managing work within the organization and sector. These respondents were selected on the basis of their roles within relevant organizations and included government employees, volunteers and private sector managers in the forestry industry. These interviews which were conducted between the February 10th and March 15th 2019, and were approximately 45-60 minutes in length. In total these interviews provided nine hours and 20 minutes of data which was used to create a thematic analysis of the broad overview of work and organizations within the fire management sector of New Brunswick.

The semi-structured interview data with various levels of forest fire management within the province provided insight that relates to the opportunities to engage in innovative work behaviour within those jobs. The content of the interviews was broadly similar for all levels of the organization regardless of who and which agency was being interviewed, however, the focus was on their experience of work in the sector. Participants were selected on the basis of their current, or recent (within the last year) employment experience in the field and recruited based on their organizational affiliation and through snowball sampling.

It should be noted that since forest fire fighting is seasonal in nature, not all recent workers in this sector would have on-going employment contracts. Furthermore, due to the

private-public cooperation's in the sector, not all participants were directly related to forest fire management agencies. Despite not being directly employed or working for forest fire management, their recent experiences were useful in understanding the extent to which organizational structures and practices support innovative work behaviours by front-line workers.

Interview data was anonymized by design, meaning that no personal information was held with the raw interview data. Transcripts were further anonymized by redacting identifiable information.

Interview data was transcribed following a thematic approach of themes identified from the literature review. The data was analyzed individually and as a set to find overall themes and patterns to help understand the structures and processes shaping the experiences of work in the sector.

2.3 Participants and how they were selected

This research engaged with 10 expert participants, seven of which were government employees, two were private industry and one was a volunteer first responder. These participants come from various regions and organizations to ensure the consistency of their answers and the validity of this study. The content of the interviews focused on their areas of professional capacity, either in a managerial or stakeholder capacity, or in their employment experience as a front-line relief worker. Expert respondents had at least five years of experience working within the sector. The reason for this is that these respondents have an in-depth understanding of the sectoral and organizational contexts. Participants were found and contacted using the Government of New Brunswick's website, under the New Brunswick

Canada Energy and Resource Development page (Government of New Brunswick, 2018), and through snowball sampling (Appendix A).

Nine of the 10 interviews were conducted over the phone but the 10th participant when given the opportunity chose to conduct a face-to-face interview. Given the remote nature of the work and the number of interconnected organizations involved in forest fire management throughout the province, phone interviews were primarily the best means of communication. While the opportunities for rapport building may be diminished through this media, non-face to face interview formats did not raise any additional ethical concerns related to participants or researcher safety.

Each participant was given code names to protect their identify. The following chart provides insight into how those code names were chosen:

Figure 2.1:

Participants profession (field of work)	Code Name	Number of respondents
Public sector employees working within various levels and regions of the Department of Energy and Resource Development (ERD) throughout New Brunswick.	Officer	7
Private sector employees working with companies operating in New Brunswick's forestry industry.	Industry Partner	2
Volunteer first responder stationed with a fire department located within New Brunswick.	Volunteer	1

2.4 Procedure

Prior to any research being conducted, a research proposal was submitted and approved by the Mount Allison Research Board of Ethics (Appendix B). Participants were not being incentivized to participate in this study and they were fully made aware of their ability to withdraw at any time before during or after the study had been completed. Awareness was drawn to the presence of a recorder and consent for recording was both asked in a consent form and a second time prior to the interview. The semi-structured interviews were structured using the interview schedule found in Appendix C.

2.5 Limitations

This study involved participants from various organizations in the province, representing the range of actors involved in forest fire management. Only 10 participants, however, were interviewed which makes this sample not representative of the entire province. Furthermore, because of the time and scope of the study, no front line forest fire specific emergency responders participated in this study. This was offset by talking to other emergency response first responders but their experience and relation to the Department of Energy and Resource Development (ERD) was different than the first responders who work seasonally within the ERD itself.

As a result of the existing pressures in the New Brunswick context, some of the findings may not be replicable elsewhere in Canada. That being said the study provides a basis for doing further research within the region and could be used in a comparative analysis amongst various provinces in order to better understand practices for workers responding to crisis.

Chapter 3. Findings from New Brunswick, Canada forest fire management

3.1 Introduction

This section presents the findings from the interview data. It was discovered that New Brunswick forest fire management is largely broken into four main regions (appendix A). The headquarters of each region is as follows: Region one is Bathurst, Region two is Miramichi, Region three is Fredericton and Region four is Edmundston (Government of New Brunswick, 2018). The four headquarters for these regions are operated separately and are spread geographically across the province. As such, even though each of the four regions work closely together and are a part of the same organization, individually they each have their own influences and priorities. Considering the findings were an accumulation of data across all four regions, it is important to have overarching themes that can link each region together despite their differences. To accomplish this, and better understand the nuances within the sector, the findings discussed in this section have been divided into four main overarching themes.

These overarching themes consist of environmental pressures and their effect on the organization, job and work design, inter-organizational cooperation and communication and lastly management control systems. This chapter examines these overarching themes in detail and sequentially to discover any relevant overlap and connections that can be made.

3.2 Environmental pressures and their effect on the industry

To be able to understand the complexities of New Brunswick's forest fire management sector, it is important to first identify the environmental work pressures that act on the industry. This section will discuss the pressures placed on the sector that are beyond its scope of control.

It will look at issues, such as the workforce challenges associated with insufficient demand, dwindling personnel, knowledge gaps and changing demographics. Each one of these challenges are sequential in nature and cumulative in their impacts.

Potentially the largest challenge, paradoxically is the lack of forest fires in the East Coast of Canada. One consistent theme throughout all 10 interviews was the realisation that big fire related incidents do not happen as frequently as they do in other parts of the country. As one participant indicated, in five years of working with their organization, they had not experienced a single big fire. Another participant shared that the last “really big” fire that they could remember was in the late 1980s (Officer 4).

If one was to analyze fire seasons, the severity of that season often follows what is referred to as a fire cycle (Officer 4). It is estimated that the average fire cycle for higher than normal fire activity in Western regions, such as California and British Columbia, happens every three years (Officer 4). In contrast, the fire cycle for New Brunswick is a big fire season only once every 35 years (Officer 4). Following that logic, one participant believed that since the last big East Coast fire season occurred back in the early 1970s and 1980s, the next big fire season is going to happen again soon (Officer 4). Consequently, when asked about these big fire seasons, the participant said, “it was bad, it was huge. But [back then] we had probably four times the staff that we have now” (Officer 4). The participant further elaborated that:

“We [have] had two dry summers [since the last big fire] that was pretty scary. So it’s going to happen because we do have a lot of fuel here, a lot of softwood, a lot of spraying to remove hardwood. So when it happens, it’s going to be pretty bad... We’ll exhaust all of our human resources very quick

and we're going to have to bring people from outside [of the province to help]" (Officer 4)

The reality within New Brunswick is that, as a result of the lack of demand caused by shorter dormant fire seasons, the ERD has been downsizing considerably. That same participant outlined that within the last 10 to 15 years, the ERD has seen a considerable reduction in its workforce (Officer 4). Although the ERD does have high levels of staff retention from year to year, the overall workforce is consistently ageing and will be in need of replacement (Officer 1). This means that there is a large focus is on recruiting, because although there is less of a demand placed by big fires, the reduction of employees means even if the organization as a whole is doing less, each person is doing more (Officer 4).

Part of this reality is that ERD employees are expected to complete multi-skilled labour. While employees of the ERD are responsible for fire management within their regions, fire is not the main focus on a daily basis. The average ERD employee is responsible for a multitude of roles within the province, most of which do not actually involve firefighting. These tasks include, forest management, fish and wildlife as well as gun control and safety (Officer 1). This exacerbates the pressures that are placed on the employees as they are now responsible for more roles and tasks in their daily working lives (Officer 4). It also places higher pressure on the managers because they feel obligated to "recruit the best people because there's so few of us now" (Officer 4).

Attempting to replace an ageing workforce is difficult in a downsized organization with low levels of demand for the service. When, "99% of our incidents...[are small fires, the ERD becomes] really good at putting out small fires" (Officer 7). The higher an employee climbs

within the organization however, the more complex the operation is. The higher the position, “the less and less experience you have, there are only so many people who have been on the highest levels of fires”, where people are managing large 1000 person base camps and operations (Officer 7). Therefore, the ERD does not build up a large repository of experiences to draw from or personnel who can make decisions based on experience in that context (Officer 7). This problem is one that spans across all forest fire management agencies, not just within the New Brunswick region and although there is a lot of discussions on the topic there is no clear solution. This has shifted a great deal of forest fire management agencies across the world to start dealing with succession management and knowledge retention (Officer 2, 6 and 7). Some agencies have even adopted the training motto, “train to replace” (Officer 2, 6 and 7). Even though Atlantic Canada is recognized for its training program, especially as pioneers of the ICS system (Officer 4), training cannot fully replace experience and years of practice (Officer 7). The result of this imbalance between training and experience is that employees are promoted and moved into senior positions on the basis of their training but may lack the experience (Officer 6). Training is ongoing and emphasised to address and replace the ageing workforce but, succession is hard given that these positions require field experience (Officer 1). This phenomena only increases the knowledge gap in high ranking positions because people get promoted into positions and have to learn as they go. It was shared that a common issue is that there is only so much training and learning that can occur from watching managers (Officer 6).

For the “officers”, who do have experience, it is “because we go out of province” (Officer 4). The practice of going on deployment tours out of province is a common occurrence for forest fire management and is the result of partnering with Canadian Interagency Forest Fire

Centre (CIFFC) and North-eastern Forest Fire Protection Compact (NFFPC). These tours, however, add a layer of complexity because of resource allocation associated with the multi skill aspect of working for the ERD in New Brunswick. Since forest fire management is only a small part of the average ERD employee's job description, ERD employees cannot always leave their jobs within the province unattended. While during the summer season fire fighting is the number one priority, other aspects of a rangers job are important as well (Officer 4 and 6). These other aspects include, forest management, fish and wildlife, hunting registration and gun safety (Officer 2).

This multi-skilled approach helps with the pressures of having a smaller amount of workers with more responsibility. It does, however, hinder the sustainability of sending personnel out of province to gain experience. Since there is a high demand for multi skilled all-purpose employees, crews can be sent on tours at the start and end of the summer season but the province struggles to send crews mid-fire season due to work obligations within the province (Officer 5). Further complicating matters is that even when crews are able to be spared and sent to gain experience, because of the dwindling workforce, each district can only afford to send one or two people (Officer 6). Thus even if an employee is willing to be sent, there is a low probability of being selected, intensifying the knowledge gap.

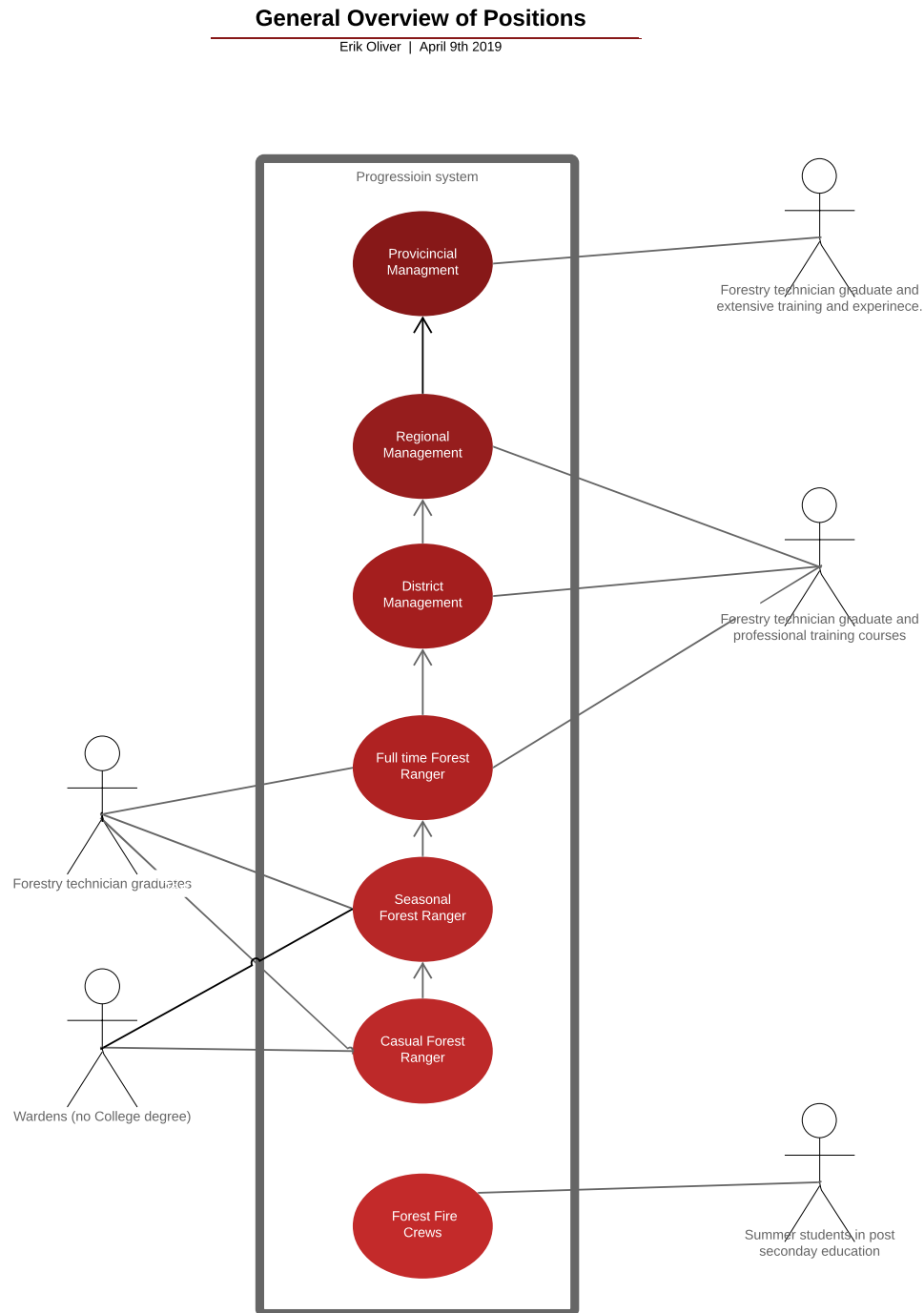
This knowledge gap is challenging to mitigate because of the ageing workforce and demographic within the industry. "The culture is changing" (Officer 1), millennials are placing higher emphasis on maintaining a work life balance (volunteer 1). One participant stated, the younger generations do not always prioritize work opportunities like the older generation did (Volunteer 1). This mindset makes it even more difficult to fill the knowledge gap because

employees have the option to pursue the proper experience and training but may choose not to. This is important because it was reported that national deployments are optional, and so are additional training activities beyond what the job demands for employees within the sector (Volunteer 1). A big challenge is with the influx of millennials entering the workforce, the new work culture is perceived to facilitate employees to be more willing to switch jobs after five to ten years in favour of going back to school or pursuing a different career (Officer 2). This new culture paired with the fact that as people get older there, “body says no” (Officer 1), to intensive physical labour which adds another environmental work pressure to the ERD.

3.3 Job and work design

Within the forest fire management sector, the leading agency on how to fight fire in the province is the Department of Energy and Resource Development (ERD). This is important to note because the forest fire management sector consists of an interconnected network of organizations. This network includes the ERD, volunteer fire departments, private forestry industries and municipality governments. Although these organizations all work together, there is a varying amount of knowledge and expertise in forest fire fighting associated with each organization. Thus, while the previous section discussed the pressures and challenges that the entire forest fire management sector faces, this section will analyze how the ERD, as the forest fire management experts, have structured their organization to deal with these pressures. In this section, how the ERD has organized its employees, how these employees progress and how the employees demonstrate their multi-skill abilities on a daily basis will be discussed. Figure 3.1 provides insight into the internal operations and the positions available within the ERD organization.

Figure 3.1:



At the most entry level position, there are summer fire crew workers who are generally young students looking for work in the summers between school. This fire crew position requires employees to be enrolled in either a university degree or professional skills education program (Officer 4). These seasonal workers are only employed during the summer. Their job

responsibilities are wholly dedicated to fire and they act as front line workers (Officer 4). The next level of the organization, which would be considered the entry level into the ERD, is the casual Forest Ranger position. These employees are divided into two categories, casual Forest Rangers and Wardens. While the requirement to become an ERD Forest Ranger is the completion of the two year forestry technician education, in some cases employees have learned on the job and been hired without having a college diploma. These employees are classified as wardens, but there are very few left as the new standards require employees to be forest technicians (Officer 4). A casual ranger is hired “when there is a vacant position...these persons may be here for a year or two and then leave to go to another organization” (Officer 5). When a position opens within a district, an employee will be given the seasonal Forest Ranger position. As a seasonal ranger the ERD expects employees to be multi-skilled. The multi-skilled aspect of the job was highlighted by numerous respondents and was a common response when asked about job demands. One participant explained that, “seasonal rangers are doing everything. They’re fighting fires, they’re doing forest management, fish and wildlife... [they are] into everything” (Officer 2)

On average the seasonal ranger’s job is between eight and nine months of the year, however, in most cases, these seasonal employees return every year (Officer 5). Many respondents indicated that even within the seasonal ranger position there was low turnover. When an open-ended position is available seasonal rangers will be given a full time ranger position (Officer 5). The progression system is not standardized and fully depends on the availability of more senior roles. One participant shared that they have had people working for over ten years as casual rangers, without ever getting a seasonal position (Officer 4). Once an

employee has reached the highest level of ranger, their next step is to become a supervisor or the district supervisor (Officer 5). From there an employee can leverage their experience as managers to apply for provincial level management and coordination teams (Officer 3 and 4). It was discovered there are few opportunities for progression from ranger to manager.

“There’s not a lot of those opportunities because there’s four regions so there’s only four district rangers, four assistants, so that’s the top of where you’re going to get within a region or a district. So you might get up to a manager level with the region... but in each region, there’s only a certain amount... There’s not a lot of opportunities, so that means a lot of people [apply]” (Officer 3).

It should be noted that several participants shared that there are opportunities for progression if you are willing to transfer to another location [within the province but outside of the region]” (Officer 4, 5 and 6). This immobility amongst the higher ranks, however, is not reported to be an issue for many employees. Although some individuals see the ranger position as a stepping stone to management, the majority of employees who become rangers do so because they want to be rangers (Officer 3).

Rangers comprise the majority of roles within the organization. There are only four district supervisors, while there are approximately 120 rangers on the ground (Officer 3). The rangers are the ones who are utilizing multi-disciplinary skills, as they are involved with fire, fish, wildlife, forest management and licenses but are also the ones delivering gun control programs and teaching classes on safety (Officer 4). At any given time rangers undergo task variety by being responsible for several roles and switching between tasks throughout the year (Officer 1). This provides rangers with new experiences and challenges each day. Consequently, through this task

variation rangers are placed in situations which require them to make critical decisions. To try and prepare these rangers for this variety, the organization selects, employees and trains them to certain level (Officer 1). The ERD tries to train, “most of our staff up to at least... the crew leader [position]” (Officer 1). This training is imperative because with the variety of tasks rangers face eventually they have to make important decisions.

“You have to make decisions and that’s part of the training, that’s part of the culture...[it requires you to] Make a decision based on your experience, based on the information you have...That’s part of this whole process of leading and that’s what we do with people...it’s left to the individual front-line to make decisions. And as that incident escalates or de-escalates, if they need support they will reach out to their regional office or regional manager... And that’s the way it works” (Officer 1).

One participant described the emphasis placed on individual decision making as the primary purpose of training. That participant explained that since there is such a wide variety of tasks, some of which are dangerous and volatile, the ERD, “instil upon our people [risk management and make sure they] understand that process, you’re jogging on the spot” (Officer 1).

Through multi-skilled roles, the ERD has a structure within the forest fire management sector which addresses the serious retention challenges common in the sector. This is exemplified by multiple participants who identified the large number of seasonal rangers returning year after year. Respondents reported feeling passionate about their work. Even with the limited potential for progression to high ranking positions, the ERD has created an environment that is effective at responding to fires while also generating employee interest and job stability by designing work with a high degree of transferable skills and knowledge.

Conversely, the multi-skilled diversity of work, is also a contributing factor in the restriction of rangers from being sent on tour and gaining larger fire experience during the summer season.

3.4 Inter-organizational cooperation and communication

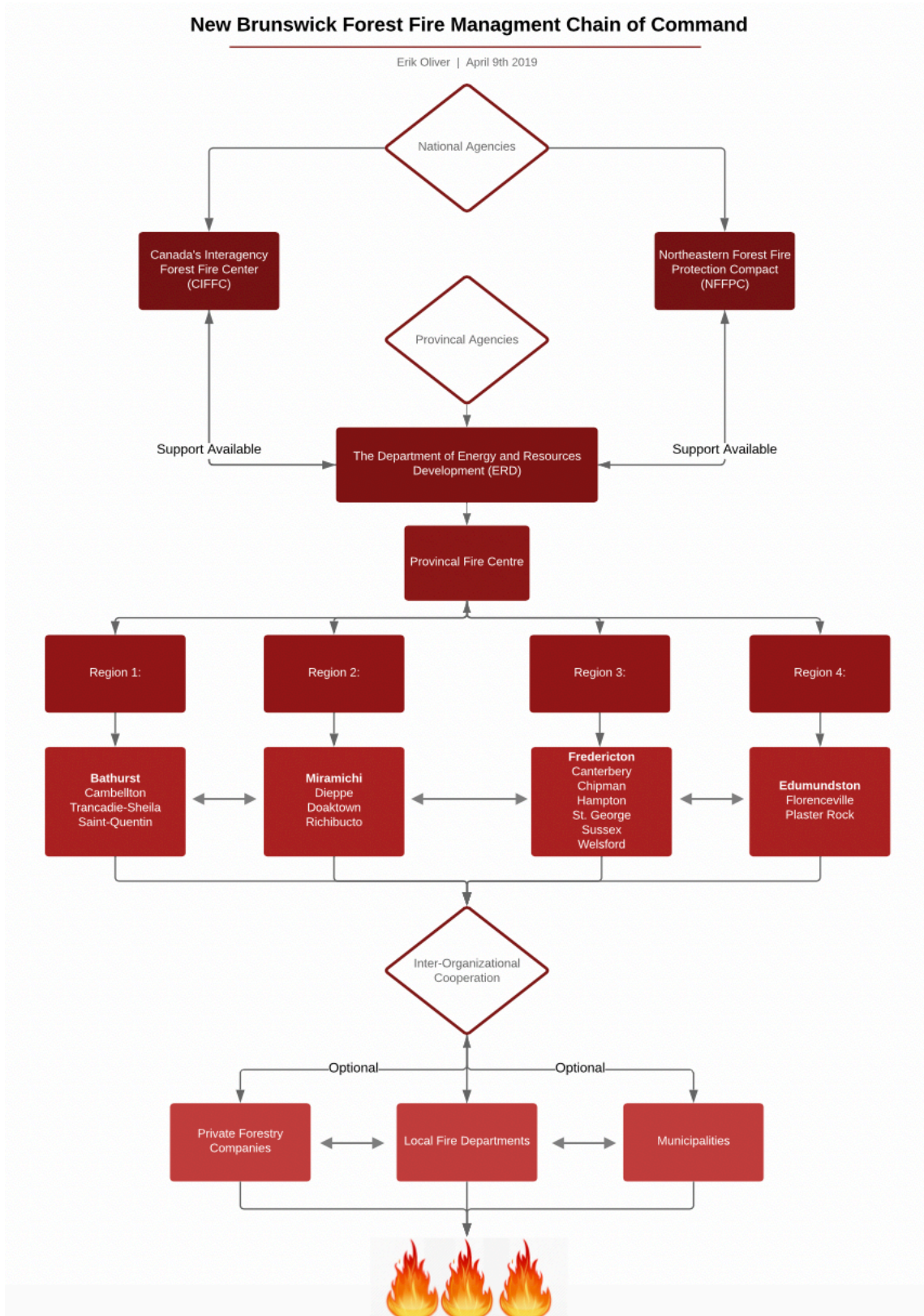
The previous two sections have discussed the environmental work pressures placed on the forest fire management sector in New Brunswick, and the resulting job structure of the leading agency in the sector, the ERD. This section discusses the complex landscape, the numerous organizations and actors involved and the importance of communication throughout the entire forest fire management process. As previously mentioned the structure of this landscape is managed by the ERD a, “not-for-profit corporation owned and operated by the federal government...It is also owned and operated by the provincial, [and] territorial wildfire management agencies” (Officer 1).

Unlike larger provinces with a higher number of fires, such as Ontario and British Columbia, who hire thousands of employees to solely fight fires, New Brunswick has “200 and some odd staff that are full-time or seasonal” (Officer 1). Although these staff are responsible for fire management within New Brunswick, as mentioned forest fire is only a small segment of these employee focus on a daily basis. Due to relatively low numbers of forest fires, over 50% of the employees have not seen large fire activity within their own province (Officer 4). Because of the environment and location of New Brunswick, most of the fire activity is smaller which prevents the fire from producing large flames (Officer 1 and 4). While there is a core group of experts located in the provincial fire centre (Figure 3) who solely lead and manage wildland fires, a large part of combating larger incidents relies on the cooperation of both the ERD and

external stakeholders. The resulting management structure is a network of diverse and multi-skilled employees from various organizations working together through inter-organizational cooperation and communication (Officer 1).

At the highest level of this network are the national agencies, The Canadian Integrated Forest Fire Centre (CIFFC) and The Northeastern Forest Fire Protection Compact (NFFPC) (Figure 3.2). These two agencies are incredibly important, and work closely with all fire management agencies throughout Canada (Officer 3). New Brunswick is a part of both organizations and thus have willingly agreed to offer resources and personnel from the province to provide additional assistance to any other province in need. This operation is bilateral in nature and ensures that if the current forest fire management structure within New Brunswick were to ever fail or need additional assistance, outside provinces would be able to step in and help (Officer 3). For the purpose of this section, however, despite the importance of CIFFC and the NFFPC, discussion will be focused on New Brunswick's regional forest fire network and not its national connections. Figure 3.2 outlines the regional network of inter-organizational cooperation and communication that has formed in the Province of New Brunswick.

Figure 3.2:



As illustrated in figure 3.2, forest fire fighting involves the cooperation and coordination of private forestry companies, local fire departments and municipality support. These organizations interact in a multiple of different ways depending on where a fire breaks out and the intensity of that fire. Often times, the bottom grouping of organizations shown in figure 3.2 are the first responders involved with a forest fire. These organizations are the external stakeholders who operate at the lowest level in the chain of command. Although these organizations work closely with the ERD on every forest fire they may not always work closely with each other. For example, when a fire is discovered by the general public the process is to call 911 to report the fire. The local fire department is then dispatched to address the situation. It was discovered that local fire fighters are the ones that are getting the majority of the spring fire call-ups (Officer 1). When the local fire departments arrive on scene, their first and most important responsibility is to size up the fire (Volunteer 1). Where the fire involves wild lands, the fire department makes a decision depending on the size and severity of the fire to either handle the crisis themselves or if needed call the ERD. In this scenario the private forestry companies are not involved.

If a fire is discovered or caused by a forestry company's machinery emitting sparks during a logging operation, the chain of command is different. In this second example, the private industry's first action is to call the ERD immediately. During these situations, the response from the private industry is highly regimented and outlined in detail through regulations and training manuals (Industry Partner 1). Although industry partners do require all logging operations to have firefighting equipment and a water tankers on site, their employees are not formally first responders. Instead, the industry organizations play a vital role by

identifying the fire and then mapping the fire for a report that will be given to the ERD upon arrival (Industry Partners 1 and 2). Additional duties on bigger fires include using heavy machinery to create a fire break, which is open space between the fire edge the healthy vegetation. Other duties include having silviculture workers cutting trails around the fire for the ERD.

Regardless of how the fire is reported and passed up the chain of command, once ERD arrives on the fire, it is expected practice by all external stakeholder listed in Figure 3.2 that the ERD will immediately take over and implement their own Incident Command System (ICS). This process places the ERD ranger(s) as incident commanders in charge of the operations on that fire (Officer 6). It is important to note that the entire chain of command must be dynamic in order to successfully respond to the various demands associated with integrating external organization's into the ERD's ICS. The location of the fire will not only determine which external stakeholder is involved but also which district(s) within the ERD should respond.

In the province of New Brunswick, there are four regions (Appendix A) which all operate under the Provincial Forest Fire Centre (Figure 3.2). Each region is composed of a varying number of district bases ranging between three and seven depending on the region (Figure 3.2). These district bases work closely together to monitor and respond to incidents in their respective regions. Although each region is primarily responsible for their allotted area, they are structured to be interconnected so that, should the occasion arise, they can backfill and assist with other regions on an as needed basis (Officer 3). This inter-organizational workforce is coordinated by the Provincial Forest Fire Centre who remain in charge of personnel

coordination and logistics (Officer 3). It is the job of the Forest Fire Centre to allocate resources and determine which region is assigned certain resources.

Although all regions are important and equally managed by the Provincial Fire Centre, there are different pressures acting on different regions (Officer 3).

“All regions are not the same size in land base or in number of staff... for instance Region Three[is] the biggest region... so we tend to have a little bit more focus on it [during the fire season]... On the other hand, we have regions up North... [with] a lot of continuous woodland... and we get a lot of external pressure in those areas from the companies ... that are depending on that wood supply” (Officer 3).

This brings up an important issue relevant in New Brunswick as in other neighbouring jurisdictions. In the province of New Brunswick, there is a large private sector focussed on forestry and logging operations. Thus within New Brunswick’s forest fire management network, these private sector forestry and logging operations have a large presence in responses to fires. As mentioned, some of these companies even have their own equipment on site as well as regulations for dealing with smaller fires (Industry Partner 2). They do not, however, have access to the extent of training available to the ERD. Thus despite having the means to fight fire, these companies cannot be fully independent from the network of forest fire management. This adds further complexity to the coordination of the Incident Command System (ICS), because these stakeholders often have competing interests and different priorities after putting out the initial fire (Officer 1 and Industry Partner 1). When private industry is involved although, “you’re on a fire because the most important thing is to get the

fire out... the problem is that they [the silviculture workers] should be out on their spacing saws and so we're losing production that way " (Industry 1).

A result of these pressure is that there may be a lack of consistency in procedure and methods of responses. For example, in the northern region there are a lot of woodland operations and although private industries are not liable for the fire, they are responsible for lost timber (Industry 1 and 2). This comes into contention with the ERD's overarching policy that the first priority is the protection of life, then property and lastly, the forest (Officer 3). For private companies, however, this logic means a loss on investment and significant utility costs associated with lending workers to help instead of conducting their regular jobs (Industry 2). The loss of productive time and investments are exacerbated by the short season for forestry companies in the Atlantic region, which only lasts four or five months before snow returns (Industry 1). These dynamics can impact the effectiveness of the forest fire management network's response, as these increased pressures from forest companies can cause operations to be rushed or not adequately dealt with.

These added pressures bolster the need for the fluidity of resources and heighten the demand placed on open communication especially between the ERD and external stakeholders. One respondent emphasized, "You've got to communicate always" (Officer 2), while another stressed, "if you don't have communication it is scary" (Volunteer 1). This communication is imperative because there are multiple actors who do not interact daily, are from different organizations yet are working together in a volatile and dangerous environment . It is important to communicate objectives, locations, goals, response methods and most importantly escape routes and exit plans (Officer 1 and Volunteer 1). When responding to crises, operational

communications needs to extend beyond just the ERD organization, it needs to include all relevant external partners (Officer 1).

Communication is highly important, especially considering that before any forest fire response occurs there has to be an action plan discussed and set in place (Officer 1). The problem is, that this plan of action cannot always accurately reflect the parameters of the fire because of the volatile work environment and spread rate of fire. Action plans and established goals are therefore not always clear cut and often change on the fly (Officer 7). One respondent admitted that although it is important to set targets and goals, “the plan always changes always adjusts, [and thus] you adapt to the new reality” (Officer 7). This adaptation is further complicated by having such an intertwined and complex network of organizations involved in New Brunswick’s forest fire management sector. Not only does the ERD have to adjust to pressures caused by the actual fire but they also must successfully manage and communicate with all of the various employees associated with the external stakeholders involved in the response. To properly respond to a fire and manage these external stakeholders, the respondents put a large emphasis on the importance of their ICS (Officer 1 through 7).

The consensus amongst all of the participants within the public sector was that ICS is absolutely critical for the initial setup of a response. By placing such a large emphasis on setting up an ICS as soon as the ERD arrives on the fire, it provides role clarity, structure and continuity to the first responders actions (Officer, 7). Conversely, multiple respondents also admitted that inherently within a network of diverse organizations operating under different pretences, initially there is an element of chaos when setting up an ICS (Officer 4 and 7).

Even though all emergency first responders regardless of their occupation will practice some form of ICS, their version of that ICS will differ (Officer 7). Even if the respective versions of ICS essentially do the same thing, the terminology used and hierarchies established may differ slightly (Officer 7). This not only adds to the chaos of setting up a unified ICS amongst different organizations, but it also introduces a new challenge to inter-organizational cooperation. In the interviews, it was discussed that these separate organizations are entrenched in their own ways of managing their response systems, which have been tested and put in place (Officer 7). This affects their willingness to adapt to the joint ICS or change their inherent structure to a commonly used ICS, because these organizations are comfortable using their own systems and in their opinion, why fix something that is not broken (Officer 7). Inter-organizational cooperation is further strained because for organizations who do not operate an ICS or organizations who utilize their own version of ICS, to adopt a standardized ICS system would be timely, expensive and require extensive retraining (Officer 7). When change does occur to external organization's ICS, it is only partial or specific elements of ICS are often adapted to fit the hosts organizations pre-existing structure (Officer 7). The result is that there are some regional and even agency variations within the province when dealing with crises (Officer 7).

The result of this variation within the province and even between organizations is that there are differing levels of understanding of what an ICS system is and how it should look. For example, the ERD, "in the wildfire world, nationally and internationally...[is] looked upon as being the forepersons of that ICS" (Officer 1). Their close partners, the local fire departments, however, "don't actually run [an] ICS right now" (Volunteer 1). The volunteer 1 respondent

elaborated on their operation of a non-standardized procedure, “we have our chain of command within our organization, [and] everyone knows our structure and how it works” (Volunteer 1). Conversely, within the ERD’s other external stakeholder group, the private forestry industry, they are not first responders and they do not have any form of ICS training (Industry Partner, 2).

The ramifications of organizations within the same interconnected network having differing levels of experience working with an established ICS can be problematic. These organizations all have vested interests and backgrounds, yet are expected to work together under a unified ICS that multiple stakeholders do not fully understand. It should be noted that there is a change in process, one respondent explained, as there is a push for all risk oriented professions such as, nuclear facilities, fire departments and EMOs to adopt a standardized ICS, however, these organizations do not totally understand it yet (officer 1.) This assertion was mirrored by the volunteer respondent who claimed, “ we are going to start taking ICS training because that’s the way everything is going” (Volunteer 1).

This standardization of ICS training is important, because when communications systems and processes outlined in ICS are not fully understood or consistently implemented by stakeholders, breakdowns of the system may occur. For example, there may be more than one incident commander, each operating under different pretences and structures which could cause conflict and duplication of efforts (Officer 1 and 4 and 7). This is an example of where there may be a breakdown in communications which can happen and be detrimental during large incidents.

This lack of understanding of the ICS structure is further compromised by the reality that there are not many joint training exercises that occur between the different organizations. Although there is a basic Emergency Forest Fire Training that is taught by the ERD and mandatory for any worker to be on a fire (Industry Partner 1), other joint training opportunities are minimal. Furthermore, there is limited cross-organizational due to the nature of the job and the infrequency of crises. The result is that most interactions only occur during a major fire. This can present challenges for trust and reliability. The consensus amongst the participants was that it is imperative to build trust to facilitate communication and cooperation beyond existing working relationships (Officer 3 and 7).

3.5 Management control systems

This last section addresses the ERD's multi-disciplinary management structure, the importance of communication and trust within that structure, and the current state of promoting that communication and trust across all organisations. Additionally this section will address cross organizational training opportunities as well as the status of joint after action reviews.

As part of the multi-disciplinary nature of the ERD, the Incident Command System (ICS) is only used during active crises (Officer 5). During the rest of the year, when the ERD is not dealing with fire or emergency response, the management structure becomes more relaxed (Officer 5). One participant described this relaxed structure as a, "quasi-ICS" system (Officer 3).

"We don't necessarily have an incident commander [on a daily basis]... [instead] it would be the Duty Officer who would be the commander... [then] we just have one administrative person working... to answer the phones and

what not... But as it ramps up, we can expand... if we need a financial person... if we need a media relations person... if we need an extra logistical person in there... we can add or take away as needed” (Officer 3).

At a surface level this dynamic structure would appear to be in contention with the highly regimented and procedural based ICS. ICS, however, is designed this way to facilitate the multi-disciplinary nature of the ERD. One respondent explained, that a lot of people do not understand how dynamic the organization needs to be. “It’s not streamlined like a factory , it’s very dynamic, so it’s hard to apply some of the [rigid] principles” (Officer 3). The system is designed to be adaptive in its structure so the ERD can conduct daily task efficiently while always being ready to respond to crises when needed (Officer 3). This structure, even in its loosely defined state during day to day activities, still places an emphasis on critical factors such as communication and trust. This allows for the system to be easily switched to full-fledged ICS when needed since there is so much overlap between the two management structures (Officer 3).

This loosely defined management structure is functional largely due to the emphasis placed on communication and trust. An example of the emphasis placed on communication, consists of the overlapping transitional period between Duty Officer shifts. Since each Duty Officer works on rotation, the ERD ensures there is overlap with the incoming and outgoing Duty Officers by having them work alongside each other on days where they are switching off (Officer 3). This is done to have the incoming Duty Officer catch up and meet with the outgoing Officer to pass on all relevant information (Officer 3). This allows the new Duty Officer to survey the landscape and be prepared should a crisis arise. To gain an appreciation of the trust required for this management structure, and the trust placed in the ability of the employees to

conduct their job efficiently, the daily routine of a Forest Ranger can be examined. Although each region has a district supervisor, the Forest Rangers do not actually report to them each day for non-fire related activities. Instead these rangers are trusted to go about their days as they see fit as long as they are filling out progress report charts (Officer 6).

It was also reported that there is a mutual respect and close working relationship between managers and employees. This promotes the ability to have a relaxed management structure during non-crises activities. Although there is a formal procedure put in place for these non-crises activities such as disciplinary correction, the procedure is not always followed (Officer 3). Instead, managers can opt to emphasize an informal relationship with their employees. One respondent explained this is possible because, "I rely a lot on the guys' integrity and experience, if the results are not there, we talk and we find out why and we go back at it" (Officer 4). Although this promotes positive relations between managers and employees it also can impact the area of organizational improvements. While there are ways of communicating organizational improvements in the form of after action reviews, these reviews are not always implemented and sometimes they are disregarded for informal discussion about improvement instead.

Moving forward this informal, dynamic system, could be changed. As of 2014, New Brunswick implemented a formal management structure to enact strict procedural guidelines to facilitate efficiency (Officer 4). This new structure was described as similar to what "Japan used to rebuild their country after the war... [or] what Toyota used to be so successful as a Japanese company" (Officer 4). Although this formal management system may have worked in both of those examples, the forest fire management sector, is not a stream-lined process and

consistently requires the structure to be able to be flexible between both ends of the spectrum; dynamic and rigid.

In contrast to the existing system, this imposed new management structure is perceived to be formalized and rigid at all times. Like with any new system attempting to be implemented, the employees who are used to the current system are hesitant. In this study, the hesitation arises from the fact that, “the way it’s designed doesn’t really lend itself to fire management because of those dynamics [mentioned above]” (Officer 3). While this new formal management structure does focus on a continuous improvement prospective, because of its rigidity in reporting structures, it has not yet been fully implemented in the fire management structure. This topic was somewhat controversial among respondents, with some employees believing that, although the system is meant to be innovative, it comes at the price of placing extra pressure on staff. “It’s hard on people, its micromanaging” (Officer 4). Since its announcement in 2014, the implementation process of this new system has been slow. Despite the concerns with the new system, it was made clear that, “it’s coming eventually with some daily management” (Officer 3). The ERD has been given the authority by the government to shape how the program is implemented (Officer 3). Since it is not being dictated from the outside but being built from within, the ERD has the opportunity to attempt to implement the new management system in a manner that can match the flexibility required for the organization’s design (Officer 3).

Although it is important to discuss this new management structure, since the new system has not yet been fully implemented, this section will continue to address the current management structure under which ERD is operating.

When analysing the existing management structure the ERD reported should a fire start, however, there are disparities between the ERD's understanding of the ICS and those of the rest of the external stakeholder organizations. While the ICS is meant to make everyone involved share common terminology and understanding of protocol, this is only possible if everyone has been properly trained and regularly immersed in the structure. This is hard to accomplish across all organizations for two reasons: firstly the infrequency of sizeable fires that require inter-organization cooperation, and secondly the infrequency of inter-organizational training opportunities across the sector. The interviews have indicated that in the absence of large fire seasons the multi-disciplinary aspect of job still keeps the rangers busy. The by-product of this is that the ERD cannot fully invest in joint training opportunities which exacerbates the lack of understanding of the ICS. It should be noted that the ERD has started emphasizing joint training, however this training is still in infancy stages:

“We're looking at cooperative training with stakeholders and with intergovernmental offices that we would regularly deal with in these types of events. So we actually go to fire departments, we offer them what's known as emergency firefighting training (EFF). It's an eight hour session so it's palatable from a volunteer perspective... we do that with industry. And... I've been cooperatively offering other government agencies our ICS training so they understand how we do business ” (Officer 1).

From the perspective of the industry partners, fills basic requirements.

“If we really wanted to concentrate a bit more on fire training and I guess the principles of forest fire management, we'll have somebody from the ERD come in... ERD [come] just about every season in April” (Industry 1).

“You have to be certified from ERD, when we took it the course was two and half days you do the course now in 5 hours... its condensed ... but it’s all theory, when we took ours it was theory for the first part and then the second day was working on pumps, hoses and damns all the stuff you have to do on the forestry end of it... we found it interesting and I can’t believe they stopped making the guys do it” (Volunteer 1).

When the external stakeholders were asked about additional training opportunities or follow up joint practice simulations after the EFF training (excluding the yearly check ins with industry companies) there were not many joint opportunities (Volunteer 1; Industry Partner 1). One respondent, stated that the first joint operation was an actual forest fire where they worked with ERD, water bombers and industry (Volunteer 1). This is in marked contrast to observations that the best way of building trust and reliability is through joint training and open communication (Officer 7).

The challenges of inter-organizational work extend beyond the lack of joint training initiatives, to also include after action review procedures. Multiple participants stressed the importance of conducting after action reviews, which aim to provide reflection on, and suggestions for improvements following any incident or major event. There appears, however, to be a lack of inter-organizational reviews, despite the complex inter-organizational relations during the incidents. This is again in contrast to the stated importance of after action reviews as methods for employees to provide feedback . These reviews were created to allow individuals who participate in the response to have a say in what they do and how to implement suggestions (Officer 2, 3 and 4).

Each of the organizations involved in the forest fire management network place a large emphasis on after action reviews within their own organizations. For the ERD, after action reviews are an important component of operations. One respondent explained these reviews are both formally and informally conducted after any incident:

“a lot of times on fires, even at a lunchtime where we can sit down at a tailgate and the commander on site will say, okay what do we need for equipment? What could we use better on this fire?... it’s always good to hear from the staff, especially on the fire line” (Officer 2).

In addition to this it was discovered that at the end of the year the ERD:

“bring everybody that's been involved within... our operations together, and... [just like] any other after-action review, [discuss] what went wrong, what went right, and how to fix it, and if we can implement those things in there or not” (Officer 1).

It was also indicated that the private forestry companies record and document everything that is discussed in their own version of after action reviews. This is done so that so that the organization can go over the, “pluses and minuses of the fire” (Industry 1). The volunteer fire respondent also indicated that they, “try to do a debrief after every incident big or small to assess what you do right and what you do wrong” (Volunteer 1). These findings set a precedence that all of the organizations involved in fighting forest fires believe in the importance and benefits of conducting after action reviews within their own individual organizations.

When asked about cross organizational reviews, however, there were mixed reactions. While all external stakeholders were quick to say there is open communication and a good

working relationship between partners, their responses to coordinated inter-organizational after action reviews were not consistent. Industry 1 described joint after action review as happening “a little bit. It’s more just general feedback” (Industry 1). Elsewhere, however the response was, “no, not that I know of” (Industry 2). From the volunteer fire perspective, when Volunteer 1 was asked about the joint after action review system the response was, “we wouldn’t necessarily have...[after action reviews] with ERD... it would be with our own group” (Volunteer 1). This appears in contradiction with views participants that trust and reliability are important in such an intertwined and complex system of various stakeholders.

Chapter 4. Discussion

4.1 Introduction

This research sought to answer the following questions, “to what extent do organizational structures support innovative behaviour and to what extent do workers engage in innovative behaviour?” and “to what extent do current hierarchical chains of command aid and/or hinder innovation in the workplace?” These questions were posed as they relate specifically to New Brunswick’s forest fire management sector. To explore these issues, interviews were completed with managers, Forest Rangers, volunteer fire fighters and private forestry companies. In the following discussion, the four main themes examined in the findings of this research will be related to the three major topics covered in the literature review: organizational structure, job and work design and innovative ability.

4.2 Organizational structure and inter-organizational cooperation

Although this study was not representative of the entire province, the analysis of the organizational complexities associated with New Brunswick’s forest fire management exhibited challenges of adaptation, flexibility, resilience and innovation. There are a wide range of influences acting on the Department of Energy and Resource Development (ERD) at any given time. Due to the consistently changing work environment within the province of New Brunswick, the forest fire management structure has adapted and is now constructed through a network of individual and social relations to better provide their service (Thompson and McHugh, 2009).

Since New Brunswick has approximately 200 staff working year round, the one formula fits all approach was not applicable in this context. Consistent with Snowden and Boone (2007) and Stark (2014), the ERD demonstrates that this “one size fits all” structure is neither practical nor efficient when dealing with real world situations. Had New Brunswick attempted to follow the generic approach to fighting fires, their operation would not have been sustainable. The reality caused by the shortened dormant fire seasons is a lack of demand for highly specified labour. Had New Brunswick emulated the one formula fits all approach and copied larger provinces who face different demands, the result would have been wasted provincial resources, increased levels of complacency and a higher rate of defection due to lack of activity.

Instead New Brunswick’s wild fire management illustrates the importance of identifying the interplay between stakeholders and the distinctive values of an organization that bind participants together (Stark 2015; Thompson and McHugh, 2009). The New Brunswick forest fire management structure resembles a network of diverse and multi-skilled employees from various organizations. These organizations work closely together through inter-organizational cooperation (Officer 1). This aligns with the concept of means to end arrangements discussed by Bryman (1984). The interconnectedness of the ERD, the local fire departments and the forestry industry, represents organizational arrangements which allow for means to end decisions when working towards common goals (Bryman, 1984 in Thompson and McHugh, 2009). The two methods of reporting fire, one through the public and the other through private forestry companies, along with the jurisdiction of who is in charge, represent the situational circumstances that are used to enhance efficiency within the operating environment (Bryman, 1984 in Thompson and McHugh, 2009). Without analyzing these social divisions of labour and

power structures in the forest fire sector, it would be impossible to determine the inherent links that have formed between actors and how they create the mechanisms needed for trust and reciprocal behaviour. Reciprocal behaviour and trust among differing groups of responders emphasizes social capital (Catts and Chammings, 2010).

As discussed by Thompson and McHugh (2009), it is because of opposing social forces, such as the differing interests of ERD employees and forest industry companies, coming together that a purposeful coordination system of action can be created to move towards the collective goal of putting out larger fires (Thompson and McHugh, 2009, pg.6). This is relevant because, organizational theory focuses on goal achievement which is only possible when relationships are formed between structure, contingency and performance (Thompson and McHugh, 2009). Within the ERD, this becomes evident considering, “a lot of people don’t understand how our business works... it’s not streamlined like a factory type thing, its dynamic” (Officer, 3). The operation would not be successful if stakeholders focused solely on structure. Instead both internal and external stakeholders work together to problem solve and, “size up the fire” (Volunteer 1) to allow for contingency planning and performance re-evaluations to better achieve objectives. The by-products of this relationship are the social links which form between organizations. These links are what create the social capital (Catts and Chammings, 2010). Within the ERD, this concept of social capital has been created through the emphasis on open communication between organizations and various agencies. The resulting outcome of this emphasis on communication is, “shared ownership and leadership, and a willingness to expand the scope of activity”(Townsell, 2016. Pg. 24). This is potentially most evident in the structuring of the ERD network. Although each region is responsible for their sector, their

interconnected network allows for the Provincial Forest Fire Centre to easily allocate personnel and resources. This creates a situation that ensures that, regardless of the pressures placed on a region at any given time, all regions are equally looked after and supported (Officer 3).

The findings of this study highlight that, organizations are better understood as consciously created arrangements to achieve goals by collective means (Thompson and McHugh, 2009, pg. 10). Within the forest fire management sector alone, there are at least three dominant stakeholder groups acting in their own self-interest. The ERD, the local fire departments and the forestry industry all have their own objectives and priorities. Although these agencies are working together towards a common goal of extinguishing fires, they all have their own organizational practices and ways of working. Despite these differences, they share responsibility for responding to emergencies. These competing priorities among stakeholders result in tensions in work practice (Thompson and McHugh; Storey and Salaman, 2009). For example, while the mandate of the ERD and local fire departments is the protection of life, property and then forest; for private companies, this prioritization can mean a loss on investments and significant utility costs associated with lending workers and equipment. Private sector partners want fires extinguished as quickly as possible, and many demand why things are being done slowly or in certain ways (Officer 7). This has the potential to place strain on the procedural action plan created by the ERD. It also illustrates the trade-offs between competing yet cooperative groups (Fredrickson, 1986). It was determined through the findings of the interviews that the ERD manages these trade-offs by finding common ground with their stakeholders which impact how a response is handled (Officer 1). This common ground

ultimately will either hinder or aid in the efficiency and success of realizing the end goal which is to put out the fire. This is the reality of having such an intertwined and complex network.

There is a dichotomy between regulation through proceduralism and adaptability through agency (Stark, 2010). Multiple authors have hinted at the importance of adaptation and sudden shifts to match environmental surroundings (Barreto, 2009; McGrath, 2013; Reeves and Deimler, 2011). Hayes (2012) suggests that disaster relief providers in particular need to facilitate adaptation into their operations. As a result of the interconnected complexity of the forest fire management network in New Brunswick, if the organizational structure does not adapt, then opportunities are lost and costs are more likely to rise (Child, 1997). This is important because when costs rise in this industry and/or opportunities are lost it can be the difference between life and death. The ERD seeks to maximize its dynamic capability to respond to environmental shocks (Barreto, 2009) by stressing the importance of the Incident Command System(ICS). Their ability to develop these dynamic capabilities, however, is challenged by the complexities of inter-organizational ICS implementation (Officer 7).

In order for an organization to be nimble and adapt quickly, it needs to be able to manage the complex and interconnected systems of multiple stakeholders (Reeves and Deimler, 2011). Within the forest fire management structure in New Brunswick, this can be problematic. Although any response organization within the province will be running a version of ICS, there are differences between them in terminology and hierarchical commands (Officer 7). These differences, although small, jeopardize the balance between McGrath's (2013) concepts of stability and agility. McGrath (2013) specifically highlights that stability requires a common identity and culture. Conversely, Hayes' (2012) study found that responders from

different organizations felt more secure in their own small working groups bound by their roles. These results were reiterated in the findings by a participant revealing that separate organizations are very entrenched in their response systems (Officer 7). This can affect their willingness to adapt to the joint ICS or change their inherent structure to a commonly used ICS (Officer 7). This can be problematic because different operating systems combined with the differing stakeholder interests can negatively impact response times, and in some cases can even lead to the duplication of efforts (Townsell, 2016).

To prevent a lapse in communication from occurring, the findings suggest that there should be a push to have more joint organizational initiatives. It should be noted that there is a move to all organizations using the same ICS structure, however, it is a slow and costly process. This push for a universally understood structure for all first response organizations supports arguments from Stark (2014), Fredrickson (1989) and Damanpour (1991), on the need for some form of structure for organizations to successfully operate. The findings support this need as there has to be some form of universal standard of ICS to facilitate an “end in mind” governing system (Damanpour, 1991; Frerickson, 1989; Stark, 2014). This universal ICS system would provide job roles, organizational objectives and guidelines for how to act in certain situations.

Both the literature (e.g. Townsell, 2016) and the interview findings highlight the need for an understanding and implementation of a standardized process for working across all responder organizations. The findings support the assertion made by Townsell (2016) that some element of coordination, control and management structure is needed in the forest fire sector and that moving forward an ICS should remain in place (Townsell, 2016). The findings also supported Townsell’s (2016) assertion that the organizational structure of forest fire

management needs to create dynamic relations through the capitalization of networks. These networks should promote increased adaptability and flexibility within and outside of the ICS structure (Townsell, 2016). Although the New Brunswick forest fire management sector struggles with the infrequency of crises, the findings suggest ERD realizes the importance of expanding their inter-organizational cooperation between various stakeholders. Currently, it has been reported that it is problematic that the majority of the relations between these stakeholders occurs during the fire itself. The participants did place a large emphasis on trust and reliability however, and reported a willingness to recognize the need to change in the future.

4.3 Job and work design

Building on the concept of trust and reliability, it becomes even more important to analyze trust and reliability when one considers the fact that New Brunswick consistently has very few large fires each season. The result of this lack in demand for fighting fires has been a reduction of the workforce, and loss of organizational knowledge. Although the organization as a whole is not fighting as many fires, remaining employees have additional pressures and responsibilities placed upon them (Officer 4). This presents challenges to resilience as, in order to be resilient, an organization needs the ability to adapt to new and upcoming obstacles (Stark, 2014). The adaptation needs to be a deviation from the norm but it must also allow for the organization's return to a stable equilibrium (Stark, 2014). The constraints on employees restricts their flexibility and limits opportunities for best practices, such as inter-organizational flexibility and network management (Stark, 2014). This study found that although the ERD engages in best practice, there is still some concern within the organization that should there be a large

breakout of fires, “we’ll exhaust all of our human resources very quick” (Officer 4). This illustrates the complexity of operating in the real world. Ideally the ERD would be ready to change its internal components and reallocate resources as needed (Barreto, 2009), however when operating in such a high pressure, time sensitive sector resource allocation can become comprised. Even when best practices are achieved, there are still a lot of uncertainties, and when operating with a reduced workforce, even with proper resource allocation, response can be affected. Although the ERD’s decision to reduce the number of employees but diversify its workforce to be more multi-skilled supported its objective of greater workforce stability, it has resulted in a new set of circumstances that the organization must mitigate.

The duality associated with making a change to multi-disciplinary work aligns with the literature reviewed. Damanpour (1991) suggests that when an organization adapts or makes a productive change to innovate part of its structure, the effect on the organization as a whole will not be uniform. The findings suggested that the multi-skilled work force was an innovative decision that enhanced job quality through generating employee interest and job stability. The multi-skilled work, however, may also be a contributing factor for restricting problem solving and operational innovation based on past experience. The reason for this is that since fire is only a small portion of the Forest Rangers yearly responsibilities, there are conflicting interests preventing employees from gaining experiential opportunities. Since the primary way of gaining practical experience on big fires in New Brunswick is to be deployed out of province this causes conflict of interests for employees who have multiple responsibilities preventing them from leaving. Their jobs involve such a wide variety of activities, due to the multi-disciplinary approach, that their other objectives and responsibilities outside of fire prevent employees

from further developing the skills required on a forest fire. This reality aligns with Stark's (2014) notion of managerial decisions being a series of trade-offs. Depending on the innovation and the means to adopt that innovation the organization will be subject to different influences which can have both positive and negative effects as illustrated by the findings (Damanpour, 1991).

Innovation, in the context of organizations is essentially enhancing the efficiency of reaching the organization's end goals by adapting to internal or external environmental influences (Bryman, 1984; Damanpour, 1991). This is done through the reworking of job and work design to better facilitate adaptation in the workforce (McGrath, 2013; Reeves and Deimler, 2011). In this study, there have been many different changes requiring different levels of action from the ERD. These changes in job design were largely in response to the shrinking workforce and lack of large fires. These changes resembled elements of both ultimate but also instrumental innovations (Damanpour, 1991). While the transition from a specified structure for fighting fires to the multi-skill approach would constitute an ultimate innovation: the subtle changes of requiring higher levels of education for recruitment and emphasizing "train to replace" (Officer 2, 6 and 7) resemble instrumental innovations (Damanpour, 1991).

The overall workforce in the ERD is aging and will need replacement especially within the higher ranks. In response to this internal pressure managers need to, "recruit the best people because there's so few of us now" (Officer 4). The findings further depict a shift in the focus of work design to start dealing with succession management, knowledge retention and collection (Officer 2, 6 and 7). This shift in recruitment and methods of training, illustrates a real

world scenario of the types of deviations an organization makes to attempt to be more efficient in the means to end decisions (Findlay et al., 2017).

Even though there has been significant progress in innovating job quality, through multi-skilled job design, within the ERD certain structures have remained in place. Damanpour (1991) found that formalized structure is not significant to the initiation or implementation of innovation. The findings of this study support the findings by Townsell (2016) that some elements of coordinated control and management structure are needed in the forest fire management. While ICS is the primary management structure during crises in the ERD, the work design of day-to-day operations is different. During the off season and on days without fire activity, the role of the “incident commander” is considerably different and more relaxed. This job design increases flexibility from within the ICS system, while maintaining staffing resource stability. The structure was described as a “quasi-ICS” system because although there is not an incident commander, the Duty Officer is in charge with flexible staff to work around them depending on demand (Officer 3). When assistance is needed in the office or when a crisis occurs there are people who can easily adjust and take up formal positions on an as needed basis (Officer 3). When asked how this operation is sustainable the response was that the structure’s dynamic nature heavily relies on trust and responsibility (Officer 4). This structure exhibits the effectiveness of McGrath’s (2013) stability and agility. The respondent emphasized that this trust and responsibility comes with the leadership development and open communication actively practiced within the ERD. This corresponds with the commitment to common identity, culture and leadership development required for organizational stability (McGrath, 2013). The ability to uphold ICS structure by quickly adding to the skeletal staff

working around the Duty Officer on the other hand strongly resembles the ability to spark change routinely which is imperative for organizational agility (McGrath, 2013).

By structuring the job roles to be dynamic in nature with a focus on trust, responsibility and open communication, the ERD has facilitated a structure that could positively promote an innovative climate. An organization's climate is considered a cluster of attitudes, feelings, and behaviours which when positively created results in innovation (Chen and Huang, 2007; Ekvall, 1996; Janssen 2000). The structure of the ERD facilitates trust, responsibility and open communication which allows for flexibility and agency in how the job is done. The literature suggests that when jobs are designed in this manner, the organization is more likely to create positive correlations between the nine climate dimensions (Ekvall, 1996).

In addition to creating potential for an innovative climate, the flexibility associated with adding specific roles on an as needed basis, allows for quick identification and response to obstacles which the literature suggests is imperative for innovating in the response sector (Hayes, 2012; Janssen, 2000). The findings of this study support innovating through problem solving activities. It was discovered that regardless of the differing roles and, activities within the ERD, employees eventually will be placed in leadership positions (Officer 4). Thus, respondents emphasized the focus on leadership development through training to create employees who are confident in making hard decisions (Officer 4). This pushes decision making capabilities to the front line, allowing for quicker shifts and responses, which in turn reduces the time it takes an organization to return to its equilibrium (Barreto, 2009; Stark, 2014). With a quick return to an organization's equilibrium of efficiency the resilience of that organization is greatly increased (Stark, 2014). It is important to remember that this is only possible within the

ERD because the rangers develop leadership skills through facing new experiences and challenges resulting from the multi-skilled dimension of their jobs.

As defined by Kanter (1985), innovation is the process of bringing together problem-solving ideas into use. This study found that the ERD is attempting to do this by cultivating employee potential through an increased focus on training. Innovation is not simply a new product but instead can be considered a diverse set of practices and skills used for change displayed by organizational actors (Jansson, 2000; Officer 1). This can be seen by the focus on continuous development training occurring in the off season and during fire season to ensure organizational preparedness. Furthermore, the multi-skilled structure of the job allows for the accumulation of a widespread knowledge of the physical environment acquired through the multi-disciplinary roles conducted. By designing the job structure and training in this regard, the ERD is building on the social exchange theory (Janssen, 2000). The outcome of which may be that the employees are more likely to feel valued and perceive their objectives and assignments as noteworthy. When this occurs employees are more invested in the development and survival of the organization (Porzse et al., 2012). This is consistent with how participants within the forest fire management sector viewed their job. All seven of the publicly employed participants stated that they liked their jobs and the opportunities they provided them.

4.4 Inter-organizational cooperation and innovation

While the ERD supports innovation through their participation in an inter-organizational network and decision to structure jobs to be dynamic, there are challenges to its implementation in the sector. Janssen (2000) proposes that innovation is not only confined to

the likes of specialists and development professionals but is actually important to everyone within the organization. Imran and Anis-ul-Haque (2011) argues that it is imperative to develop the innovative potential of everyone in the organization. This study finds, however, that collaborative practices that support innovation in the ERD may not translate across the entire New Brunswick forest fire management network. The New Brunswick's forest fire management sector is largely operated by an interconnected network of organizations working together. Although they are separate organizations with distinguishable interests, their close proximity and inter-organizational cooperation would warrant high levels of joint initiative such as training and after action reviews. Participants, however, reported limited network-wide initiatives.

The findings suggest there is a lack of understanding of ICS and not all of those involved in this industry have the same levels of training or emphasis placed on innovating the response process. This issue arises due to the competing priorities with workers across the network having a wide range of work responsibilities and tasks. Although there are examples of the ERD looking for increased cooperative training opportunities with external stakeholders and intergovernmental offices, this is something that needs to be emphasized more (Officer 1). This may support innovation as adaptation is required as a response to both internal or external pressures (Damanpour, 1991). Thus in the case of the ERD who regularly deal with and operate with external stakeholders and various environmental work pressures, these stakeholders need to be equally prepared to adapt accordingly.

Part of the imbalance of emphasis placed on innovation can be allotted to the fact that while the ERD requires employees to have a base knowledge of problem solving skills and

leadership capabilities before being hired, the external stakeholders do not. To work for the ERD one of the requirements of the ranger position at any level is the completion of a two year comprehensive and detailed forest technician education (Officer 1). Conversely, since the majority of local fire departments are volunteer based, although there is a high level of social exchange occurring in their operations, the fundamental skills and specific knowledge requirements for forest fires is not the same. While the ERD as a Canadian forest fire agency helped pioneer the ICS and regularly trains to understand that system, the local fire departments training regime is based on the willingness of the volunteers to commit (Volunteer 1). This study found that despite attempts to stay on top of training trends, it is hard to maintain because, “everybody has a full-time job other than the fire department” (Volunteer 1). This is problematic for the execution of a response plan, because an ICS requires all organizations to work together which can be greatly hindered if there is a disparity in training and/or an emphasis on different practices (Townsell, 2016).

To successfully run an ICS it is first important to be able to facilitate enough cooperation and training to properly implement the system in the first place. This cooperation is made even more difficult because of the interconnected network of stakeholders involved in New Brunswick’s forest fire management sector. To successfully implement and run an ICS, all parties must be on the same page (Townsell, 2016). Hayes (2012) suggests that this can be a difficult process since a common theme in emergency response organizations is the segregation between various organizations. This creates a fundamental problem that occurs especially in hierarchical structures, such as an ICS (Hayes, 2012). The reason for this is that enforcing hierarchies on different organizations, where one is in charge of the other, can have negative

impacts on the perceived fairness ratio of the job (Janssen 2000). When there are many different stakeholders involved in a response with varying levels of authority, issues can arise between the parties due to different and competing interests. For example, even though a local fire department will arrive and have 15 to 18 people on the ground ready to put out a fire, because of protocol, if that fire is burning in the woods, it is the ERDs jurisdiction (Volunteer 1). Even if the fire department could have that fire out without ERD assistance, they must wait for the incident commander before initiating an attack on the fire (Volunteer 1). This raises issues around clarity of who should handle the situation when jurisdiction boundaries are in play (Officer 7).

Should a higher emphasis be placed on cross organizational training, however it would provide an opportunity to educate the sector about the processes and reasons behind the ICS's hierarchy. It also would have the added benefit of bringing in different perspectives, new ideas and employees with fewer obligations to specific internal organizational constituencies, which is proven to be more successful in harnessing and creating innovative opportunities (Damanpour, 1991). Since the New Brunswick forest fire landscape is so heavily dependent on the network between ERD, volunteer fire departments, and forestry companies there needs to be every effort to share organizational structures, ways of working, communication and improvement processes. The ERD has already made several steps in facilitating this mandate but it is only through strengthening these connections and organizational practices that the forest fire management sector will be able to operate efficiently and innovatively .

This study found a common theme emerging throughout the interviews when discussing maximizing efficiency. Each organization discussed in some form the importance of developing

and relying on the strengths of the team and ensuring that everybody is being listened to (Officer 1 and Volunteer 1). Since there are a lot of varying perspectives and experiences in the forest fire management landscape, and it was reported that most individuals enjoy their job, one would expect discretionary effort to be a regular occurrence (Janssen, 2000). Furthermore, the reported infrastructure, would suggest that employees should feel comfortable coming forward with new ideas. The findings however, suggest that just as the ERD and external stakeholders have challenges with sufficient joint training there is also a challenge with listening and learning from each other. While each of the organizations have mechanisms put in place to facilitate feedback and improvements within their own organizations through after action reviews, the majority of these reviews are conducted with minimal cross-organization cooperation.

This is an issue that should be addressed in the future. By looking comprehensively at the entire New Brunswick forest fire management sector, it become clear that the infrastructure for providing communication, training, reviews and suggestions across organizations needs improvement. Although each individual organization is respectively strong at these activities on their own, the inter-organizational cooperation element of the fire management network is not given enough emphasis. By facilitating more joint activities across all organizations it would positively impact seven of Ekvall's (1996) 10 dimensions and add value to each organization. The seven dimensions positively effected would be, idea support, debates, trust/openness, idea time, playfulness, dynamism and conflict reduction (Ekvall, 1996). The by-product of more joint operations, especially within the field of reviews and training, would result in higher trust and dependability between the various stakeholder. This

would inherently have a positive impact on the remaining dimensions of freedom, risk taking and challenge (Ekvall, 1996). If a larger focus were to be placed on inter-organizational training and performance reviews, as suggested by this study, innovative work behaviour would be greatly improved. Joint training may also have the added benefit of dissipating some of the factors that create segregation between response organizations (Hayes, 2012).

Innovation can be broken down into three basic behavioural tasks (Janssen, 2000). These tasks are: idea generation, idea promotion and idea realization. When these tasks are emphasized by the organization anyone has the ability to bring forward innovations (Jansson, 2000). Joint training and review processes may offer opportunities for involvement of all employees in idea generation. It is through training exercises that people begin seeing how the system works and can thus analyze how it can respond better under certain circumstances, and then make suggestions for improvements. Innovation can come from any level within or outside of an organization. Joint interactions, therefore, may foster spaces for problem solving and innovative work behaviours (Damanpour, 1991; Janssen, 2000). Actors involved in these initiatives may benefit from new perspectives, which facilitates the generation of ideas. Furthermore, the increased training allows for people to safely test and try out new ideas without the pressures of real fires. This allows for more creativity in how to respond, and thus can help the idea realization stage of innovation. Conversely when looking at the impact of after action reviews and increasing the amount of people involved in the suggestion process, this may benefit the idea promotion phase. Having more people involved in voicing their experiences and perspectives of an incident, allows for more open communication and free

flow of ideas which can then gain momentum and begin building a coalition of supporters to help implement the ideas further down the line (Janssen, 200).

Chapter 5. Conclusions and Implications for the Field

The study found that not only does the organizational structure and job design influence the organization but that their effect can be maximized and designed to harness and facilitate innovative work behaviour. The limited workforce and size of New Brunswick has necessitated a cooperative network of agencies involved in the response to wild fire. Within this network, inter-organizational cooperation is a necessity. To build this cooperation, open communication, reliability and trust between all partners involved is required. It was further found that although there are strong working relations between partners, there can be discrepancies in the understanding of the Incident Command System (ICS) between various stakeholders. A larger emphasis needs to be placed on facilitating multilateral understanding and communication to address this issue.

Additionally, it was found that because of the shrinking workforce and low numbers of large regular forest fires in the region, there are several workplace environmental pressures placed on the workers and organizations. Organizations balance the need for retention and workforce stability by designing multi-skilled jobs. Despite the benefits of having multi-skilled employees, this adds pressures on workers and organizations to respond to fires. Furthermore, it makes gaining crucial experience through national tours logistically challenging.

Since the New Brunswick forest fire management structure relies so heavily on the inter-organizational cooperation of the various stakeholders, to succeed it is important to go beyond having good working relationship in order to facilitate increased open communication, trust and partnership between all parties whenever possible. Thus the two interrelated recommendations from this research are:

1. Increased emphasis on inter-organizational initiatives including training beyond providing the basic emergency firefighting training (EFF), may strengthen inter-agency workings and foster the process of innovation across organizational lines. Greater stakeholder collaboration may allow learning from each other's processes and facilitate greater cooperation. These interactions could increase trust and reliability between the differing stakeholders. The increased trust during the off-season may support greater inter-agency adaptation during crises.
2. Increased efforts to engage in joint after action reviews may help to improve inter-organization communication and trust and thus promote innovation. Separate organizations review their own procedures following incidents, however, there was not a regular approach to bring together the stakeholders in joint after action reviews. Joint after action reviews may further promote trust, reliability and create spaces for innovative work behaviours and problem solving across the network.

The main objective of this research was to analyze the influences organizational structure and job design have on innovation within New Brunswick's emergency response forest fire management sector. To do this the nuances within the forest fire management sector were investigated through the central research questions:

- To what extent do organizational structures support innovative behaviour and consequently to what extent do workers engage in innovative behaviour?
- To what extent do current hierarchical chains of command aid and/or hinder innovation in the workplace?

Although limited, using these questions, this study presents insights that connect the organizational practices of the forest fire management organizations within New Brunswick to the broader innovation literature. Due to the scope of this study, forest fire specific front line workers were not included. While there were volunteer emergency response participants, their experiences are likely different from that of someone within the ERD summer fire crew program. This is because the ERD has a heavily focused training program which is more intense than the standardized EFF training and focuses specifically on forest fire suppression. Various strategic management and organizational theory concepts such as organizational structure and job design, were discussed within the narrow context of the inter-agency workings of the sector. This inter-agency network is an ideal target segment because of the higher than average pressures due to its complex and intense nature. This study also illustrates the increased pressures faced by internal and external stakeholders when dealing with crises and the appropriate response both during and after the crises occurs. The results cannot be considered representative of the provincial system. Future research that includes front line workers would provide additional insight into opportunities for discretionary effort and innovation from the frontline. Further areas of research could also be conducted as a comparative project amongst Canadian provinces to better understand networks working within and between provinces.

References

- Barney, J.B. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, 17 (1), 99-120.
- Barreto, I. (2009). Dynamic Capabilities: A Review of Past Research and an Agenda for the Future. *Journal of Management*, 36(1), 256-280. doi:10.1177/0149206309350776
- Business Dictionary. (2018). Organization Definition. *Business Dictionary*. Retrieved from <http://www.businessdictionary.com/definition/organization.html>
- Catts, R., & Chamings, D. (2006). Recognising current competencies of volunteers in emergency service organisations. *Journal of Workplace Learning*, 18(7), 451-463.
doi:<http://dx.doi.org/10.1108/13665620610693015>
- Chen, C., & Huang, J. (2007). How organizational climate and structure affect knowledge management—The social interaction perspective. *International Journal of Information Management*, 27 (2007) 104–118.
- Child, J. (1997). Strategic Choice in the Analysis of Action, Structure, Organizations and Environment: Retrospect and Prospect. *Organization Studies*, 18(1), 43–76.
<https://doi.org/10.1177/017084069701800104>
- Climate Atlas. (2018, April). Forest Fires and Climate Change. *The Climate Atlas of Canada*. Retrieved from <https://climateatlas.ca/forest-fires-and-climate-change>

- Damanpour, F. (1991). Organizational Innovation: A Meta-Analysis Of Effects Of Determinants and Moderators. *Academy of Management Journal*, 34(3), 555-590. doi:10.5465/256406
- Ekvall, G. (1996). Organizational climate for creativity and innovation. *European Journal of Work and Organizational Psychology*, 5, 105 – 123.
- Flanagan, R. (2018, August 06). Forest fires will become more widespread and destructive, expert warns. *CTV News*. Retrieved from <https://www.ctvnews.ca/canada/forest-fires-will-become-more-widespread-and-destructive-expert-warns-1.4034546>
- Fredrickson, J. W. (1986). The Strategic Decision Process and Organizational Structure. *The Academy of Management Review*, 11(2), 280. doi:10.2307/258460
- Government of New Brunswick. (2018, July 17). Regions. Energy and Resource Development. *Government of New Brunswick*. Retrieved from https://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/Regions.html
- Hayes, E. (2012). The Impact of Organizational Culture, Climate, and Provider Characteristics on Perceived Cultural Adaptability of Disaster Health Care Providers. *Trident University International*.
- Imran, R., & Anis-ul-Haq, M. (2011). Mediating Effect of Organizational Climate between Transformational Leadership and Innovative Work Behaviour. *Pakistan Journal of Psychological Research*, 26(2), 183-199

Janssen, O. (2000). Job demands, perceptions of effort-reward fairness and innovative work behaviour. *Journal of Occupational and Organizational Psychology*, 73(3), 287-302.

Kanter, R.N. (1985). Supporting innovation and venture development in established companies. *Journal of Business Venturing*, 1(1), 47-60. [https://doi.org/10.1016/0883-9026\(85\)90006-0](https://doi.org/10.1016/0883-9026(85)90006-0)

McGrath, R. G. (2013). Continuous reconfiguration in the transient advantage economy. *Strategy & Leadership*, 41(5), 17-22.

Porzse, G., Takacs, S., Csedo, Z., Berta, Z., Sara, Z., & Fejes, J. (2012). The Impact of Creative Organizational Climate on the Innovation Activity of Medical Devices Manufacturing Firms in Hungary. *European Journal of Business and Management*, 4(2222-2839)

Reeves, M. & Deimler, M. (2011). Adaptability: The new competitive advantage. *Harvard Business Review*, 89(7/8), pp. 135-141.

Saijo, Y., Ueno, T., & Hashimoto, Y. (2007). Job stress and depressive symptoms among Japanese fire fighters. *American Journal of Industrial Medicine*, 50(6), 470–480.
doi:10.1002/ajim.20460

Scott, S. G., & Bruce, R. A. (1994). Determinants of innovative behavior: A path model of individual innovation in the workplace. *Academy of Management Journal*, 37(3), 580-607.

- Snowden, D. J., & Boone, M. E. (2007). A leader's framework for decision making. *Harvard Business Review*, 85(11), 69-76.
- Stark, A. (2014). Bureaucratic Values And Resilience: An Exploration Of Crisis Management Adaptation. *Public Administration*. doi:10.1111/padm.12085
<https://onlinelibrary.wiley.com/doi/full/10.1111/padm.12085>
- Storey, J., & Salaman, G. (2009). *Managerial dilemmas: Exploiting paradox for strategic leadership*. Chichester, England: Wiley.
- Thompson, P., & McHugh, D. (2009). *Work Organizations: A Critical Approach* (4th ed). Houndmills, Basingstoke, Hampshire; New York: Macmillan
- Townsell, J. (2016). A case Study Analysis of California Wildland Fire Response and Management Models: The 2003 Cerad Fire and 2013 Rim Fire. *California State University*.
- Van de Ven. (1986). Central Problems in the Management of Innovation. *Management Science*, 32(5), 590-607.
- Wolter, C., Santa Maria, A., Wörfel, F., Gusy, B., Lesener, T., Kleiber, D., & Renneberg, B. (2018). Job Demands, Job Resources, and Well-being in Police Officers—a Resource-Oriented Approach. *Journal of Police and Criminal Psychology*. doi:10.1007/s11896-018-9265-1

Appendix A: Energy and Resource Development Regions

All contact information was publicly available and accessible under New Brunswick's Energy and Resource Development page (Government of New Brunswick, 2018).

For the purpose of this study the website was used to contact each and of the individual regions and conduct research on each location

Table 1: List of forest fire regions in New Brunswick

<p>Region 1:</p>	<ul style="list-style-type: none"> • Bathurst • Campbellton • Tracadie-Sheila • Saint-Quentin
<p>Region 2:</p>	<ul style="list-style-type: none"> • Dieppe • Doaktown • Miramichi • Richibucto
<p>Region 3:</p>	<ul style="list-style-type: none"> • Canterbury • Chipman • Fredericton • Hampton • St. George • Sussex • Welsford
<p>Region 4:</p>	<ul style="list-style-type: none"> • Edmundston • Florenceville • Plaster Rock

Appendix B: Ethical Considerations and Approval

Prior to any contact the Principle Researcher Erik Oliver has completed a research proposal (ROMEO) and been approved by the Mount Allison Board of Ethics.

Figure 2.2: Photo of Mount Allison Research Ethics Board's approval of research



February 06, 2019

Mr. Erik Oliver (Principal Investigator)
Dr. Rachelle Pascoe-Deslauriers (Supervisor)
Faculty of Social Sciences\Department of Commerce
Mount Allison University

Dear Mr. Oliver:

The Mount Allison University Research Ethics Board reviewed your revisions to protocol #102325 "**Harnessing Innovation In The Workplace: Experiences of positive conditions for improvement and value added activities, in emergency first responders.**" and determined that it meets its ethical guidelines as prescribed in the Tri-Council Policy Statement (TCPS 2014) on Ethical Conduct for Research Involving Humans.

The REB requires that all researchers who submit projects for ethics review provide a brief report at the end of the year outlining their progress with data collection and commenting on any problems they may have encountered.

Annual Report Due-2020/02/05

This should be completed using the ROMEO @ MTA system (www.mta.ca/romeo). Researchers are also urged to contact the REB immediately if any ethical issues arise during data collection.

Members of the board would like to thank you for your submission and wish you great success with your research.

Sincerely

A handwritten signature in blue ink, appearing to read "Lisa Dawn Hamilton".

Dr. Lisa Dawn Hamilton
Chair, Research Ethics Board
506-364-2618
reb@mta.ca

Appendix C: Semi-Structured Interview Questions

Questions were separated into two categories, questions for managers and senior stakeholders illustrated in figure 2.3, and questions for front line first response employees illustrated in figure 2.4

Figure 2.3: Interview Questions for Managers

Code	Position	Years on the job

Demographics:

- Can I start by asking you, how old you are?
- What is your role and job title in this organization?
 - How long have you been in this role?
- How long have you worked in this organization?
- How long have you worked in the firefighting, specifically forest fire fighting sector/ disaster relief sector?
- Can you tell me a bit about your educational background and how you came to do this work?

Existing ways of working

- How many people do you manage?
- How are they organized?
- How much interaction do you have on a daily basis with your employees?
- How often do you consider your workload manageable?
 - How do you manage your workload to make it manageable?
- How often do you feel stressed at work?
 - What stresses you ?
- Can you think of a time where miscommunication impacted your workforce?
- Does only having seasonal employees affect your management style?

Main innovative questions:

- How does your organization find new ways to improve the processes in which it operates? Are individuals who bring new ideas forward, rewarded? If so how?

- If a new idea is not successful, are the person(s) responsible held accountable?
Or are they given the opportunity to remedy the situation?
- Can you give an example of a time an employees in your organization felt comfortable coming forward and suggesting or trying new processes or ideas?
- Can you think of a time that your organization adopted a new way of working ?
- Do you feel there a support system that encourages (or facilitates) employees and managers to learn from one another?
- How many new processes have you introduced in the last year?
- Do your employees' ideas have a role in creating change to the business process?
- How is the best way of dealing with a crisis are there preestablished systems in place for emergencies?
 - Do you find that setting up hierarchical structures like ICS hinders or aids your organization when dealing with emergencies?
- How would you describe the organizational culture of your workplace? What are the values you feel are most applicable to your organization?
 - What values are you looking for in your organization?
- What is your understanding of innovation in the work place?
- Where/ who do new ideas come from in the organization?
- What (if any) training is specifically used to encourage employee development and creative potential for coming up with new ideas?
- How do you design your jobs for employees so to encourage positive interaction, problem solving and development potential?
- Do employees have the autonomy to change the way they complete their jobs?
 - Do your employees use their autonomy to go above and beyond the required jobs?
- Do you ever see conflict between response teams and their differing response tactics when working with other organizations and or departments?
- How do you balance governmental austerity measures to first response sectors? When there is an emphasis on saving money how does that affect resource allocation?
- Since crises response teams are largely divided between independent organizations is it hard to trust the teams you don't manage or know?
 - Do you feel like everyone you get assigned to work with is capable and effective at their respective jobs?

Figure 2.4: Interview questions for employees

Code	Position	Years on the Job

Demographics:

- Can I start by asking you, how old you are?
- What is your role and job title in this organization?
 - How long have you been in this role?
- How long have you worked in this organization?
- How long have you worked in the firefighting, specifically forest fire fighting sector/ disaster relief sector?
- Can you tell me a bit about your educational background and how you came to do this work?

Existing ways of working

- How many people do you work with?
- How are they organized?
- How much interaction do you have on a daily basis with management and coworkers?
- How often do you consider your workload manageable?
- How often do you feel stressed at work?
- Can you think of a time where miscommunication impacted your ability to work?
- How do you suggest new ideas for the organization?
- Is there a support system for you to go to if you need help or extra training?
- How were you trained to deal with high pressure situations?
- Do you like working here?
- Do you feel like this could be a permanent job for you?
- Do you believe you have a chance to be promoted?
 - Will it be easy or are there a lot of hoops to jump through?
- How do you deal with conflict when it arises between you and a co-worker?
 - How do you deal with it if its between you and a manager?
- Do relations outside of the workplace effect your ability to work in this role?

Main innovative Questions:

- Do you find there is a cooperative atmosphere where colleagues feel comfortable asking for help from each other and learning from each other?
- Do you feel that you have autonomy in how you complete the requirements of your job?
- Do you feel valued within your organization?

- Have you ever had issues with not being able to effectively communicate with co-workers or other cooperative organizations while working an emergency?
- Do you feel you receive as much from the organization as you give back to it?
- Do you ever feel burnt out from your job? There are high stressors working in this industry so it is natural to feel mentally and physically exhausted. If this occurs do you feel comfortable coming forward or do you deal with it privately?
- How flexible is your job role and do you use your operational freedom to take on extra work?
- Given that the development of trust amongst personal is imperative to efficient operation, is there an element of autonomy and job control in the organization for whom you work?
- Does management and the organization itself take measures to ensure there is a healthy workplace?
- How does only being seasonally employed affect your desire to stay in the industry and make a career out of it?
- Do you feel heard in your organization when you voice your opinion and/or new ideas?
- Do you feel your job requirements are fair and easily completed?
- Do you feel properly rewarded for your efforts?
- Do you feel that management trusts your knowledge on how best to respond to emergency situations?