

Adaptive Governance for Fire Management Planning: A Case Study on Prince Albert National Park, Saskatchewan

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ABSTRACT

Fire is a natural ecological process in the boreal forest, but also a threat to human lives, properties and other values at risk. The challenge is to find a way to manage fire where both the positive and negative aspects of fire are effectively balanced. This is especially important since more frequent and intense wildfires are predicted in the future due to climate change. There is also a need for increased cooperation across jurisdictions to improve the efficiency and effectiveness of Canadian fire management. To address the current and future challenges of fire management, this thesis argues that an effective and adaptive governance approach is needed.

The purpose of the study was to develop principles, criteria and indicators of adaptive governance and to apply this framework to fire management planning in Prince Albert National Park (PANP), Saskatchewan. Because of the need to include other agencies with fire responsibilities, the study also focused on the interagency cooperation with Saskatchewan Environment (SE), the provincial ministry responsible for wildfires.

Principles, criteria and indicators of adaptive governance were identified based on literature on good governance, adaptive management, adaptive governance, and wildfire specific literature. A qualitative research approach was then used to collect data mainly through semi-structured interviews with representatives from Parks Canada (both from PANP and at the national level) and SE, and document analysis of fire plans and strategies.

This study shows that many aspects of adaptive governance have already been implemented in PANP, so that principles and criteria of inclusiveness, legitimacy, foresight, leadership, and many aspects of performance-oriented and adaptiveness have been at least partially met. Yet, there is a need to improve information-sharing and communication, especially across jurisdictions. In terms of the interagency cooperation between PANP and SE, having different mandates is the biggest challenge, but it does not prevent cooperation. Throughout the years both agencies have worked out ways to deal with differences in their mandate and fire management strategies. Having a dialogue to try to understand each other's mandate and respect each other has been and continues to be a key factor in the cooperation. Finally, maintaining and retaining social capital may be crucial to future success in fire management planning, both from an intra- and from an interagency perspective.

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LIST OF ABBREVIATIONS

CEO	Chief Executive Officer
CIFFC	Canadian Interagency Forest Fire Centre
CWFS	Canadian Wildland Fire Strategy
ICS	Incident Command System
MARS	Mutual Aid Resource Sharing
PANP	Prince Albert National Park
PCA	Parks Canada Agency
SE	Saskatchewan Environment
WCC	Waskesiu Community Council
WUI	Wildland-Urban Interface

CHAPTER 1: INTRODUCTION

1.1 Statement of Problem

Fire is a natural ecological process in the Canadian boreal forest helping to maintain its diversity and health, but it is also a threat to public health and safety, properties and natural resources (Natural Resources Canada 2008). Fire is strongly linked to weather and climate and, hence, climate change is a major concern for future fire activity (Wotton et al. 2010). For example, climate change may lead to more intense and frequent forest fires as a result of extreme weather conditions (e.g. heat waves, severe thunderstorms). This, together with changes in vegetation, may lead to changes in fire regimes (Hesseln 2006). Increased insect infestation (e.g. mountain pine beetle and spruce budworm), which results in dead and dry wood material, is another factor contributing to more intense wildfires (Born et al. 2007). In addition, the increasing population in the wildland-urban interface (WUI) is adding to the pressure on fire management. With people moving closer to wildland areas they are more susceptible to wildfires while at the same time being a potential fire hazard. An increase in fire incidences and more values to protect may also raise the already high cost of fire management (Born et al. 2007). The challenge is to find a way to manage fire where both the positive and negative aspects of fire are effectively balanced (Natural Resources Canada 2008). Indeed, intense wildfires in the past have made governments aware of the need for national inter-jurisdictional cooperation in planning and implementation in order to improve the efficiency and effectiveness of Canadian fire management, as well as the need to learn to co-exist with fire (Born et al. 2007).

Today most scientists and fire agencies acknowledge the role of fire for healthy ecosystems and that total fire suppression is “a direct contributor to the dangerous excess of forest fuels” (Hesseln 2005, p. 1). Consequently there has been a paradigm shift in fire management policy, from total fire suppression to introducing fire use¹ on the landscape (e.g.

¹ Fire use refers to the use of prescribed burning or to let lightning-sparked fires burn (Jensen & McPherson 2008).

² Prescribed burning refers to “the deliberate application of fire to a predetermined area under prescribed conditions to accomplish forest management or other land use objectives” (Parks Canada 2005a, p. 5).

prescribed burning²). However, there is still political and social resistance to these alternative fire management practices and hence fire suppression is still the dominant tactic (Hesseln 2005; Hesseln 2006). One reason for this is the forestry's importance for the Canadian economy, but also because of recreational reasons and the need to protect human lives and properties. Nevertheless, in areas with sparse population and limited economic values, such as national parks and remote forest areas, "fire is often allowed to behave more naturally" (Born et al. 2007, p. 3). Parks Canada³ is one of the agencies that has adopted the practice of fire use⁴.

For Parks Canada, fire management is part of an overall approach to ecosystem management. Ecosystem management must respond to the dynamic character of social-ecological systems characterized by uncertainty and surprise, and to build the capacity to maintain resilience at the time of change (i.e. adaptive capacity) (Brondizio et al. 2009). Also, national parks are open systems and therefore management decisions taken within parks may also affect the surrounding area. Other agencies, at the provincial/territorial level, and the rural municipalities with a responsibility for managing land outside of national parks also have a stake in fire management. In such situations cooperation between fire agencies is crucial. However, different jurisdictions, laws and policies for each agency may act as barriers to interagency cooperation, such as absence of common policy and management goals among agencies; inflexible policies and procedures; and group attitudes, mistrust, and organizational norms and values affecting the willingness to cooperate (Wondolleck & Yaffee 2000; Danby & Slocombe 2002). Other stakeholders⁵ may also be affected, such as forestry companies, local landowners, and local residents, calling for the need of inclusiveness in the fire management planning process. To address the current and future challenges of fire management, this thesis argues that an effective and adaptive governance approach is needed.

Determining the characteristics of adaptive governance remains a challenge. Concerns include the legitimacy and accountability of the governing agency, the inclusion of multiple interests, cooperation among agencies, and the ability to address changing conditions. Thus, this

² Prescribed burning refers to "the deliberate application of fire to a predetermined area under prescribed conditions to accomplish forest management or other land use objectives" (Parks Canada 2005a, p. 5).

³ In 1998 Parks Canada became a separate agency and changed its name to Parks Canada Agency, but still the name Parks Canada is commonly used and, hence, is the name used in this study.

⁴ Parks Canada defines fire use as "all activities aimed at attaining ecosystem management objectives or fire risk reduction through the use of prescribed fires" (Parks Canada 2005a, p. 4).

⁵ Stakeholders are the people who are affected by a decision or can affect a decision (Reed 2008).

study focuses on the governance structure of fire management planning and assesses to what extent its characteristics corresponds with the characteristics of adaptive governance, using Prince Albert National Park, Saskatchewan as a case study. Such an assessment can both reveal missing aspects of adaptive governance that could make fire management planning more effective and adaptive to changing conditions, and advance the understanding of adaptive governance in a setting characterized by uncertainty and changing conditions, such as fire management planning.

1.2 Research Objectives

The purpose of this study is to assess the extent to which planning for fire management in Prince Albert National Park (PANP), Saskatchewan is consistent with the features of adaptive governance. The focus is hence on the governance structure of fire management planning rather than the actual management of fire (i.e. implementation of fire plans and programs). Because of the need to include other agencies with fire responsibilities, this thesis also examines the interagency cooperation between PANP and Saskatchewan Environment (SE).⁶ The specific objectives of the research are:

1. To develop an operational definition of adaptive governance, including principles, criteria and indicators;
2. To document the structure of governance of fire management planning in PANP;
3. To assess the extent to which fire management planning in PANP is consistent with the features of adaptive governance;
4. To assess the interagency cooperation between PANP and SE with focus on the challenges they face and how to address these; and
5. To provide recommendations on
 - a) how to improve the governance structure to deal with fire management planning in a more effective and adaptive way; and
 - b) how to improve the interagency cooperation between PANP and SE.

⁶ The specific unit responsible for wildfire management in Saskatchewan is the Fire Management and Forest Protection Branch. Also, the formal name Saskatchewan Ministry of Environment is sometimes referred to as Saskatchewan Environment (SE); this name is also used in this thesis.

1.3 Thesis Overview

There are six chapters in this thesis, including this introductory chapter. Chapter 2 provides a literature review that gives the context of this study, followed by Chapter 3 which describes the study area and the research methods. Chapter 4 documents the governance structure of fire management planning in PANP, and assesses the interagency cooperation between PANP and SE. The assessment of the governance structure of fire management planning in PANP is presented next, in Chapter 5. The last chapter, Chapter 6, concludes with a summary of findings and recommendations for fire management planning in PANP and how to improve the interagency cooperation between PANP and SE. The significance of study, limitations and suggestions for future research are also provided in the concluding chapter.

1.4 Note to Reader

This study has its focus on the fire management planning process in ‘wilderness areas’. Since Parks Canada uses the term *fire management* to include both wildfire suppression and fire use this term is also used in this study in relation to PANP. Nevertheless, when fires cross the park boundary they are classified as wildfires even if they started as prescribed fires. Hence, when talking about interagency cooperation with SE, or at the national level, the term *wildfire* is sometimes used. In other cases it is clearly stated what kind of fire is in focus.

In order to follow the ethical guidelines the interviewees’ names are not included in this thesis, but since it is of value to distinguish the affiliation of each interviewee I have assigned a random number together with the affiliation. For example, interviewee number 1 from PANP is referred to as (1, PANP), and (2, SE) refers to interviewee number 2 from SE. The interviewees at the national level of Parks Canada are referred to as PCA (Parks Canada Agency), and the representative from the Waskesiu Community Council as (1, WCC).

Finally, the way this thesis refers to the main actors requires clarification. PANP is used both to represent the actual park as a physical unit, and as representing the unit responsible for fire management in the Park in order to distinguish the park level from Parks Canada as a whole. Also, some interviewees referred to *Saskatchewan Environment* (SE) rather than the more formal *Saskatchewan Ministry of Environment* and thus I adopted this name at an early stage. Hence, throughout this thesis I talk about the cooperation between PANP and SE.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Adaptive governance for fire management planning includes many elements that together create a complex theory. The literature map below, Figure 2.1, illustrates how the different elements covered in this literature review are connected. The bigger boxes (dashed lines) serve to group the elements that belong to the same section of the literature review.

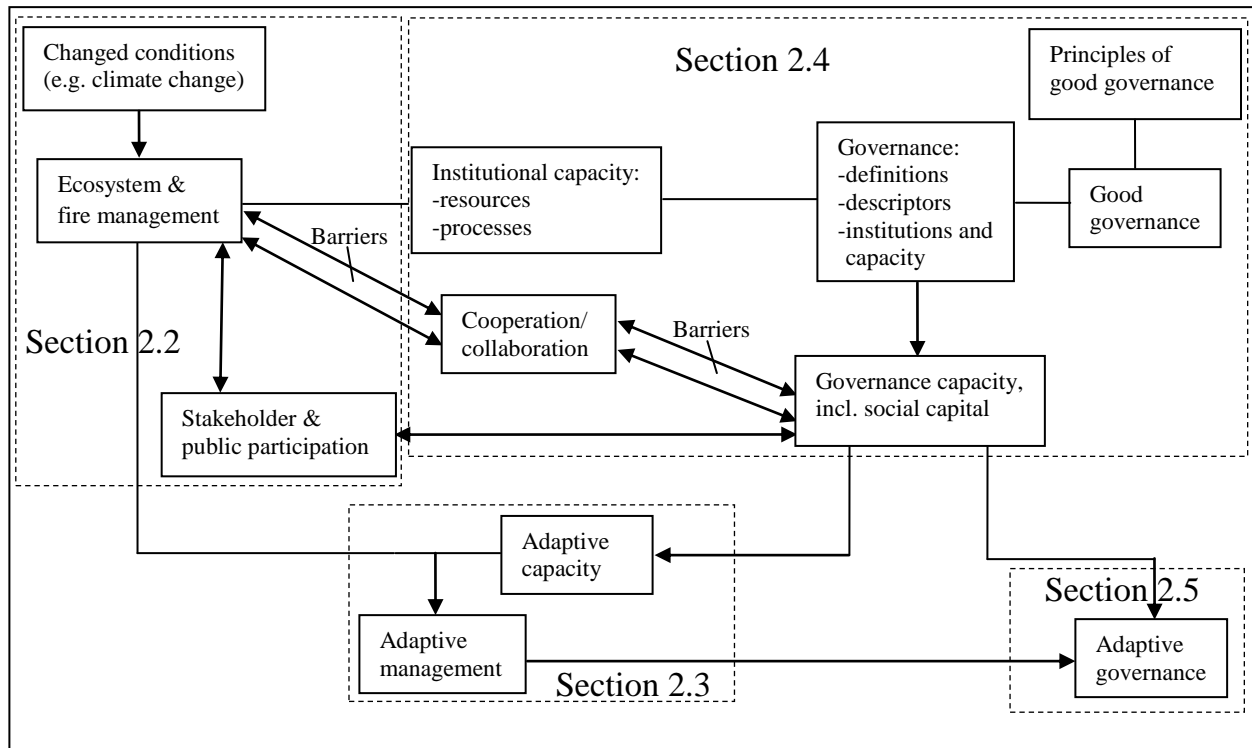


Figure 2.1. Literature map.

The literature review begins with a contextual background (section 2.2) explaining how climate change affects ecosystems, and then presents theory and background information on ecosystem management and fire management. Stakeholder participation and public participation are seen as an essential part of management. The next section (2.3) describes adaptive capacity and adaptive management which are important elements in dealing with changed conditions such as climate change. For example, a high level of adaptive capacity facilitates adaptation to

changed conditions. Also, adaptive management is seen as suitable to manage ecosystems subject to changed conditions and uncertainty in that it constantly revises policies and actions in an experimental learning-by-doing process (Holling et al. 1998). Section 2.4 explains theory on governance. Governance is closely connected to management whereby management can be seen as the operational procedures of governance (Bakker 2007). The institutional capacity, including resources and processes, affects both how governance is exercised and how management is implemented (Lockwood 2009). One kind of governance is good governance which is seen as a fair and effective way of governing (Abrams et al. 2003). Whether a governance structure is consistent with good governance can be assessed by using the principles of good governance, which basically are normative claims regarding how governance should be conducted (Lockwood 2009). Moreover, the characteristics of the governance structure affect the governance capacity. A high level of governance capacity is more likely to result in effective governance and includes a high level of social capital. It facilitates cooperation and collaboration between agencies and organizations across boundaries (e.g. jurisdictional), enables stakeholder and public participation, and enables the building of adaptive capacity. However, to be able to respond to changing conditions in an effective *and* adaptive way it is necessary to join elements from both good governance and adaptive management. Such governance structure is called adaptive governance and is described in section 2.5.

2.2 Setting the Context

2.2.1 Effects of a Changing Climate on Ecosystems and Protected Areas

Today it is widely acknowledged that climate change will have a future impact on our ecosystems. In fact, there are already signs of climate change impacts in every region of Canada (Lemmen et al. 2008). Canada, with its high latitude ecosystems, such as the arctic and boreal regions, is believed to be especially affected by climate change (Wotton et al. 2010). Also the southern and central Prairies are expected to be affected (Lemmen & Warren 2004). For example, ecosystems are predicted to be impacted by shifts in bioclimate, changed disturbance regimes (e.g. fire and insect infestation), the introduction of non-native plants and animals, and stressed aquatic habitats (Sauchyn & Kulshreshtha 2008). Moreover, warming is projected to have seasonal variations with the greatest change in winter. Consequently, changes in precipitation patterns, more extreme climate events, and changes in climate variability will occur

(Lemmen & Warren 2004). Forests are especially susceptible to climate change since even modest temperature changes can affect forest growth and its survival. Some impacts of climate change could be positive (e.g. increased tree growth due to higher temperatures), but this is likely to be offset by increasing moisture stress, species migrations causing ecosystem instability, and increasing frequency and intensity of forest fires and insect infestations. Climate change may also have social, economic and political impacts (*ibid.*).

Boreal forests are generally resilient systems where natural disturbances such as fire and insect infestations help regenerate the ecosystem (Canadian Forest Service 2005). However, with changed conditions, such as climate change, the resiliency function may be affected. For example, the boreal forest of the Canadian Prairie Provinces is expected increased forest fire activity with increased length of fire season, increased fire danger levels, and increased ignition factors (Wheaton 2001). Moreover, there are studies showing that fire frequency in the boreal forest, as well as total area burned, have increased over the last 20 to 40 years and fire risk is expected to increase in most parts of Canada (Lemmen & Warren 2004).

Climate change will challenge the protection of representative ecosystems in Canada. This division in representative areas is built on the assumption of essentially static biogeography. With climate change the whole system is challenged and hence it is necessary to incorporate climate change, ecosystem dynamics and processes into the planning and management for protected areas to avoid loss of species (Lemieux & Scott 2005). Parks Canada, for example, is using ‘natural regions’ to represent natural areas of Canadian significance to protect for future generations (Scott & Lemieux 2005). Hence, climate change will challenge their mandate of protecting the ecological integrity of these natural regions (Suffling & Scott 2002).⁷ Next, Suffling and Scott (2002) argue that even though the ecosystem response to climate change is uncertain “we can be sure that any major climate change will alter both the extent and composition of current ecosystems” (p. 132). They call for increased interagency cooperation to meet the challenge of climate change in and around parks and argue that “climate change monitoring, impact research and adaptation strategies cannot be undertaken successfully by a single agency or research institution” (*ibid.*, p. 136). Scott and Lemieux (2005) stress the need to

⁷ This is something that Parks Canada has acknowledged as a corporate risk (key risk #2 - environmental forces): Parks Canada “may not be able to adapt effectively or quickly enough to environmental forces such as climate change, biodiversity loss, and exotic/invasive species, and this may hinder the ability of the Agency to maintain or improve overall ecological integrity in national parks” (Parks Canada 2010, p. 18).

start developing adaptation strategies to climate change now, considering the time ecosystems require to respond to some management interventions and the “planning horizon of their mandate” (p. 701).

2.2.2 Ecosystem and Fire Management

*Ecosystems*⁸ are characterized as open, dynamic and complex systems (Cortner et al. 1996) which are subject to internal and external relationships that change over time (Imperial 1999). According to Imperial (1999), “this creates conditions of extreme uncertainty and presents unique challenges for the design and management of governance systems” (p. 451). In addition, climate change is believed to increase the degree of complexity and uncertainty in ecosystems (Lockwood et al. 2009a). *Ecosystem management* can be defined as “a set of management practices and philosophies aimed at selecting, maintaining, and enhancing the integrity of an ecosystem while still providing resources and experiences for humans” (Needham & Rollins 2003, p. 1). When applied to park management, ecosystem management includes more specifically: specifying management goals and objectives; involving different stakeholders in the decision-making process; addressing social (e.g. experiences) and biophysical (e.g. resources) attributes of an area; managing impacts within the whole ecosystem (including impacts in surrounding areas that is a threat to the park); and monitoring to evaluate if the management objectives are sustainable (ibid.). There are also, besides ecological considerations, other factors managers need to take into account, such as “political considerations, economic limitations, existing laws, and the necessity of satisfying the needs and perceptions of the public that visit [the area]” (Wright 2008, p. 169). Hence, ecosystem managers need to take into account both the nature of ecosystems and the jurisdictional setting where it is located in order to manage the ecosystem successfully, and this will require cooperation (Gilbert 1988).

Another needed component in ecosystem management is participation of stakeholders and the public. For true participation information-sharing should only be seen as a starting point. Gooch (2007) argues that the level of participation managers choose depends on the objectives of the participatory approach. For example, if the objective is to raise public awareness then

⁸ A traditional definition of *ecosystem* is: “A dynamic system of plants, animals and other organisms, together with the non-living components of the environment, functioning as an interdependent unit” (Canadian Forest Service 2005, p. 92). Today there is a general agreement on the inclusion of humans in the ecosystem. This interaction between societies and natural systems are referred to as social-ecological systems (Berkes 2004) (see section 2.3).

information-sharing is enough, but if the managers also want to take into account stakeholders', or the broader public's, perceptions and opinions then consultation⁹ is the minimum level. If managers consider collective management and/or to use local knowledge, higher involvement such as partnership or delegated power is needed (Gooch 2007). However, involving stakeholders and the public in management of ecosystems is sometimes difficult due to the complexity and difficulty to understand the issues at stake; "they [stakeholders and the public] may find it more difficult to express an informed opinion on ecosystem governance" (ibid., p. 135). Also Özerol and Newig (2008) list reasons for public participation. These are: increasing public awareness of environmental issues; increased quality of decisions by drawing on lay local knowledge; social learning and developing a shared understanding of the problem dimensions; less litigation, fewer misunderstandings, fewer delays and more effective implementation; public acceptance, commitment and support with regard to decisions and plans; stronger democratic legitimacy of decisions by allowing the public to have a say in and/or an influence on the decisions at stake; and social goals such as the building of trust in institutions. They also stress the importance of effective communication in public participation where the governing authority should strive for a two-way communication rather than a situation where the public request information that they possess; "they should be aware of the expectations of the public, be open to the ideas of the public and respond to their requests so that the legitimacy of the PP [public participation] process can also be ensured" (ibid., p. 644). In their study on public participation in water resources management they identified barriers for communication with the public. These are: insufficient, unclear, inaccessible or too technical information; lack of trust; delay or no response from authorities; and unclear decision-making process. Özerol and Newig (2008) also argue that public involvement should start as early as possible. In the same study they found that the reason for not participating was not because of lack of interest but rather due to foregone conclusion; "since the public was not involved from the beginning, they believed that the decisions had already been made at the time they participated, and they believed that their participation therefore would not have any impact on the decision" (ibid., p. 652).

Fire management is part of the overall ecosystem management. Ideally a fire management plan should be connected to a land management plan which provides the long-term

⁹ Consultation refers to the process where the public, or stakeholders, get the chance to express their concerns regarding, for example, planned projects (Özerol & Newig 2008).

goals and objectives for the fire management plan (Miller 2003). The nature of fire makes fire management especially challenging. Fire does not stay within fixed borders, but rather burn at a landscape scale. This means that a fire may escape into neighbouring jurisdiction. Even if the fire stays within an enclosed area, such as a 'wilderness area', there may be smoke issues outside the boundary (ibid.). All this calls for fire management at the landscape level as well as interagency cooperation, making fire management more effective, especially in terms of planning and ecosystem fire impacts (Rideout & Botti 2002). It is also important with stakeholder involvement in fire management since it is an effective way to increase both the understanding of fire practices and to build trust. Research shows that two-way communication is the most effective way to change attitudes and behaviour. If people feel excluded the acceptance for a fire management practice will be lower (Wildland Fire Lessons Learned Center 2010).

It is also important for the fire managing agency during a wildfire to "respond quickly with accurate, timely information in open communication" to the public (Taylor et al. 2007, p. 199). The information must also be easy to understand, using plain language, and distributed through different communication channels (ibid.). This is also acknowledged by Kulig et al. (2008). Through lessons learned from the Lost Creek Fire in 2003 they point to the importance of communication in interagency cooperation and dissemination of information to local residents. During this fire event public announcements were communicated through the local radio station, and information booths were set up at different places in the community with the latest fire information and with staff answering questions. There was also a 24-hour phone line for residents, and for 'out-of-town callers' with family members living in the area, to use to ask questions about the fire status and evacuations. Kulig et al. (2008) stress the need for the community members to receive detailed information "regarding the land they know intimately", presented in a straightforward way (p. 7). One aspect is that "without accurate and adequate access to information, rumors can start and anxiety escalates" (Kulig et al. 2008 - citing a community member, p. 7). Moreover, using the media to inform the public can be an effective way to get the information out to the residents, but requires effective planning to make sure the media gets consistent and accurate information. It is also crucial that fire administration officials receive accurate and frequent reports regarding the fire situation to be better prepared to make decisions (ibid.).

Fire management is subject to a number of challenges, such as climate change, insect infestation, alien species, shifting demographics, WUI development, and public policy on land management practices. This complexity has increased since the 1980s due to various ecological, political, economic, and social factors, such as a growing population in the WUI and conflicting demands on resources. This is putting even more strain on the challenged fire management agencies which already experience decreased resources. Aircraft and equipment are aging, fire management costs rise, fire agencies face budget constraints, and experienced fire management staff retire (BC Ministry of Forests and Range Wildfire Management Branch 2009). There has also been an increase in information that “tends to feature the sensational, negative side of wildland fire¹⁰, with little recognition of the ecological benefits” (ibid., p. 2). Similarly, Hesseln (2006) argues that the public expects the fire agencies to protect private and public property once a fire has started: “The showmanship involved with fire suppression then overshadows the rest of fire management. [...] Because of the danger involved, and values at risk, fire fighters are often touted as heroes. As a result, suppression gets a great deal of media attention” (p. 23). Because of this, she argues, wildland fire suppression has been institutionalized making it difficult to change people’s perception and expectations on wildfire management. It also has as effect that many property owners in the WUI areas, especially those moving from urban areas, do not fully understand the risk of fire and often they oppose fuel treatment because of aesthetic reasons (ibid.). Also, with the property owners relying on the fire agencies suppressing fires they may refrain from taking responsibility to mitigate the fire risk on their own property (Taylor et al. 2006). The FireSmart program developed in Alberta in the 1990s to help individuals and communities reduce wildfire threats in the WUI, including mitigation strategies and techniques, has been implemented in some communities across Canada. However, FireSmart is not legally bounded and is conducted on a voluntary basis with the communities or individual property owners being responsible for its implementation. Public education is an important component of the FireSmart program (ibid.).

Canadian fire management has evolved over the years from striving “to control all wildfires through early detection and initial attack when the fires were small” to the “awareness of the important role of natural disturbances in maintaining ecosystem health, productivity, and

¹⁰ *Wildland fire* refers to fires occurring in ‘wilderness’ areas, in contrast to fires that start in urban areas, and includes both wildfires and prescribed fires.

biodiversity” in the late 1970s, early 1980s (Born et al. 2007, p. 3). This led to a new fire management strategy where “consideration is given to the ecological role of fire, the economics of suppression, and the priority of values at risk” (ibid.). Fire management in Canada is decentralized and mainly carried out by governmental agencies. The provincial/territorial governments manage provincial crown land, each with their own goals and objectives, and the federal government manage national parks, federal crown land and Nunavut (Hesseln 2006). Other lands are primarily subject to fire suppression. For example, forest companies and other private landowners/tenure holders are responsible for fire suppression that starts on their own land. If the private properties are small it is common that the provincial agency suppress fires on a cost recovery basis (Taylor et al. 2006). Provincial agencies often set up agreements with Indian reserves and Department of National Defence lands to suppress fires. The rural communities are responsible for suppressing fires that start within their land, but often they have agreements with neighbouring jurisdiction to get access to resources or to request assistance. Nevertheless, if the fire event turns into a disaster situation the federal government, in their position as responsible for the health and safety of the public, will give disaster assistance (ibid.).

One factor that facilitates coordination of fire fighting across Canada is the Canadian Interagency Forest Fire Centre (CIFFC), opened in 1982. It is a non-profit organization that, under the Canadian Interagency Mutual Aid and Resource Sharing (MARS) Agreement, coordinates resource-sharing (i.e. equipment, personnel, aircraft) and information-sharing between the provincial/territorial and federal agencies based on self-interested reciprocity. The MARS Agreement facilitates “problems that cross jurisdictional boundaries” and “peak-load problems created by occasional extreme demands on service capacity” (Taylor et al. 2006, p. 12). However, this agreement is voluntary and “agencies must continually balance the benefits of lending resources with the risk of not meeting their internal demand for fire services”; hence, the MARS Agreement may not always provide a fire agency with requested resources (ibid., p. 13). CIFFC also set national standards for equipment and training, and is also the contact point for international requests (Born et al. 2007). Moreover, Canada has set up a resource sharing agreement with the United States, the Canada/United States Reciprocal Forest Fire Fighting

Arrangement (CANUS), which is managed by CIFFC.¹¹ Indeed, Born et al. (2007) argue that “CIFFC’s role is vital to helping agencies to efficiently respond to extreme fire events that are beyond their respective internal capacities” (p. 4). Another factor that facilitates fire management across jurisdictions is the Incident Command System (ICS). It is a standardized organizational system that all fire management agencies are using and that facilitates resource sharing (e.g. personnel, equipment) all over Canada (Taylor et al. 2006) without being hampered by jurisdictional boundaries (Parks Canada 2005a, p. 5). In terms of preparedness, fire management agencies in planning and fire operations use the Canadian Forest Fire Danger Rating System (CFFDRS) which is a fire danger rating system that predict fires and makes it possible to “pre-positioning resources in anticipation of fire activity” (Born et al. 2007, p. 4). Another part of fire preparedness is fire weather forecasting. Today many provincial fire agencies have their own forecasting, but the service can also be provided by the Meteorological Service of Canada on a cost recovery basis (Taylor et al. 2006).

One example of a national initiative to make fire management more effective and efficient is the Canadian Wildland Fire Strategy (CWFS) that was developed jointly by the provinces, territories and the federal government, and approved by the Canadian Council of Forest Ministers (CCFM) in 2005. It includes an assessment of current and future problems such as climate change, public safety, economic efficiency, and sustainable resource management (BC Ministry of Forests and Range Wildfire Management Branch 2009). One important idea behind CWFS is that “managing the risks from wildland fire is a shared responsibility needing integrated and co-operating actions” (Born et al. 2007, p. 10). There are four strategic objectives: public awareness, policy, and risk analysis; innovation; a Canadian FireSmart initiative; and an enhanced wildland fire preparedness and response capability. The first two objectives “are fundamental enablers of change” and the other two “will foster immediate action on the most urgent issues and concerns” (ibid., p. 11). One of the goals is that “wildland fire management agencies will be adaptable, continually upgrading their policies and practices to ensure public safety and security while facilitating the process of fire as a regenerator of healthy forests” (ibid., p. 10). Moreover, even though the CWFS is striving for increased cooperation, it states that the governments are responsible for forest fire management on their lands according to jurisdiction

¹¹ There also exist mutual aid agreements between provinces and states. For example, Saskatchewan, Alberta, British Columbia, Yukon, Alaska and four Pacific Northwest states are forming the Northwest Wildland Fire Compact (Taylor et al. 2006; 4, SE).

and mandate, and that the CWFS will respect, through agreements, the jurisdictions and their policies, laws, regulations and implementation needs (Born et al. 2007). The CWFS was originally planned to be implemented over a 10 years period, but today nearly five years later there are many aspects that still remain to be implemented. However, it is outside the scope of this thesis to assess the current status of the CWFS.

2.3 Adaptive Capacity and Adaptive Management

Ecological systems are closely connected to social systems. This notion has led to the concept of *social-ecological systems*, which is the integration of social systems and ecological systems (Folke et al. 2005). Social-ecological systems are complex and respond to change in a non-linear and dynamic way, making it difficult to predict and manage (Bellamy 2007). Indeed, uncertainty and surprise are intrinsic characteristics of social-ecological systems (Holling 1995).

With social-ecological systems being exposed to changing conditions, such as climate change, managers need to learn how to adapt to these changes in order to maintain a resilient system. *Social-ecological resilience* refers to “the capacity of a social-ecological system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks” (Olsson et al. 2004, p. 2). This capacity to adapt to and shape change is an important component of social-ecological system resilience and is called *adaptive capacity* (ibid.). More specifically, in a social-ecological system with high adaptability (i.e. high adaptive capacity) “the actors have the capacity to reorganize the system within desired states in response to changing conditions” (Folke et al. 2007a, p. 539). A resilient social-ecological system may also take advantage of disturbances to transform into a more desired state (ibid.). Galaz et al. (2008) stress that the ability to increase the social-ecological resilience both depends on the dynamics of biophysical system and the institutional arrangements and governance processes’ ability to manage these dynamics adaptively, and their capacity to handle surprise. To monitor, interpret and respond to ecosystem feedback are part of the process to increase the capacity (Olsson et al. 2004); this is part of adaptive management (see below). Indeed, it has been argued that building adaptive capacity to respond to changed conditions is a prerequisite for sustainability in linked social-ecological systems (Folke et al. 2002). Important human factors to maintain the adaptive capacity are, for example, social capital (including trust-building), social learning, different knowledge systems, and cross-scale institutional arrangements (Francis 2008). Other factors that determine the adaptive capacity are flexibility

and efficiency of institutions and policy, distribution and availability of financial resources, technological capacity, human capital, infrastructure quality, and the perception of climate risk (Johnston & Williamson 2007).

As indicated above, adaptive capacity is closely linked to *adaptive management*. Fundamentally it focuses on learning-by-doing by treating policies as hypotheses and management as experiments from which managers can learn (Holling et al. 1998; Folke et al. 2007b). This kind of learning is a social process, called *social learning* (Folke et al. 2005). What distinguishes adaptive management from “conventional practice” of resource management is “the importance of feedbacks from the environment in shaping policy followed by further systematic (i.e. non-random) experimentation to shape subsequent policy” (i.e. an iterative process) (Berkes & Folke 1998, p. 10). However, adaptive management is not the same as managing adaptively. Noble (2010) argues that resource managers who involve the public and monitor and adapt to changing conditions often think they practice adaptive management. He states: “Adaptive management is more than monitoring, adapting, and responding to the unexpected; it is a clearly articulated approach to environmental management that treats policies or management prescriptions as experiments to test hypotheses, monitors the outcomes in order to refine those hypotheses, and subsequently adapts policies and actions as new knowledge and understanding are gained” (p. 434). An important element is learning from failures: “Management institutions must be willing to accept the fact that their actions and policies may be incorrect or less than sufficient and that by acknowledging their mistakes, they can learn from the lesser successes and improve future management practices” (ibid., p. 458). Hence, “the goal of adaptive management is not to eliminate the uncertain but to benefit from it through the development of more resilient policies and management practices” (ibid., p. 458). Another aspect is that the ability of institutions to respond to new knowledge depends on their willingness to act on it (McLain & Lee 1996). Next, adaptive management can be divided into passive adaptive management and active adaptive management. Passive adaptive management involves the implementation of a single management policy or practice that the managers perceive as the most appropriate, and then it is monitored to see if it meets the objectives (Noble 2010). It is also referred to as sequential learning (Stankey et al. 2005). This kind of learning is slower than in active adaptive management, but it is also less resource-intensive (Noble 2010). Active adaptive management involves implementation of more than one management policy or practice as

parallel experiments to decide which one best meets the objectives (ibid.). It is also referred to as parallel learning (Stankey et al. 2005).

However, Stankey et al. (2005) argue that the literature and experience show that “while adaptive management might be full of promise, generally it has fallen short on delivery” (p. 7). Noble (2010) suggests key reasons why this is the case, for example, inconsistency in definition and principles; lack of participative approaches; focus on short-term results; and institutional rigidity. Also, Walters (1997) found in his review of adaptive management of riparian and coastal ecosystems that one reason for failure was that research and management stakeholders were showing “deplorable self-interest, seeing adaptive-policy development as a threat to existing research programs and management regimes, rather than as an opportunity for improvement” (p. 1). Moreover, Noble (2010) lists a number of conditions that needs to be met in order for adaptive management to work. These are: a mandate exists to take action in the face of uncertainty; management and policy prescriptions are treated as experiments; sufficient stability is present to measure long-term outcomes; mechanisms are available to transfer the results of adaptive management to broader policy and management practices; and managers and planners work with interests in a cooperative environment.

Finally, adaptive management efforts are of tradition science-based, but other kinds of knowing such as local knowledge may also be valuable. For example, local knowledge often possesses valuable knowledge of local ecosystems and their relation to the social system, which is important in monitoring environmental change (Nelson et al. 2007). Similarly, Jacobson et al. (2009) argue that adaptive management “requires people to have a range of understandings from science, management and local knowledge” (p. 287). Also, McLain and Lee (1996) note that scientific adaptive management “relies excessively on the use of linear systems models” and ignores other kinds of knowledge (p. 437). They argue that incorporating knowledge from multiple sources is part of making adaptive management more effective (ibid.). In fact, Folke et al. (1998) argue that “adaptive management can be seen as a rediscovery of dynamic practices and institutions already existing in some traditional systems of knowledge and management, and to some extent in contemporary local communities” (p. 431). Hence, “drawing on management practices based on ecological knowledge and understanding the social mechanisms behind the development of them may speed up the process of adaptive management” (ibid., p. 431).

2.4 Governance

2.4.1 Definitions and Descriptors

Governance is a broad topic with various definitions. Drawing on work by Francis (2003), Pollock et al. (2008) define governance as “the institutional arrangements that extend beyond government to include private-sector and other non-governmental organizations, as well as the rule systems under which these different actors operate” (p. 111). Another definition by Graham et al. (2003) is: “Governance is the interactions among structures, processes and traditions that determine how power and responsibilities are exercised, how decisions are taken, and how citizens or other stakeholders have their say” (pp. 2-3). They argue that issues today (e.g. environmental issues) are too complex for the government to deal with alone and therefore issues of public concern should involve other actors as well (ibid.). Next, power, relationships and accountability are the core elements in governance: “who has influence, who decides, and how decision-makers are held accountable” (ibid., p. 3). Graham et al. (2003) also emphasize the aspect of steering and the notion that governance is both about what direction to go and who should take part in the decision-making (i.e. direction and roles), as well as about ends and means (i.e. the results of power and how it is exercised).

Various kinds of governance arrangements have appeared lately that intend to improve ecosystem management and natural resource management by having a more inclusive approach with non-governmental actors as part of governance (Lockwood et al. 2009a), such as collaborative management, partnership arrangements, delegated authority and community management (Lockwood 2010). This more collaborative kind of governance is sometimes called *new governance* (Lockwood et al. 2009a). There is also an increase in interdependencies among various actors which requires a higher level of interaction at multiple levels of governance (ibid.) (see multi-level governance below). Lee (2003) refers to new governance as “a polycentric form of social coordination in which actions are coordinated voluntarily by individuals and organizations with self-organizing and self-enforcing capabilities” (p. 20). This requires a certain minimum level of social capital in order to be carried out in an effective way (Lee 2003; Folke et al. 2005). Another aspect is that these new governance approaches often includes a learning-and-experimentation component which is suitable for dealing with problems that are characterized by complexity, uncertainty (e.g. climate change), interdependency, and that is lacking in knowledge,

expertise and resources (Lockwood et al. 2009a). Such problems are sometimes referred to as *wicked problems*¹².

Multi-level governance refers to “a form of governance involving distinct but interlinked components at two or more levels of social organization” (Brondizio et al. 2009, p. 269). Briassoulis (2004) points to the potential of multi-level governance arrangements to facilitate communication, cooperation and coordination among actors, resource regimes and organizational levels, as well as to link policy to planning in a meaningful way and create effective management to be able to adapt to changing conditions. Key factors are also relations of trust, mutual respect and responsibility between actors, and transparency in decision-making processes (Lockwood et al. 2009b). Moreover, Folke et al. (2002) argue that multi-level governance of complex ecosystems require “constant adjustment, which requires innovation and experimentation” (p. 47). Multi-level governance may be useful in governance of environmental related issues since they often transcend jurisdictions and hence need “institutional responses that operate on multiple geographic scales” (Steinberg 2009, p. 61).

Another label of governance is *good governance*. Good governance is a kind of governance with a fair and effective way of governing powers in order to reach the desired result, for example the objectives of a protected area (Abrams et al. 2003). Abrams et al. (2003) describe good governance as “founded upon the capacity and reliability of governing institutions to effectively respond to problems and achieve social unity through various forms of consultation, negotiation and multi-party agreements” (p. 19). Characteristics of good governance are, for example, dealing with conflicts constructively, accepting different points of view and exploring the diverse meanings, and the evolution of consensus solutions. The governing bodies practising good governance will hence increase the legitimacy, as well as the social compliance to prevailing rules (ibid.). A kind of governance where good governance is needed is *protected area governance*. As the name indicates, it refers to governance in protected areas, such as national parks. There are four kinds of protected area governance: governance by government, shared governance (co-governed), private governance, and governance by indigenous peoples and local communities (Lockwood 2010). The dynamic, complex and polycentric governance that exist in protected areas raise questions about appropriate design,

¹² More specifically, *wicked problems* refer to problems where there is a disagreement on what the problem is and with competing solutions (Jones 2005). Furthermore, the problems cannot be separated from issues of value, equity and social justice (Berkes 2004).

quality and effectiveness, all of which are questions that relates to good governance. Moreover, protected area governance requires a landscape perspective which implies cross-boundary interaction with neighbouring area and its users, such as forestry, agriculture and urban areas (Lockwood 2010). Indeed, Lockwood (2010) argues that good governance is a prerequisite for effective management and to secure political and community support.

The governance structure can be evaluated by using criteria for governance that covers the key aspects (Eagles 2008). A widespread set of principles and criteria for good governance of protected areas have been developed by Graham et al. (2003), deriving from the characteristics of good governance by the United Nations Development Programme (UNDP) (Eagles 2008). These characteristics are: participation; rule of law; transparency; responsiveness; consensus orientation; equity; effectiveness and efficiency; accountability; and strategic vision (UNDP 1997). The characteristics have been further grouped by Graham et al. (2003) under five principles: legitimacy and voice; direction; performance; accountability; and fairness.¹³ Abrams et al. (2003) also use principles and criteria in their handbook on evaluation of governance. They use the principles of Graham et al. (2003), but the criteria have been elaborated (see Abrams et al. 2003). Also Lockwood (2010) presents seven principles of good governance for protected areas as part of a framework for governance assessment. These are: legitimacy, transparency, accountability, inclusiveness, fairness, connectivity, and resilience. He defines governance effectiveness as the combination of governance quality and institutional capacity (i.e. the available resources and the processes that enable governance *and* management) together with the supportive context (e.g. values, threats, influences, stakeholders) (ibid.). Lockwood also compares his principles and their outcomes with the principles of Graham et al. (2003), with the UNDP characteristics for good governance and with the criteria of Abrams et al. (2003).¹⁴ The different principles and characteristics of good governance by UNDP (1997), Grahams et al. (2003), and Lockwood (2010) can be found in Appendix A. However, using principles and criteria to evaluate governance should be carried out with caution. It is important to see them as representing an ideal and that consideration has to be taken to the local context such as the social and political systems (Graham et al. 2003; Eagles 2008).

¹³ These principles have been accepted by the World Park Congress as the basis for assessing protected area governance (Eagles 2008).

¹⁴ Note that they all, except for UNDP (1997), use the same definition of governance, the one of Graham et al. 2003 presented above.

Finally, *governance* is closely linked to *management*. The use of the two concepts could be somewhat confusing and requires clarification. Governance refers to the powers, authorities and responsibilities of organizations and individuals, whereas management refers to the product of governance in form of resources, plans and actions (Lockwood 2010). Another way to see it is governance as the decision-making process and management as “the models, principles, and information we use to make those decisions” (Bakker 2007, p. 16). Hence, management refers to the operational procedures of governance (ibid.), or, in other words, the implementation of various plans and programs determined by the governing body. Also, as earlier stated, governance determines the effectiveness of management (Eagle 2008).

2.4.2 Institutions and Capacity

Part of governance arrangements are *institutions*. Institutions have been defined in many ways, but the broadest definitions include both formal institutions (e.g. administrative structures) and informal institutions (e.g. customs, practices) (Cortner et al. 1998). For example, Berkes (2004) describes institutions as “human devised constraints that structure human interactions, made up of formal constraints (rules, laws, constitutions), informal constraints (norms of behaviour, conventions, and self-imposed codes of conduct), and their enforcement characteristics” (p. 623). Today it is widely acknowledged that institutions in ecosystem management need to be flexible in order to respond to changed conditions, such as ecological conditions, changes in social values, and political pressures, as well as to respond to new knowledge (Cortner and Moote 1999). Hence, adaptable institutional arrangements are needed, in contrast to the hierarchical and rigid institutions where the policy is set at the highest level of the organization (Cortner et al. 1996). Cortner et al. (1996) suggest an ecosystem approach where policy and information is distributed top-down as well as bottom-up within the organization so that “information based on management experiences flows up the organization from field offices and helps to frame policy at higher levels” (p. 9). In addition, the adaptable institutions should treat management “as a learning process in which decisions are continuously reviewed and revised, and therefore allow planning and decision-making to go forward in the face of uncertainty” (ibid., p. 5); that is, the practice of adaptive management, discussed in section 2.3.

Institutional change is necessary when institutions are inefficient. However, Briassoulis (2004) argues that “institutional change is a long process due to the inertia of the present

institutions to accommodate change, relying heavily on the catalytic role of political will” (p. 131). Young (2002) refers to this kind of institutional constraint as path dependency which is the “tendency of human systems to follow well-defined courses once they are launched on particular paths” (pp. 71-72). This may result in mismatches between ecosystems and institutions; ecosystems undergo rapid changes whereas institutional arrangements “often change or evolve at a much slower pace” (ibid., p. 72). Moreover, institutional inertia also lies at the individual level since the way people respond to changing conditions is highly individual. Some people are flexible and open to new ideas, while others are more rigid and strive to maintain the status quo (Clark 2002). Clark (2002) argues that “if people’s perspectives are highly rigid, they will be unable to change to meet the demands of new situations” (p. 18).

How well the governance system adjusts to changed conditions depends on its capacity. According to Innes and Booher (2003), “a governance system with capacity can learn, experiment, and adapt creatively to threats and opportunities. It is characterized by regular interaction among diverse players who solve problems or complete complex new tasks by working together” (p. 7). *Governance capacity* includes collective action; inclusiveness of a range of interests to inform and empower them; dialogues; knowledge sharing from various actors to the governance process; networking (including relationships among jurisdictions); mutual trust; recognition of mutual interests; and the ability to quickly solve problems using appropriate knowledge and experience from actors within the governance system (ibid.). The outcome of governance capacity is a resilient governance system that quickly responds to new conditions and adapts and changes its procedures and relationships as needed. Moreover, “it constantly improves its economic, environmental and equity performance, or slows down or reverses negative change. It is in a constant state of institutional evolution as it adjusts to maintain a sustainable system” (Innes & Booher, p. 18). However, since the governance system is dependent on the individual actors the *individual capacity* is an important aspect. A person with a high level of capacity has the right skills, an understanding of opportunities and problems, creative ideas, the ability to absorb different kinds of information, a holistic perspective, and the ability to work together with others. He/she is also self-reflective, willing to experiment and learn from failures, is a good listener, can build networks, and takes initiative (ibid.). Innes and Booher (2003) argue that the person with most capacity is suitable to become a leader since he/she has the skill to “provide leadership through vision”, inspire others and help them enhance

their own capacity (p. 16). Moreover, the *institutional capacity* is, as earlier stated, a prerequisite for effective governance as well as an important part of management effectiveness. It refers both to the available resources (e.g. infrastructure, financial, human and knowledge) and the processes that enable governance to be exercised and management to be implemented (e.g. administration and planning) (Lockwood 2009).

2.4.3 Collaboration and Cooperation

Collaboration and cooperation are, as already indicated, important components of governance. Collaboration and cooperation refer to the process when organizations or agencies work together across boundaries (e.g. organizational, jurisdictional). Although they mean different things they are often used interchangeably (Motsi 2009). *Collaboration* refers to “active partnerships with resources being shared or work being done by multiple partners” (Yaffee 1998, p. 301), while *cooperation* refers to “individuals or groups moving in concert in a situation in which no party has the power to command the behaviour of the others” (Wondolleck & Yaffee 2000, p. xiii). Thus, collaboration implies a higher degree of interorganizational relationship than cooperation. Related to cooperation is *interdependency*. Interdependency refers to a situation where actors can offer something that the other actor needs, that is, reciprocity exists (Booher & Innes 2002, p. 225). Thomas (2003) argues that interdependence is a condition for cooperation to take place, and gives agencies “a reason to work together toward some common objective” (p. 3). This can result in *interagency cooperation* which refers to “an unmandated effort by public officials in at least two local, state, or federal agencies to coordinate their activities or share resources” (ibid., p. 24). However, the cooperative relationships are created at the individual level rather than at the agency level since it is individuals that work together to accomplish what they cannot do on their own. Examples of factors that are needed for cooperation to work are information, knowledge, personal efforts, and that the goals are common, or at least not mutually exclusive (ibid.). Thomas (2003) explains: “Minimally, individuals must know of each other’s existence and have some understanding of each other’s interests. The more opportunities individuals have to interact with one another, to learn about one another, and to trust others’ intentions, the more likely they are to work together toward a common goal” (p. 45). This means that “some agency officials are more likely than others to perceive their common interests and to act on them” (ibid., p. 45). Moreover, building a strong relationship and to have roles and responsibilities are also important (Innes & Booher 2003).

However, reaching effective collaboration and cooperation can be challenging. Wondolleck and Yaffe (2000) argue that cooperation may take place despite the barriers because of the mutual benefits of such arrangements and that actors believe that their interests “can be better achieved through collective action” (p. 66). They also argue that “processes that work at building understanding, trust, and relationships between disparate groups can help create a climate in which collaboration can develop” (ibid., p. 68). Thus, they recognize the importance of social capital (see section 2.4.4).

Table 2.1 lists a number of barriers/obstacles from the literature in a context of protected areas and natural resource management, with examples of suggested ways to overcome them.

Table 2.1. Barriers of collaboration and cooperation in protected areas and natural resource management, and suggested ways to overcome them.¹⁵

	Barriers of collaboration and cooperation	Suggested ways to overcome the barriers
Danby & Slocombe 2002: -from the literature (pp. 248-249)	<ul style="list-style-type: none"> -Absence of common policy and management goals among agencies. -The high complexity in regards to coordinating activities between involved agencies. -Agencies unwillingness to give up control. -A lack of incentives for planning broad collaborative programs. 	
-from their study on intergovernmental cooperation in St. Elias region (pp. 264-266)	<ul style="list-style-type: none"> -Planning and management is issue driven and the need for cooperation is not seen until a specific issue arises. -The land managers’ prioritize their own land. -The perception that increased cooperation would imply relinquished control. -Changing staff makes it difficult to establish cooperative relationships. 	<ul style="list-style-type: none"> -Reinforcing the general benefits of cooperation. -Consensus-building. -Identifying common goals and objectives. -Identifying shared resources.
Buechner et al. 1992, pp. 806-808: -from their study on cross-boundary issues for U.S.	<ul style="list-style-type: none"> -Ineffective communication. -Insufficient information (e.g. on the resource, public opinion, local institutions, economics, regulations relevant to the issue). 	<ul style="list-style-type: none"> -Park staff need to be good listeners and effective speakers. -Park staff need access to adequate information on the people, processes and natural resources important to

¹⁵ This list is not comprehensive, but illustrates examples of barriers and suggestions on how to overcome them. They come in no particular order.

national parks	<ul style="list-style-type: none"> -Lack of motivation for negotiated agreements. -Lack of personnel and funds. -Conflicting mandates. -Number of stakeholders. -Lack of constituency that supports park goals. -Power differences. -Enforcement problems. 	<ul style="list-style-type: none"> the park. -The use of personal contacts between park staff and local communities (e.g. using advisory groups) to get the local communities more involved and for the park to gain support.
<p>Wondolleck & Yaffee 2000, pp. 51-64:</p> <p>-in a context of collaboration¹⁶ in natural resource management</p>	<ul style="list-style-type: none"> -The institutional structure within which collaboration takes place (e.g. lack of opportunity or incentives, conflicting goals and missions, inflexible policies and procedures, and lack of resources (time, money, personnel) to carry out collaboration). -The way people think about collaboration and each other affecting the willingness to collaborate (e.g. mistrust, group attitudes about each other, organizational norms and values, and lack of support for collaboration from higher levels of agency). -Problems that relate to the process of collaboration (e.g. unfamiliarity with the process, and lack of skills to carry out the process). 	<ul style="list-style-type: none"> -Building on common ground (e.g. shared goals and interest, shared problems and fears, a sense of place, compatible interests). -Having a holistic and integrative perspective. -Maintaining communications. -Building and sustaining relationships (e.g. fostering trust and respect, maintain relationships: requires long-term staff). -Leadership. -Being proactive. -Willingness to try new approaches. -Learn from failures.
<p>Norman & Bakker¹⁷ 2005, pp. 4, 19; 2009, p. 108:</p> <p>-from their study on transboundary water governance along the Canada – U.S. border</p>	<ul style="list-style-type: none"> -Mismatched governance structures. -Different governance cultures and mandates. -Lack of institutional capacity and financial resources. -Difficulty assessing data. -Mistrust. -Lack of leadership. 	<ul style="list-style-type: none"> -Informal governance mechanisms (e.g. leadership, networks, contacts, and personal relationships). -Specific issues (e.g. endangered species, disaster mitigation). -Crisis. -Public availability of data. -Legal obligations. -Bureaucratic transparency. -Mutual respect and fairness.

2.4.4 Social Capital

Social capital is a crucial part in collaboration and cooperation efforts, but it is also an important element among group members. There are various definitions, referring to horizontal

¹⁶ The barriers are of such kind that they are applicable on cooperation as well.

¹⁷ Norman and Bakker refer to barriers and drivers. Hence, the third column shows some of their identified drivers.

relationships within families and communities, or vertical relationships between communities and institutions (Grant 2001). Putnam (1995) defines social capital as the “features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit” (p. 67). This definition, Brondizio et al. (2009) argue, resembles the conceptualization of institutions and institutional arrangements. Indeed, in their study on the role of social capital in governance of multi-level social-ecological systems they argue that “institutions facilitating cross-level environmental governance become an important form of social capital” (p. 253). They perceive social capital as “the value of trust generated by social networks to facilitate individual and group cooperation on shared interests and the organization of social institutions at different scales” (ibid., p. 255), including the levels of the individual, communities, and the overall society (ibid.). Building on the literature, the term social capital is used in this thesis to refer to levels of trust, common rules, norms, and networking among individuals and/or groups. Social capital is studied in the governance assessment of PANP (section 5.2), and in the interagency cooperation between PANP and SE (section 4.4).

The kind of connection within and between different groups and networks relate to the notion of bonding, bridging and linking social capital (Brondizio et al. 2009). Bonding social capital refers to social cohesion within a social group (Grant 2001), including trust and reciprocity (Casey 2009); bridging social capital links different social groups, or links social groups with government (Narayan 1999); and linking social capital “describes the ability of groups to engage with external agencies, either to influence their policies or to draw on useful resources” (Pretty 2003, p. 1913).

Social capital exists at the group level and accumulates and develops over time, requiring frequent interaction to reach a high level (Thomas 2003). Investing in social relationships and time is crucial to create the networks (i.e. horizontal or vertical) and build trust (Folke et al. 2005; Johnston et al. 2006). Trust enhances the ability for people to work together and it also contributes to creating a sense of community (Folke et al. 2005). In addition, Johnston et al. (2008) argue that high levels of social capital “may facilitate improved access to information, collective actions and responses and access to resources that an individual or organization would not otherwise have access to” (p. 179). It has also been argued that social capital contributes to a community’s ability to adapt to change and could hence be seen as an indicator of adaptive capacity (Williamson et al. 2007). However, social capital “improves with proper use and

deteriorates rapidly with disuse” (Brondizio et al. 2009, p. 262). It is therefore important to maintain and sustain the levels of trust and reciprocity to keep the necessary level of social capital (ibid.). When participants stick to their commitments and the level of trust and reciprocity is maintained, social capital can increase in value the more it is used. At the contrary, with changes within the group, such as new people entering, the level of trust may decrease if established ways of interaction are not transferred to the newcomers (e.g. through job training or initiation). The cost of starting all over again and/or to lose joint gains is hence at risk (ibid.). Similarly, Bergmann and Bliss (2004) in their study on cross-boundary cooperation note that short-term land managers are a problem. They state: “Not only do short-term managers lack accountability for the long-term impacts of their management choices, they have limited opportunity to develop long-term relationships with the local community” (p. 385). Thus, they mean that “the rapid turnover of agency employees limits the accumulation of social capital that might accrue to long-term relationships” (ibid., p. 385).

2.5 Adaptive Governance

Adaptive governance has emerged as a response to failures in conventional modes of governing social-ecological relations (Leach et al. 2007) and is part of the new governance approaches (see section 2.4.1). The Stockholm Resilience Centre¹⁸ (2007) defines adaptive governance as “an evolving research framework for analyzing the social, institutional, economical and ecological foundations of multilevel governance modes that are successful in building resilience for the vast challenges posed by global change, and coupled complex adaptive SES [social-ecological systems]” (n.p.). In other words research in adaptive governance can help to “better understand the social dimension of ecosystem management; the interactions between individuals, organizations, and institutions at multiple levels; the factors for responding to crisis, shaping change and building resilience” (ibid., n.p.). Compared to other approaches that are flexible and holistic with stakeholder participation and integrated planning (e.g. adaptive management, adaptive co-management, ecosystem management), adaptive governance is to a greater extent looking at the dynamics of social-ecological systems. For example, adaptive governance includes the aspects of “being able to deal with both uncertainty and abrupt change; enhance learning of complex SES; promote experimentation and innovation; and supporting

¹⁸ The Stockholm Resilience Centre conducts research on adaptive governance with Per Olsson and Victor Galaz as part of the research team. Carl Folke and Thomas Hahn are examples of other researchers at the Centre.

cross-scale institutional linkages” (Stockholm Resilience Centre, n.p.). The experimental and learning part is also emphasized by Leach et al. (2007), stating that “adaptive governance is essentially experimental in nature, seeking to build capabilities based on past experiences and a commitment to social learning” (p. 26). Thus, adaptive management is an important part of adaptive governance (Gunderson & Light 2006) (see section 2.3). Indeed, the Resilience Alliance (2006) describes adaptive governance as expanding the focus from adaptive management of ecosystems “to address the broader social contexts that enable ecosystem-based management” (n.p.). Another essential part of adaptive governance is the acceptance that uncertainty will always exist in social-ecological systems (Leach et al. 2007), and that it is not about entirely avoiding crises but to be better prepared next time a crisis will happen (Gunderson & Light 2006). Rapid change and disturbance could be accepted on an early stage instead of risking a large-scale collapse (Folke et al. 2005).

Other essential aspects of adaptive governance are that “adaptive governance systems often self-organize as social networks with teams and actor groups that draw on various knowledge systems and experiences for the development of a common understanding and policies”, and that key persons - providing leadership, trust, vision, and meaning - help the management organizations transform toward a learning environment (Folke et al. 2005, p. 441). However, as Folke et al. (2005) argue, linking “a broad range of actors at multiple scales to deal with the interrelated dynamics of resources and ecosystems, management systems and social systems, as well as uncertainty, unpredictability, and surprise” is challenging (p. 462). In this situation social relations and social networks (i.e. social capital) “serve as the web that tie together the adaptive governance system” (ibid., p. 463). To summarize, Folke et al. (2005) suggest four interacting aspects of importance in adaptive governance of complex social-ecological systems. These are:

- to build knowledge and understanding of resource and ecosystem dynamics to be able to respond to environmental feedback in a way that enhance resilience;
- to feed ecological knowledge into adaptive management practices to create conditions for learning;
- to support flexible institutions and multi-level governance systems that allow for adaptive management;

- to deal with external perturbations, uncertainty and surprise, which includes enhancing the adaptive capacity for dealing with changes (pp. 463-464; Galaz et al. 2008, p. 169).

However, some limitations with the adaptive governance approach have been identified in the literature. One concern is that the network-based characteristics with many actors involved slow down the problem-solving capacity, something that is problematic when a quick response is needed (Galaz et al. 2008). Other problems have been identified by Leach et al. (2007). They argue: “Consensus knowledge production, voluntaristic strategic action, and a shared mission that scientists advocating adaptive governance see as essential for effective social-ecological management” is difficult when actors with different interests are involved (ibid., p. 26). This may result in upholding the “dominant ‘expert’ views and supporting those in power, marginalising the perspectives and priorities of the poor” (ibid., p. 27).

2.6 Principles and Criteria of Adaptive Governance for Fire Management Planning

Part of this study is to develop an operational definition of adaptive governance (Objective 1). The literature review has guided me to the following definition:

Adaptive governance refers to governance arrangements that are effective and adaptive to changing environmental, economic, and social conditions, as well as to uncertainty and surprise. It requires: collective action across scales; a flexible governance structure; and continuous learning.

As the literature review shows, adaptive governance includes characteristics from both adaptive management and good governance. Elements from both themes have contributed to the principles, criteria and indicators of adaptive governance I have identified for fire management planning. Thus, adaptive governance as used in this study assumes that good governance is in place. The principles and characteristics of good governance as presented by Lockwood (2010), Graham et al. (2003), and UNDP (1997) (see Appendix A) have been influential, as have the characteristics of adaptive management presented by Noble (2010), Holling et al. (1998), and McLain and Lee (1996). Other influential literature was Folke et al. (2005) on adaptive governance, and wildfire related literature (e.g. Born et al. 2007; Kulig et al. 2008). Wildfire literature has especially been important in shaping the principles, criteria and indicators to fit fire

management planning. A schematic overview of the principles and criteria of adaptive governance for fire management planning that I have established to guide my research, together with the contributing elements from good governance, adaptive management, adaptive governance, and wildfire related literature, is presented in Figure 2.2. For a more detailed description of the principles and criteria of adaptive governance for fire management planning, together with the specific principles or characteristics that influenced each criterion, see Appendix B. Moreover, the identified indicators of adaptive governance for fire management planning, together with the principles and criteria, are presented in Appendix C.

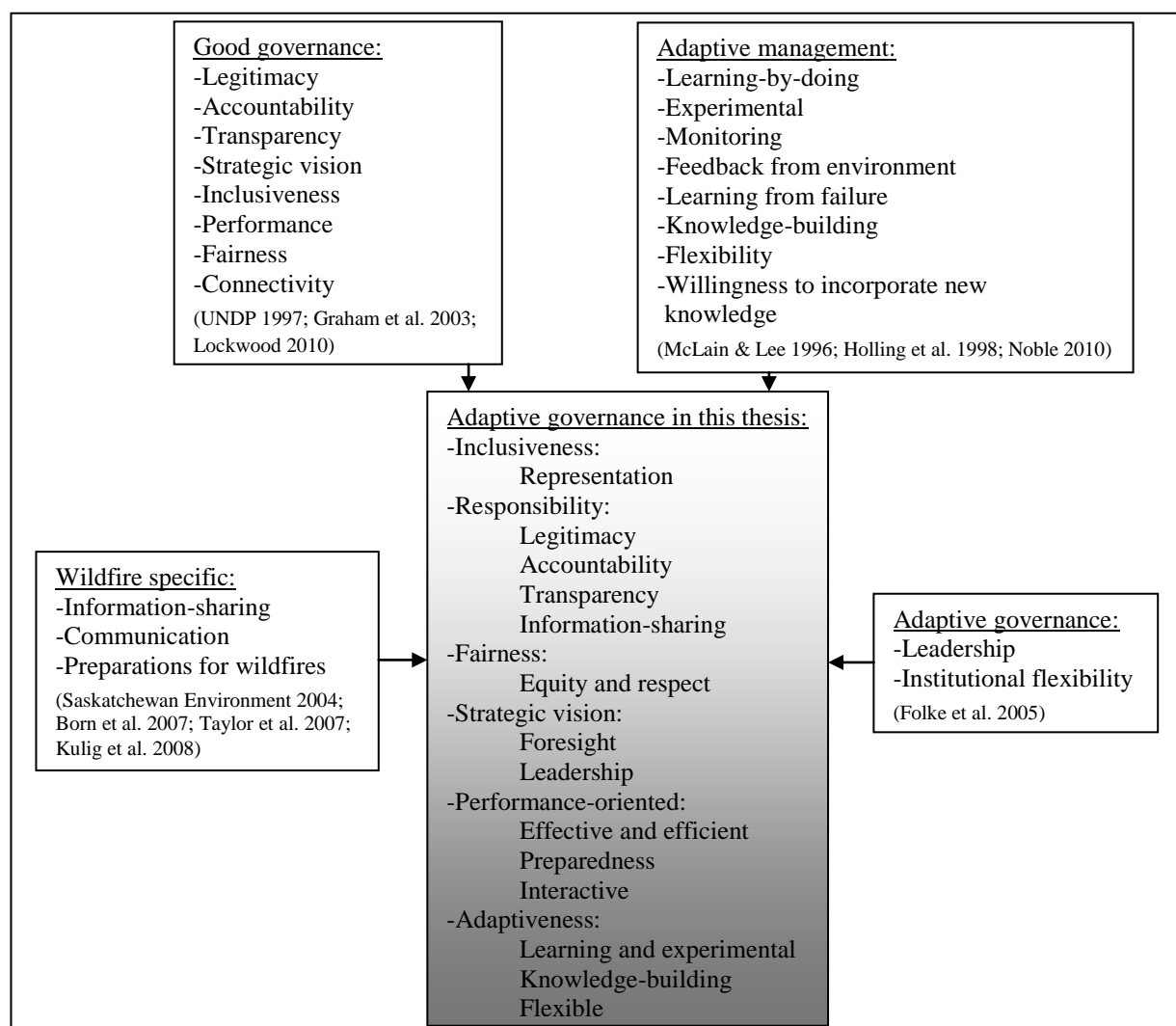


Figure 2.2. Principles and criteria of adaptive governance for fire management planning, together with the influential principles and characteristics of good governance, adaptive management, adaptive governance, and wildfire specific elements.

2.7 Research Gaps

As the literature review indicates, adaptive governance is an established research area that has increased during the past years with the increasing interest in the complexity of social-ecological systems, and the need to develop new governance structures that better can deal with uncertainty and changing conditions, such as climate change (e.g. Folke et al. 2005; Bellamy 2007). However, there are no studies that I am aware of where adaptive governance has been applied on fire management planning, or even fire management in general. Also, there is little, if any, literature that has developed principles and criteria of adaptive governance. A related topic with developed principles is adaptive policy-making (e.g. IISD & TERI 2006), but it does not include all aspects of governance but rather focus on policies. Also, the framework for governance assessment from a protected area perspective developed by Lockwood (2010) includes some of the principles and indicators (what he calls performance outcomes) that characterize adaptive governance, such as the establishment of a flexible governance structure and the use of adaptive planning and management, both discussed under his principle 'resilience'. Lockwood, however, does not explicitly refer to adaptive governance, and his framework is not applied to fire management. Nevertheless, his framework can be usefully adapted and applied to fire management. Next, there are studies on cooperation across jurisdictions in a context of wildfire management (e.g. Stapp 2003), but not in a context of adaptive governance. There are also various studies on wildfire management and adaptation to climate change (e.g. Wheaton 2001; de Groot et al. 2002), as well as the impact of climate change on protected areas (e.g. Suffling & Scott 2002; Scott & Lemieux 2005), but, again, none of them include adaptive governance. Hence, this study attempts to fill these gaps and bring all these aspects together into a framework - consisting of principles, criteria and indicators of adaptive governance - for assessment of the governance structure of fire management planning, including the aspects of climate change and interagency cooperation.

CHAPTER 3: STUDY AREA AND METHODOLOGY

3.1 Introduction

The case study used in this study, Prince Albert National Park (PANP) was selected for three main reasons. First, PANP is subject to wildfires which are predicted to be more frequent and intense in the future due to climate change (see section 3.3). Second, being under federal jurisdiction and located next to provincial land provides interesting governance issues to study in terms of interagency cooperation. Third, PANP's status as a national park, with the purpose to both protect the ecological integrity and to be used by the public for recreational and educational purposes, makes it an area that many people have an interest in and is something that has to be considered in the governance of the Park. Altogether, this makes PANP an interesting case to study from an adaptive governance perspective.

This chapter includes a description of the study area, followed by the predicted effects a changing climate will have on PANP. The chapter ends with the methodology used for this study.

3.2 Study Area

Prince Albert National Park (PANP), Saskatchewan (Figure 3.1) was established in 1927, but officially opened in August 1928 (Waskesiu Community Council n.d.a). The Park is 3,875 square kilometres in size (Parks Canada 2008a) and represents the Southern Boreal Plains and Plateaux natural region (Parks Canada 2005c). PANP is in a transition zone between the grasslands in the south and the boreal forest in the north (Hui et al. 2000). Mixed-wood forests are the dominating forest type, including aspen (*Populus tremuloides* Michx.), jack pine (*Pinus banksiana* Lamb.), black spruce (*Picea mariana* (Mill.) B.S.P.), white spruce (*Picea glauca* (Moench) Voss), balsam poplar (*Populus balsamifera* L.), white birch (*Betula papyrifera* Marsh.), and tamarack (*Larix laricina* (Du Roi) K. Koch) (Weir et al. 2000; Parks Canada 2005c). In the southern part are pockets of aspen parkland and fescue grasslands. In the Park is also a network of lakes and rivers; approximately 10 percent of the Park is covered by water. PANP also plays an important part in protecting wildlife. Of national significance are, for

example, a small herd of Woodland caribou (*Rangifer tarandus caribou*), free roaming plains bison (*Bison bison bison*) in the southwestern part of the Park, and the American white pelican (*Pelecanus erythrorhynchos*) which is one of the largest colonies in Canada. There are also moose (*Alces alces*), elk (*Cervus elaphus*) and white-tailed deer (*Odocoileus virginianus*), and predators such as black bears (*Ursus americanus*), wolves (*Canis lupus*) and cougars (*Felis concolor*) (Parks Canada 2005c).

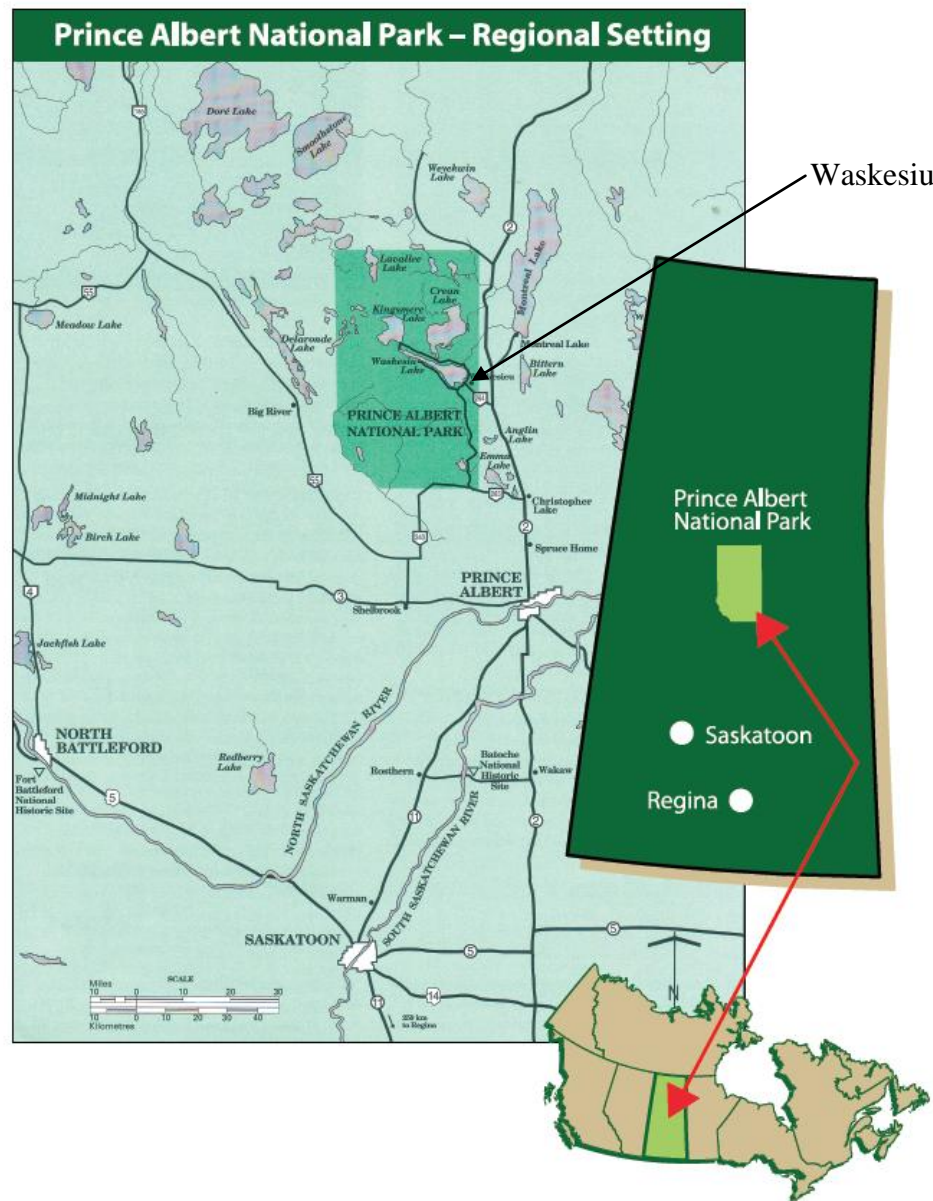


Figure 3.1. The location of Prince Albert National Park, Saskatchewan (Parks Canada 2008a, p. 12).

Surrounding PANP are a number of small communities, resort villages, First Nation reserves, Métis communities, private agricultural lands, provincial forest and grazing lands, and forest harvesting leases (Parks Canada 2008a). Within the Park, the townsite of Waskesiu¹⁹ is an important resort village with most services available (e.g. restaurants, accommodation, gas station, convenience store). Together with the rest of the Park, Waskesiu offers a variety of recreational opportunities. PANP is one of the most important tourist destinations in Saskatchewan and plays an important role in the tourism industry of central Saskatchewan (Parks Canada 2005c).

The townsite of Waskesiu has about 2500 residents in summer time (excluding campers), and fewer than 100 residents in winter time²⁰ (Waskesiu Community Council n.d.b). Waskesiu is under federal jurisdiction and follows federal laws and regulations. The voice of the community is the Waskesiu Community Association who through their elected council, the Waskesiu Community Council, represents the cabin owners, cottage owners, permanent residents and business owners (Waskesiu Community Council 2009; 1, WCC). The Council also serves as the advisory council to Parks Canada on issues concerning the community (1, WCC). Through a Memorandum of Understanding between Parks Canada and the Council, agreed upon in 1997 but not signed until 2002, Parks Canada devolved some of its management authority to the local level in return for increased financial participation by the community. However, this quasi-municipal structure does not give the community taxation or levying authority (Waskesiu Community Council n.d.c).

3.3 Predicted Effects of a Changing Climate

It is predicted that forest fires and insect infestations will increase in frequency and intensity in PANP due to climate change (Sauchyn et al. 2009). In more detail, climate change scenarios for PANP indicate increased temperatures (3 to 8°C in winter and 1 to 4°C in summer) which may increase evaporation rates, lower soil moisture levels, and more drought stress. There are also indications that the boreal forest will shift northwards, and be displaced by more drought resistant southern forest species and grasslands (Hui et al. 2000). Since the Park is responsible

¹⁹ Waskesiu is formally classified by Parks Canada as a visitor centre, with the formal name *the visitor centre of Waskesiu in Prince Albert National Park of Canada* (Government of Canada 2000).

²⁰ Living all-year-round in PANP requires a need-to-reside, which is given to a person operating a business or being employed in Waskesiu (1, WCC).

for protecting the ecosystem that represents the natural region, such major changes would mean that the Park cannot live up to the mandate in the long run (Scott & Lemieux 2005). Scott and Lemieux (2005) also stress that the reintroduction of natural fire regimes in PANP “would hasten the transition to grassland communities and therefore be ostensible in conflict with the current park purpose” (p. 699). However, this last remark is somewhat in conflict with other management objectives; simulations have showed that prescribed burning is an important component of future fire management in the Park from a fire cycle perspective. Without prescribed fire the fire cycle would be too long to maintain current stands of tree (i.e. aspen, jack pine, white birch), which requires a 75-year fire cycle (de Groot et al. 2002).²¹

3.4 Research Methods

The study was carried out using a qualitative research approach based mainly on data collected through interviews and document analysis. A significant part of the study was also to develop principles, criteria and indicators of adaptive governance for fire management planning which served as the framework for assessing the extent to which planning for fire is consistent with the features of adaptive governance (Objective 3). The use of principles and criteria in a context of good governance was briefly discussed in section 2.4.1.

3.4.1 Development of Principles, Criteria and Indicators

Using principles, criteria and indicators to evaluate the quality of a governance structure, for example as in this case from an adaptive governance perspective, makes it possible to identify strengths and weaknesses of the governance structure. Indeed, Graham et al. (2003) describe the use of principles and criteria as useful when “assessing the gap between the current and desired state of governance” and “in analyzing options, developing strategies and setting priorities” (p. 27). Moreover, Lockwood et al. (2009a) refer to governance principles as “normative statements that make claims about how governing or steering should happen and in what direction – that is, how governance actors should exercise their powers in meeting their objectives” (pp. 2-3). Hence, they serve as a kind of normative guidance. Innes et al. (2004) describe principles as “fundamental rules for action”, criteria as “desired conditions resulting

²¹ The fire cycle of PANP has increased from 75 years to 645 years since 1945 due to fire suppression, the fragmentation of forests on neighbouring agricultural lands, and climate change (Weir & Pidwerbeski 2000).

from adherence to principles”; and indicators are “quantitative or qualitative parameters of a criterion” (p. 7).

The original set of principles, criteria and indicators of adaptive governance was identified through the review of literature. However, as new information and insights appeared throughout the study, especially after the interviews, these principles, criteria and indicators were modified and updated to better suit fire management planning. For example, after the interviews it was clear that some aspects in the initial list of criteria and indicators did not pertain to fire management and were hence removed or modified. Also, collected data showed that some aspects deserved more weight than anticipated, for example the importance of communication. Another source of information that led to a revision of the original principles, criteria and indicators was peer reviewed articles that was either published or uncovered after the development of the original principles, criteria and indicators (e.g. Lockwood 2010). Section 2.6 describes in more detail which literature contributed to the final version of principles, criteria and indicators of adaptive governance for fire management planning.

A drawback with this method is that some phenomenon and processes are difficult to measure. For example, whether management goals have been met requires clearly defined and measurable goals and it does not assess how appropriate the goals are in the first place (Conley & Moote 2003). Measuring capacity is another difficulty. The subjective nature of data from interviews also makes precise assessment difficult.

3.4.2 Data collection

3.4.2.1 Interviews

The study used semi-structured one-on-one interviews as the main data collection method, with a combination of open-ended and closed questions. In semi-structured interviews, questions are decided in advance, but the sequential order is not fixed. The conversation flows more naturally and might go in unexpected direction leading to new knowledge (Denzin & Lincoln 2000). Open-ended questions lead to open answers, that is, the interviewee determines what information to give. The questions are often merely specifying the general topic. Closed questions, on the contrary, are narrow in focus and lead to restricted answers (Stewart & Cash 2008). They are useful when factual answers are wanted and where restricted responses are

necessary to save time in coding and analysis. Yes/no questions are examples of closed questions (Millar et al. 1992).

In total, fifteen interviews were conducted: six face-to-face interviews in PANP with Park staff, five face-to-face interviews at the Provincial Forest Fire Centre in Prince Albert with SE staff, three phone interviews (two representatives at the national level of Parks Canada, one representative from SE), and one face-to-face interview at the University of Saskatchewan with one representative from the Waskesiu Community Council. The interviewees from Parks Canada were identified using a key informant who guided me further by suggesting additional interviewees (i.e. the snowball technique). One interviewee from PANP suggested a first contact from SE, and that contact provided me with a list of people to interview within SE. Another interviewee from PANP suggested names to contact within the Council. However, since the Council has a limited role in the study I considered one interview sufficient. All the interviewees were knowledgeable and had experience in a specific field and in this way I covered a broad spectrum of knowledge. An invitation letter was sent out by mail to all prospective participants before the interviews. It contained an introduction to the study, a summary of the research context, and a consent form for to sign if they agreed to participate. The consent form explained their right to withdraw and that I would protect their anonymity and aggregate all data obtained from the interviews. Most participants handed over the signed copy at the time of the interview, and a few sent by mail or scanned a signed copy and sent by e-mail. The length of the interviews ranged from 45 to 90 minutes, and they were all audio recorded, with the consent of the interviewee. All interviewees were offered to review the transcript after completion to eliminate the risk of misunderstandings and of ethical reasons, but no one accepted the offer. The interviewees were also given the opportunity to read through the final draft of this thesis to see if the information they had contributed with was correctly cited.

There were two main sets of questions. The first part included background questions, and questions related to the governance structure and interagency cooperation. Most of these were open-ended questions. The second part included questions linked to the identified principles, criteria and indicators of adaptive governance, with many of them being yes/no questions. The specific questions can be found in Appendix E. The questions were modified for some interviewees to reflect their specific knowledge in certain areas. Also, the interviews yielded more extensive data for some criteria than for others. This is noticeable in section 5.2 with some

parts being less extensive than others. Moreover, not all criteria were covered in the interviews due to the revision described in section 3.4.1. Thus, follow-up questions were sent out to Parks Canada. Unfortunately, this coincided with the beginning of the fire season (i.e. a busy period for fire staff) with the result that only one person answered the questions, and could only partially compensate for the missing data for the particular criterion. However, some of the missing information was found in Parks Canada documents (e.g. on legitimacy).

3.4.2.2 Document Analysis

Document analysis refers to exploring written documents for content and/or themes as a primary source of data (O'Leary 2004). The document analysis in this study was carried out in two steps: before the interviews and after the interviews. The first step included a limited number of documents that could be found on the Internet. For example, it appeared that fire management plans for Parks Canada were not available. A few PANP-specific documents were found such as the *Prince Albert National Park of Canada: Management Plan* (2008) and the *State of the Park Report: An Assessment of Ecological Integrity* (2005). These were reviewed together with documents that provided a background to Canadian fire management (e.g. Born et al. 2007) and wildfire management in Saskatchewan (i.e. *Saskatchewan's Wildfire Management Strategies*, 2004). However, the most significant documents for this study were received at the time of the interviews, either as paper copies or sent as documents by e-mail. Hence, the main document analysis was carried out after the interviews. The core documents - *Prince Albert National Park Fire Management Plan* (2000), *National Fire Management Strategy - Parks Canada Agency* (2005), *Management Directive #2.4.4* (2005), *National Fire Management Plan* (2007) – provided valuable insight into fire management within Parks Canada in general and for PANP in particular. For example, these documents present goals and objectives, laws and regulations, and fire management strategies. Also, *Parks Canada Agency Act* (1998) and *Canada National Parks Act* (2000) were reviewed to understand the legal foundation for Canadian national parks. Another significant document was the *Saskatchewan/Parks Canada Fire Cooperation Agreement* (2002) which explains the content in the border agreement between PANP and SE. Moreover, the document analysis also served to corroborate what was said in the interviews with Parks Canada staff in regards to, for example, resource sharing, roles and responsibilities, agreements, and communications. Hence, the document analysis and the interviews together resulted in triangulation. Triangulation refers to the use of more than one set of data to confirm

the authenticity of each source, which gives more convincing and accurate conclusions than if only one data source is used (Conley & Moote 2003; Yin 2003).

3.4.3 Data Analysis

The collected data from interviews and the document analysis were analyzed to identify common themes that pertained to the objectives of this study. Before the analysis of the interview data could start the recorded interviews were transcribed into Word-documents. Next, the interview data were analyzed using the qualitative data analysis software program *ATLAS.ti*, which is a tool for dealing with large amounts of text, making interpretation of text easier. It helps the researcher to arrange and manage data, while the actual interpretation is done by the researcher (Muhr 1991). *ATLAS.ti* facilitates many of the basic activities of text interpretation: selection of relevant documents; viewing, reading and comparing of documents; coding selected text under certain categories; annotating findings in primary documents; and the creation of secondary texts (i.e. the outcome of interpretation of text) (ibid.). It appeared to be a suitable tool to organize the vast amount of data that had been acquired. The main use of *ATLAS.ti* was coding the text into themes that emerged from the interview data (e.g. themes pertaining to the principles, criteria and indicators of adaptive governance) that could then be analyzed. Last, the results of the data analysis of interview data were combined with the observations derived from the document analysis. The merged findings are presented in the following chapters.

CHAPTER 4: ORGANIZATIONAL STRUCTURE AND INTERAGENCY COOPERATION

4.1 Introduction

In this chapter the findings that pertain to the governance structure of fire management planning in PANP (Objective 2) and the interagency cooperation between PANP and SE (Objective 4) are presented. With PANP being part of Parks Canada's network of national parks it implies that they need to follow the policies and strategies set at the national level of Parks Canada. Hence, both aspects of the national governance structure, and more specifically the governance structure of PANP, are included in this chapter. Also, a brief description of the provincial wildfire management is presented to provide a background for the last section of this chapter, which discusses the interagency cooperation between PANP and SE. In this last section the identified challenges in the cooperation, together with the suggestions on how to address them, are presented.

4.2 Parks Canada Fire Management

4.2.1 Legislation and Mandate

Parks Canada became a separate Government of Canada Agency in 1998 and then formally changed name to Parks Canada Agency (Parks Canada 2010). The main legislation pertinent to national parks include the *Parks Canada Agency Act* (1998), the *Canada National Parks Act* (2000), *Canadian Environmental Assessment Act* (1992), and the *Species at Risk Act* (2002) (Parks Canada 2008a). The overall mandate of Parks Canada is as follows:

On behalf of the people of Canada, we protect and present nationally significant examples of Canada's natural and cultural heritage, and foster public understanding, appreciation and enjoyment in ways that ensure the ecological and commemorative integrity of these places for present and future generations (Parks Canada 2010, p. b).

As indicated above, protecting the ecological integrity²² is the main priority in the management of parks and is stated in the *Canada National Parks Act*, 8(2) as follows: “Maintenance or restoration of ecological integrity, through the protection of natural resources and natural processes, shall be the first priority of the Minister when considering all aspects of the management of parks” (Government of Canada 2000, p. 4). As part of maintaining and restoring the ecological integrity Parks Canada therefore both manage wildfires and reintroduce fire to the landscape, for example through prescribed burning (Parks Canada 2008b).

The responsibility for Parks Canada rests with the Minister of the Environment. The Parks Canada’s Chief Executive Officer (CEO) has the control and management of the Agency (Government of Canada 1998) and reports directly to the Minister (Parks Canada 2010).

4.2.2 Fire Management

In the 1980s the fire management strategies within Parks Canada changed significantly from being advocates of a full suppression strategy to adopting management practices that restore the ecological role of fire and enhance the ecological integrity (Weir & Pidwerbeski, 2000; Parks Canada, 2005a). This change in fire management direction was approved in *Keepers of the Flame* in 1989, which can be seen as the “first strong strategic document” for fire management within Parks Canada (2, PCA). Since then, the strategy has been revised due to the need to incorporate factors such as increased incidence of wildfires, increased use of prescribed fire, and fuel management²³ needs (Parks Canada 2005b). Today Parks Canada “uses a more holistic approach to ensure resource protection and preservation and recognizes the functional role forest fires play in the Park ecosystem” (Weir & Pidwerbeski, 2000, p. 2). Their vision, as stated in the National Fire Management Strategy from 2005, is as follows:

The Agency will move from a reactive to a pro-active fire management program. The program will be nationally cohesive and fully integrated with the other functions of the Agency. It is based on clear accountabilities and sound business planning principles. It will have a landscape focus and engage Canadians in its development and delivery (Parks Canada 2005b, pp. 4-5).

²² In *Canada National Parks Act*, 2(1) ecological integrity is defined as “a condition that is determined to be characteristic of its natural region and likely to persist, including abiotic components and the composition and abundance of native species and biological communities, rates of change and supporting processes” (Government of Canada 2000, p. 1).

²³ Fuel management is an “alternative to prescribed fire to achieve hazard reduction objectives” (Parks Canada 2007, p. 13). Examples of fuel management are fuel thinning and fireguard construction (Parks Canada 2005a).

Another component of the fire program is adaptive management: “The fire management program will be managed in an adaptive way by acting, monitoring and responding to changes in technical, ecological, economic, and socio-political management indicators” (Parks Canada 2005b, p. 9).

Parks Canada’s national fire management program is a decentralized program “that integrates expertise, personnel and services from National Office, Service Centres and Field Units” (Parks Canada 2005a, p. 7). The program is directed by the National Fire Management Committee that is responsible for the strategic coordination of the program (Parks Canada 2005a). Its overall goals are “to reduce wildfire risk and approximate the ecological effects of the long-term historical fire regime characteristic of each park/site thereby contributing to the maintenance and restoration of ecological integrity” (Parks Canada 2007, p. 1). The *National Fire Management Plan* (NFMP) “governs the operation” of the program (Parks Canada 2005b, p. 7). The NFMP “guides the collective planning, implementation, monitoring, review and reporting of fire management actions in Parks Canada Agency at the national level on a three-year cycle” (Parks Canada 2007, p. iv). The NFMP is guided by the *National Fire Management Strategy - Parks Canada Agency* which gives the vision, principles and strategic direction for fire management within Parks Canada (ibid.). The guiding principles and the strategic direction for the fire management program are presented in Appendix D. Another significant element of the program is the *Management Directive 2.4.4* which provides “direction on the control and the use of vegetation fire in Canada’s national parks and national historic sites” (Parks Canada 2005a, p. 1).

Fire management, according to Parks Canada, refers to the “activities associated with the protection of people, property, and landscapes from fire, as well as the use of prescribed fire to achieve land management objectives” (Parks Canada, 2005b, p. 4). Basically, the first part refers to wildfires (i.e. fire control) and the second part to fire use (i.e. active fire management) (Weir & Pidwerbeski 2000). Every national park must have a *fire management plan*, which is a strategic document that includes information “on the organization, policies, and planned responses relative to prescribed fires and wildfires for a specific area” (Parks Canada, 2005b, p. 4). Basically it directs the control and use of fire to achieve specific objectives (ibid.). The Directive gives the direction for the fire management plans. When the fire management plan is approved a more detailed prescribed fire plan and fuel management plan are developed (ibid.).

Moreover, the fire management plan needs to be consistent with the direction of other plans specific for the park, such as the Park Management Plan and Community Plans (Parks Canada 2005a), and is also subject to an environmental assessment according to the Canadian Environmental Assessment Act (1, PCA; 2, PCA). The Superintendent is accountable for the development of the fire management plan, including consultation with communities and neighbouring jurisdictions. He/she is also accountable for developing, reviewing, and approving prescribed fire plans and fuel management plans (Parks Canada 2005b). The Superintendent is accountable directly to the CEO (2, PANP).

Parks Canada acknowledges the need to involve affected agencies and other stakeholders in the planning process and effectively communicate the strategies to make sure all stakeholders understand the objectives (Weir & Pidwerbeski 2000). Hence, the fire management plan is developed in consultation with stakeholders in communities, neighbouring jurisdictions, and fire management specialists. There is also public consultation. The prescribed fire plan and fuel management plan are also subject to consultation (Parks Canada 2005a). Moreover, all fire plans should also include a communication component that shows how the public was involved in the development of the plans (ibid.). When a plan is developed, it is subject to review by the Western or Eastern Service Centre and other fire personnel across the fire program. They give feedback and after all the amendments in the plan are done it is sent back for review before the Superintendent approves it. This procedure is a way to make sure each plan follows the national guidelines (2, PANP).

Cooperation with other agencies and stakeholders is recognized by Parks Canada as important to reach their management goals. For example, the *Parks Canada Guiding Principles and Operational Policies* states that to maintain the ecological integrity “will require cooperation with individuals and other government agencies in ecosystem management beyond park boundaries, recognizing that there are legitimate but often different objectives for surrounding regions” (Parks Canada 1994, n.p.). This is coherent with the guidelines for fire management. For example, the Directive states:

National parks/sites must integrate their fire management with that of the surrounding lands. Landscape management often involves intervention over an area larger than the parks themselves. Accordingly, agreements between the Parks Canada Agency and the jurisdiction(s) overseeing neighbouring lands should be developed (Parks Canada 2005a, p. 16).

Also at the national level Parks Canada is acknowledging the need for cooperation with other fire agencies and has as one of their guiding principles (nr 11): “Fire management is integrated with other Canadian Fire Management Agencies” (Parks Canada 2005b, p. 5). This includes training, planning, science and fire management implementation initiatives (ibid.). Being a member of CIFFC is one example of such cooperation initiative (see section 2.2.2).

In terms of stakeholder and public involvement, Parks Canada’s national fire management program is striving to move beyond stakeholder consultation to involve partners in shaping the vision and management for parks (Parks Canada 2007). This is in line with Parks Canada’s goal to actively involve Canadians as partners in management of national parks and historic sites, and to craft a shared vision (Parks Canada 2008a). Another important aspect is public education which is seen as an important action to increase the public understanding of the role fire plays in ecosystem regeneration (Parks Canada 2008b). Public education also serves to make the public aware of the fire danger and to “implement preventative measures aiming to reduce the likelihood of accidental fires” (Parks Canada 2005a, p. 12).

4.2.3 Prince Albert National Park

4.2.3.1 Fire Management

Parks Canada is responsible for the fire management in PANP which is carried out in accordance with the regulations and guidelines of Parks Canada’s national fire management program (see section 4.2.2). As earlier indicated, fire management is not a separate unit, but is linked to the overall management of the Park. This is illustrated in the overall goal of fire management in PANP: “To safely manage fire in Prince Albert National Park in order that the landscape composition, structure, and processes that are representative of the Southern Boreal Plains and Plateaux natural region are maintained or restored” (Weir & Pidwerbeski 2000, p. 3). The *Prince Albert National Park Fire Management Plan* is from 2000 and includes both the aspect of protecting values at risk and the aspect of allowing fire to burn (ibid.). The PANP fire management strategy is to “allow *random ignition fires*²⁴ to burn in the majority of the Park, provide a means of limiting the spread of these fires to Park lands, and strive to protect Park and Provincial values from wildfires that originate in the Park and escape control” (ibid., p. 4).

²⁴ A random ignition fire is “a lightning or accidentally man caused fire that ignites at a random time and location” (Weir & Pidwerbeski 2000, p. 4).

Moreover, adaptive management has been implemented both in terms of the overall management of the Park and in fire management. According to the *Prince Albert National Park of Canada Management Plan*, adaptive management is defined as “Learning while doing” (Parks Canada 2008a, p. 66). This means that “results of the carefully thought out actions are monitored and compared to the predicted outcome. Future actions are adjusted accordingly” (ibid., p. 66).

PANP is divided into two fire management units: a containment unit and a fire suppression unit (Figure 4.1).

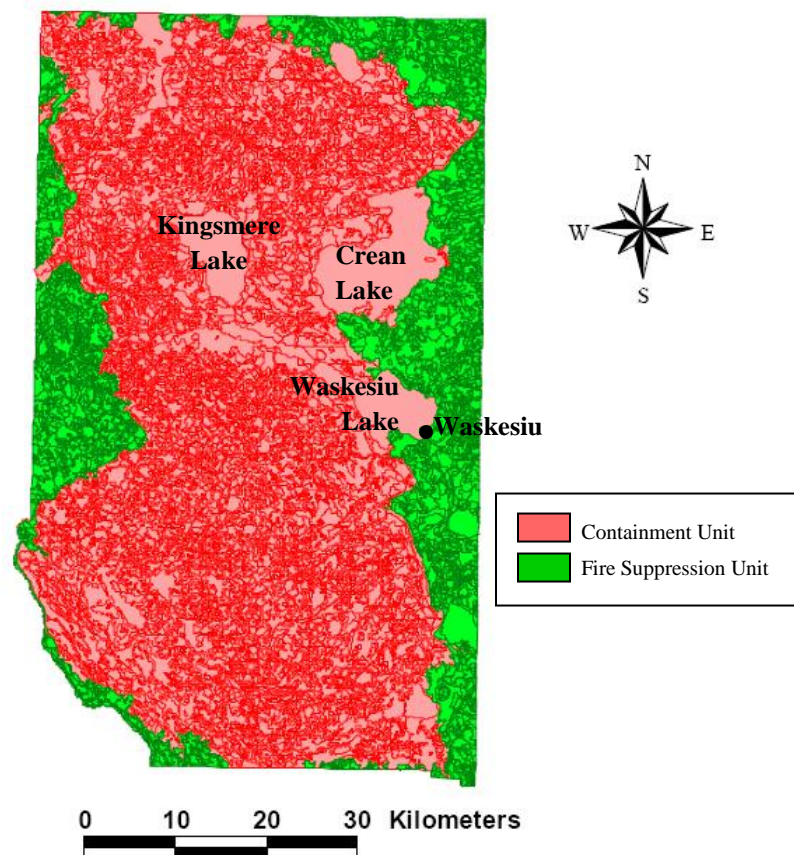


Figure 4.1. Fire management units in PANP (modified from de Groot et al. 2002, p. 30).

The fire suppression unit is in the peripheral part of the Park adjacent to provincial land and forestry land. It includes the majority of the cultural values and older forest (Weir & Pidwerbeski 2000). The goal is to extinguish and control the fire as quickly as possible. Prescribed burning may be carried out in this unit to reduce fire hazard near values at risk, or to achieve other specific management objectives. The containment unit is in the central part of the Park. In this area there are fewer values at risk and the goal is to allow wildfires to burn with minimal

interference (Weir & Pidwerbeski 2000). To avoid fires escaping into the fire suppression unit, a continuous fuel break²⁵ will be created along the perimeter. Parts of the fuel break are landscape features (e.g. lakes, rivers, roads) working as fire barriers, areas of young forest, and forest cover types that are less susceptible to fire. In other parts, prescribed burning is needed to create areas of young forest (ibid.). According to one interviewee from PANP, there has been strategic burning to create the fuel break (2, PANP), but it is not yet completed.

4.2.3.2 Governance Structure

The governance structure of PANP fire management planning includes two parts: the actors (i.e. agencies, organizations and stakeholders) that are part of the planning process, and the rule system under which the actors operate.²⁶ An overview of the governance structure is presented in Figure 4.2.

As already illustrated in the previous sections, PANP is part of Parks Canada Agency and its national fire management program. Accountable for fire management in the Park is the Superintendent and he has delegated the responsibility for fire management to the Resource Conservation section (2, PCA). However, since fire can cross borders stakeholders, neighbouring jurisdictions, and local residents have to be included in the planning process. SE is PANP's main partner and stakeholder. However, neither agency is formally part of the other agency's planning process other than through consultation and information-sharing (4, SE). Other stakeholders²⁷ involved in planning, mostly through consultation, include the forest management license holders (i.e. forestry companies), local residents and businesses in Waskesiu represented by the Waskesiu Community Council (see section 3.2), Park visitors, local communities outside the Park, First Nations reserves (i.e. Montreal Lake and Little Red River Cree Nations), Métis communities, private landowners, and the general public (Weir & Pidwerbeski 2000; 2, PANP). Other stakeholder groups that utilize the forest and would be directly affected by forest fires are: hunting outfitters (e.g. outfitters guiding American hunters), trappers, and recreational groups (e.g. snowmobile clubs).

²⁵ A fuel break refers to “a generally wide strip of land on which the vegetation is naturally or otherwise less flammable than that surrounding it so that fires burning into them can be more readily controlled” (Weir & Pidwerbeski 2000, p. 19).

²⁶ In this study ‘governance’ refers to the arrangements among governments, non-governmental organizations, and private actors, and the rule systems (i.e. laws, regulations, standards, policies) under which these actors operate.

²⁷ The concept ‘stakeholder’ as used in this thesis refers both to stakeholders and rightholders.

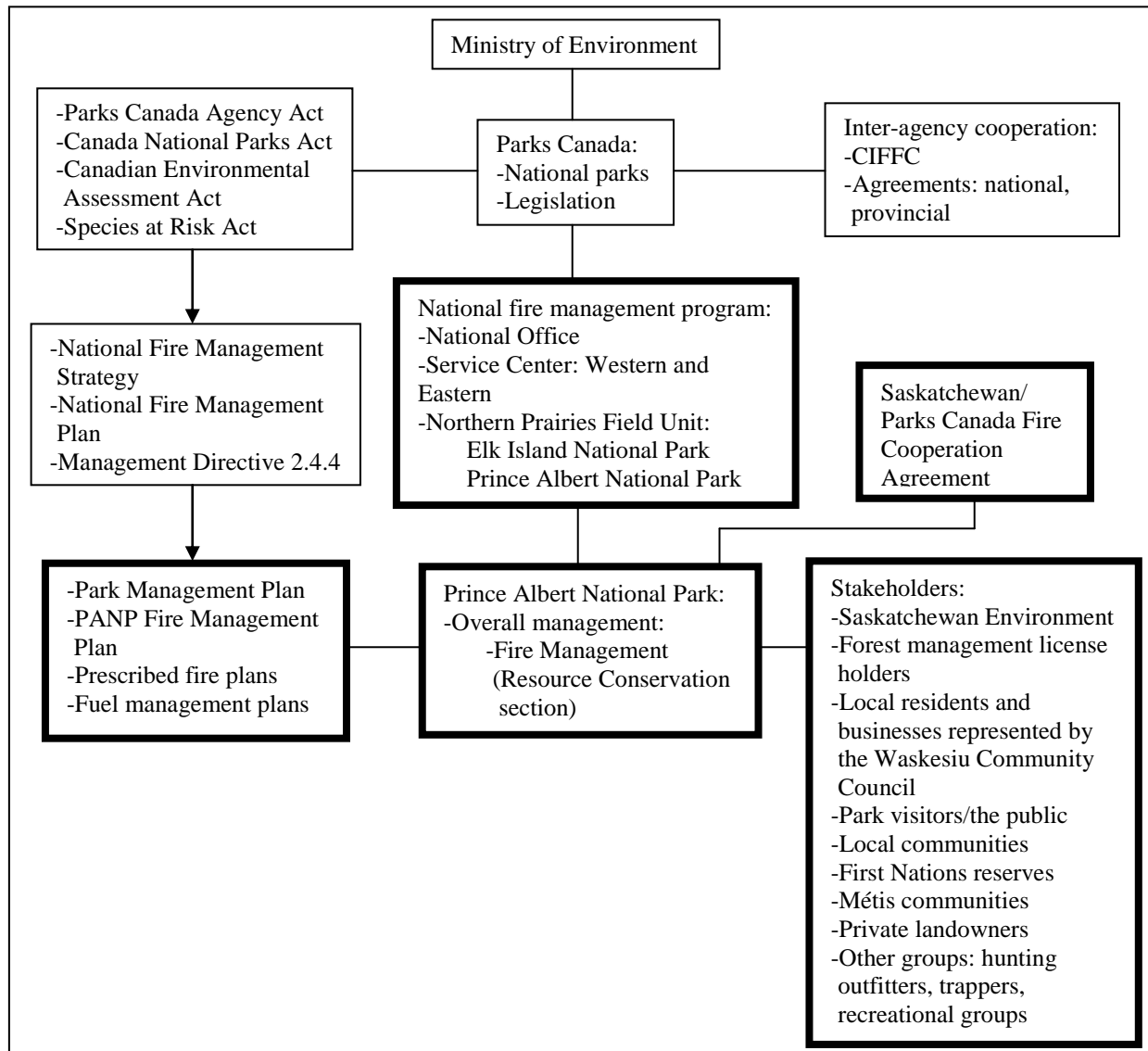


Figure 4.2. A schematic overview of the governance structure of PANP. The boxes in bold indicate the aspects that are most relevant for PANP.

At the moment there are no, or very little, active harvesting operations around the Park due to a slowdown in the forest product market (6, PANP). Nevertheless, major forestry companies still have Forest Management License Agreements for timber with the province and they will likely resume harvesting when the markets pick up (3, SE). Consequently, there is no consultation directly with the forest industry today (6, PANP), and instead SE is dealing with any issue that concerns the commercial forest (2, PANP). At the time of the development of the Fire Management Plan there was still active forestry, with Weyerhaeuser²⁸ being the biggest forest

²⁸ At the moment Domtar is Weyerhaeuser's agent in the area (Saskatchewan Environment n.d.).

management license holder, and both local foresters and regional foresters were consulted (2, PANP). There also used to be local stakeholder advisory committees, including forestry interests and other stakeholders, such as trappers and eco-tourism companies, to consult with but these committees shut down when the forestry activity paused (ibid.).

The governance structure of PANP, as explained above, indicates that multi-level governance is in place with vertical coordination with the different levels of Parks Canada (i.e. national, regional, local), all having their specific responsibilities, and horizontal cooperation with SE. At the local level there are also different stakeholders within and around the Park that PANP needs to consult with in the planning process. Even though their involvement is more limited they should still be considered part of the governance structure. Moreover, PANP is also connected to the other national parks, and through the national level connected to CIFFC and other agencies and organizations Parks Canada cooperate and collaborate with. This kind of multi-level governance differs somewhat from the literature which focuses more on different actors (e.g. private, NGOs, governments) at the different levels of the multi-level governance structure. Also, there is no joint decision-making at the local level. Instead, PANP is the only governing body responsible for managing fire within the Park, and thus this kind of protected area governance is ‘governance by government’ (see section 2.4.1).

The legislation and policies that constitute the rule system for fire management planning in PANP were presented in previous sections, and can also be seen in Figure 4.2.

4.3 Saskatchewan Environment

Saskatchewan Environment (SE), or formally the Ministry of Environment, is as already mentioned, PANP’s major stakeholder. SE has the legal responsibility for fire management in Saskatchewan including prevention, preparedness, suppression, and ecological sustainability (Saskatchewan Environment 2009). The mandate of SE is “to protect and manage Saskatchewan’s environmental and natural resources so as to maintain a high level of environmental quality, ensure sustainable development, and provide economic and social benefits for present and future generations” (Saskatchewan Environment 2004, p. 2). According to the *Saskatchewan’s Wildfire Management Strategies* from 2004, the overall fire management strategy is “to continue to protect the things that are most important to people; to allow fire to play a more natural and beneficial role on the landscape and; to reduce the chance of the extreme costs” of fire management (Saskatchewan Environment 2004, p. 4). Thus, the strategic approach

attempts to find a balance between the protection of values, the ecological benefits of wildfire, and the costs of suppression (Saskatchewan Environment 2009). The priorities of protection are human life, communities, commercial forest, and public infrastructure (Saskatchewan Environment 2004). The province has a zone system, as shown in Figure 4.3, with different fire strategies based on the values present on the landscape (Saskatchewan Environment 2009). There are three different zones: Full Response Zone – of two kinds: Community Value and Timber Value (see explanation below); Modified Response Zone (i.e. if the initial attack is unsuccessful limited action may result depending on values at risk and suppression cost, focus is instead moved to protect Full Response Zones in the area); and Observation Zone (i.e. monitoring the progress of wildfires, when no values are at risk fire is generally allowed to burn to achieve ecological benefits) (Saskatchewan Environment 2004; Saskatchewan Environment 2009).

The land area to the west, northeast, and east of PANP is in the Full Response Zone – Community Value and to the north and northwest of PANP is the Full Response Zone – Timber Value (Figure 4.3). In these zones the approach is initial attack and sustained action (i.e. until fire is extinguished) in areas with high values at risk. South and southwest of PANP is Rural/Urban Landbase, which is the responsibility of the rural municipalities (Saskatchewan Environment 2010). However, the rural municipalities can request assistance for fire suppression from SE on a cost recovery basis (Saskatchewan Environment 2009). Consequently, even though the provincial fire management strategy overall considers fire as a natural process on the landscape, the values at risk in the provincial area surrounding PANP require full fire suppression. This means that SE has a different fire management strategy than the neighbouring federal jurisdiction, resulting in certain challenges (see section 4.4.2). It also means that the two fire agencies have similar visions but the “applications on the landscape are different because of our different mandates” (1, SE). However, since it is the area in and around PANP that is in focus in this thesis, the observation is that the vision is not shared between PANP and SE. Nevertheless, cooperation still takes place between them.

In terms of prescribed burning, SE recognizes it as a valid fire management tool that may be needed when natural fire does not occur and fire would be ecologically beneficial

(Saskatchewan Environment 2004). However, due to community values and commercial values prescribed burning is difficult to practice, as the interviewees from SE pointed out.²⁹

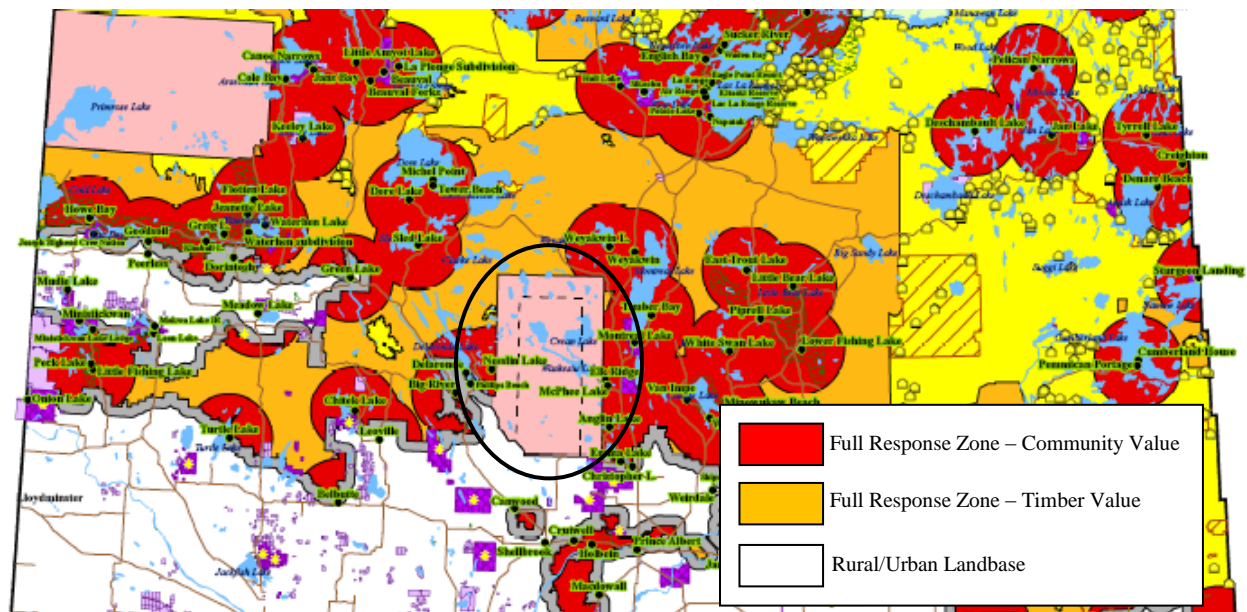


Figure 4.3. Forest fire management strategy zones around PANP. The black circle encompasses PANP (Saskatchewan Environment 2010).

4.4 Interagency Cooperation

In this section the results from the assessment of the interagency cooperation between PANP and SE are presented (Objective 4). The cooperation was overall described positively by interviewees, but there are also challenges that originate in the different jurisdictions to which they belong. The interviewees were asked to identify these challenges and also to give suggestions on how to address them. These findings are presented in section 4.4.2 and 4.4.3, respectively. First, a description of the border agreement between PANP and SE is provided.

4.4.1 Border Agreement

The *Saskatchewan/Parks Canada Fire Cooperation Agreement*, established in 2002, is an agreement concerning cooperation between Parks Canada and SE in “the detection and

²⁹ A clarification is here needed. Within SE prescribed burning is initiated by the Forest Service Branch or the Wildlife Branch as a tool to carry out their objectives. These branches develop the prescribed burn plans, provide the funding and then they hire Fire Management and Forest Protection Branch to deliver the fire. Also, the Parks Service Branch under the Ministry of Tourism, Parks, Culture and Sport sometimes hires the Fire Management and Forest Protection Branch to deliver fire. However, one interviewee from SE claimed that the province overall has done little prescribed burning outside of provincial parks (3, SE).

suppression of Fires in the areas along the boundary between Prince Albert National Park of Canada, and provincial lands adjacent to that Park” (Saskatchewan Environment & Parks Canada 2002, p. 1). It is often referred to as the Border Agreement. “Fires” refers to wildfires (i.e. “an unplanned or unwanted natural or man-caused Fire” (ibid. p. 3)) that are within the so-called Fire Cooperation Zone, that is, a 10 kilometres zone of land on each side of the Park border. Included in the agreement are directions on what actions are expected of both parties in case of a wildfire (e.g. if a fire starts on the Park side and Parks Canada is unable to suppress the fire, Saskatchewan Environment can come in and take action until the Parks’ staff can take over, and vice versa (5, PANP)), as well as the billing and payment issue. Even though the parties have agreed “to use their best efforts in providing Appropriate Fire Suppression Activity on a Fire”, it is not an agreement with obligations to support the other party in situations when suppression assistance is needed elsewhere within the own jurisdiction (Saskatchewan Environment & Parks Canada 2002, p. 4). The agreement also deals with the liability issue (ibid.).

The Border Agreement could be seen as a way to deal with the issue of different mandates and the risk of escaping fires. As indicated above, the agreement clarifies who should take action in certain situations and it enables the province to take actions within the Park border before a fire escape into provincial land. Also, before the agreement was created there were payment issues on fire suppression along the Park border; who is going to pay the fire cost and how much? The agreement was a way to solve these discussions in a pre-planning phase to avoid arguments at the time of the fire (1, SE).

4.4.2 Challenges

Although there are no challenges that completely restrain Parks Canada and SE from cooperating, there are challenges that sometimes make tasks complicated to carry out. The most obvious challenge, and where the biggest difference between the two agencies exists, is *different mandates* with different goals and objectives of managing fire. This implies different fire management strategies; PANP perceives fire as a natural process on the landscape and would like to see more fires where possible, whereas SE tries to minimize the area burned due to commercial timber values and settlements. Hence, the values at risk makes it difficult for SE to practice, for example, prescribed burning in the area outside the Park, even though SE also has

the overall objective to allow fire on the landscape where possible (see section 4.3).³⁰ Also, with the different strategies between the two agencies, fire use versus full suppression, SE is concerned of the risk that a fire within the Park could escape into provincial land. One interviewee from SE argued that even though PANP share information and has adopted strategies to reduce the risk of escaping fires that is always “kind of in the background that we have to be aware of that” (4, SE). Another implication of different fire strategies is the use of different fire tools. For example, SE uses heavy equipment when fighting fires whereas PANP try to avoid bulldozers and other heavy equipment. This can be a challenge when fighting fire together, as one interviewee from SE pointed out:

They don't allow any heavy equipment and, you know, one of the things we rely on is heavy equipment, if there's road access, because it's just a useful tool for us to gain access to the fire. And we can slow the progress of the fire down, we can get water around the fire whereas [...] they don't allow it. So that's created challenges for us on some fires where we've worked together (3, SE).

Another interviewee gave a more pragmatic reflection on the aspect of PANP and SE having different values, illustrating the whole complex situation:

And it's not that we're right and they're wrong. It's just our value is we have trees they have timber. Theirs have commercial value. If we lose hundred hectares to fire that's just part of a natural process, but five kilometres away that might have huge commercial value. So we look at things differently, you know, in terms of values at risk. And based on those values we're also gonna have differences federally and provincially as far as what resources we are willing to put on to a fire in those same scenario. That's a challenge for us. Also, even though our trees don't have the same commercial value we still have to plan and react based on the knowledge that this fire could go into their area (4, PANP).

The *location of PANP* is another challenge that is directly connected to the challenge of different mandates and objectives. If the Park had been located, for example, in northern Saskatchewan, the fire management strategy would have been different due to the zoning system (see section 4.3). One interviewee illustrated this aspect:

They want more fire and we don't necessarily want more fire there. We like more fire too but just not there. [...] You look at a map of Saskatchewan and you see where PA

³⁰ Again, this study only takes into account the provincial land outside the Park which is in the Full Response Zone (see Figure 4.3).

National Park is. It's in the middle of commercial forest and if that park had been up near Stoney Rapids or in the far north I think it would be a lot easier to deal with, but it's where it is. So, you know, that's created some challenges and that probably should be reflected in your report because of its location (3, SE).

There are also challenges of more social aspects that relate to *communication*. One is that personality may affect a person's willingness to help, as expressed by one interviewee from PANP: "It's seems that at times depending on who you're dealing with specifically that personality kind of come into play a little bit too" (5, PANP).³¹ This relates to the challenge of knowing who to contact. As one interviewee said: "The challenges I think for on a day-to-day basis that we face: always knowing who to contact. They get people changing position. Somebody's getting a promotion and move on. So sometimes you don't know who to call" (4, PANP).³² Another situation when knowing who to contact becomes a problem is when staff have days off, as claimed by one interviewee at the local level of SE³³: "You never know who you're talking to and they probably don't know who they're talking to" (6, SE). A related challenge is *changing staff*, which can also be a challenge within the own organization. Changing staff could also result in a situation where a strong working relationship may change with new people, as illustrated by one interviewee from Parks Canada's national level:

Things never, you know, stay the same and we might have had the resolution and built up a good cadre of people that understand each other, but then people change both in Saskatchewan and in Parks Canada. You know, so different personalities come in. They don't have that same history [...] so some lessons have to be relearned (1, PCA).

Other challenges that were mentioned are: the *liability and payment issues* that make expanded cooperation challenging, for example, for SE to take part in prescribed burning (see section 5.2.1) which is outside the Border Agreement (6, SE); and *understanding the structure of*

³¹ Similarly, one interviewee at the national level argued that the quality on communication across jurisdictions can depend on personalities: "There can be a real difference in personalities involved. So yeah, there are some jurisdictions where you can do just a lot better job of communicating, other places where it's working just fine" (1, PCA).

³² This relates more to the day-to-day contact at the local level. The official route for PANP to contact SE is through the Park's duty officer who contacts Parks Canada's national duty officer who then contacts the provincial duty officer. This is more used in case of larger fires and when the situation is getting more political. According to one interviewee from PANP this official way of contact adds complexity (5, PANP).

³³ The local level of SE refers to the Weyakwin Fire Base and the Big River Fire Base, and the higher levels of SE refer to the Prince Albert Fire Centre (regional level) and the Provincial Fire Centre (provincial level).

organization as expressed by PANP and may be more of a challenge for them: “We think we’ve done all the consultation we can but then we’ve missed an entire branch” (2, PANP).

4.4.3 Addressing Challenges

The suggestions on how to address challenges in the interagency cooperation between PANP and SE, as illustrated in previous section, are presented in Table 4.1. It appeared that many of the challenges have already been addressed throughout the years. However, addressing challenges refers more to mitigating challenges rather than dissolving them, especially those that originate in belonging to different jurisdictions. Also, most of them are not a one-time action and, hence, require continuous efforts.

Table 4.1. Suggested ways to address challenges in the cooperation between PANP and SE (see section 4.4.2).³⁴

Challenges	PANP perspective	SE perspective	Suggestions on how to address challenges (actions already taken in italics)
Different mandates and fire management strategies	<p>SE needs to understand why PANP has adopted their specific management approaches, and at the same time PANP needs to understand that SE has forestry values at the Park boundary (5, PANP).</p> <p>“I think the best thing we can do is to work together both during the fire season and off-season. If we go to the same conferences, if we put on training programmes, we invite our neighbours to come and train with us. We get to know them and then we get to know how each other works and build on that mutual respect and understanding” (4, PANP).</p>	<p>“Talking to one another, explaining each other’s mandates and so on is the first step in doing that [address this challenge]. You need to understand where we’re all coming from before you can even move on [...]. We can’t really change [...] our priorities and our mandates, you know. Our mandates are a little bit different [...]. If they were exactly the same it would be a lot easier, but the fact is they are different. [...] We just have to respect one another, you know, and move forward” (3, SE).</p> <p>“And I think that we’ve had enough meetings and enough dialogue that they do fully understand that. [...] I</p>	<p><i>Have a dialogue and discussions to try to understand each other’s mandate and respect each other’s differences.</i></p>

³⁴ The table does not claim to constitute a comprehensive list of suggestions on how to address the identified challenges. Also, the perspectives of PANP and SE, respectively, represent selective comments from interviewees. Where empty cells appear indicates that no representatives from the agency mentioned this challenge; it does not necessarily mean that they do not acknowledge it as a challenge.

		think we pretty much know where they're coming from and they know where we're coming from too, so we just need to respect those differences, that's all" (3, SE).	
	PANP has been taking some measures to prevent fires in the Park from escaping into provincial land. "I think that we have to a large degree adapted our management strategies to make sure that we can provide some insurances and protection" (5, PANP).	<p>"They did come up with their plan to put in prescribed burns to create fuel barriers [...] so they would be able to control fire within the central part of the Park so that it would not escape and run out of the Park. I believe that they did take our concerns under advisement and also included those concerns in the way they designed the implementation of natural fire on the landscape in Prince Albert National Park" (1, SE).</p> <p>"When the province sees the National Park is undertaking those efforts and doing a good job of planning for it, of course the provincial government understands that they are acting in good faith" (2, SE).</p>	<i>PANP respects the provincial values outside the Park and tries to contain the fires within the borders (e.g. using fuel breaks).</i>
		"Sure there are some challenges in understanding each other's mandates, but I think we have been able to mostly work through that and coming to the recognition that, to establish this Border Agreement where the province would be allowed to actually cross the boundary and do an initial attack within that 10 kilometres, I mean I think that is a recognition by the National Park that there was an issue there" (1, SE).	<i>The creation of the Border Agreement was part of dealing with the issue of different mandates.</i>
	The challenge of different fire management strategies when fighting fires together has been moderated with the use of the Incident Command System (ICS).		<i>International standardization in fire fighting.</i>

	This means that both PANP and SE are using the same standards and the fire fighters all have to take the same tests (4, PANP).		
Location of the Park		"It's where it is" (3, SE).	<i>Since there is nothing to do about the location, the only thing to do is to understand and respect each other's mandate</i> (see above).
Communication	<p>A person's unwillingness to help may be due to not knowing each other's mandates (5, PANP). Hence, all staff could meet off-season and get to know each other's mandate "so everybody knows where everybody's coming from" (5, PANP).</p> <p>Knowing who to contact: give each other updated information "just so we know who we're dealing with" (4, PANP).</p>	<p>Knowing who to contact when staff is having days off: could establish on a day-to-day basis "this is who is working, this is who's off" [...], between the two agencies and then you know if there is going to be an issue you know who you're going to be talking to. [...] That could just be a two-minute conversation or a quick email" (6, SE).</p>	<p>Willingness to help: -meet off-season to get to know each other's mandate.</p> <p>Knowing who to contact: -give updated information in terms of personnel (i.e. who is working).</p>
Changing staff	More meetings so that staff know who is involved on both sides and have the chance to get to know each other (2, PANP).		More meetings to get to know each other and start building a good relationship with new staff.
Understanding structure of organization	<p>More meetings: "We need to have more meetings so that we, as soon as you know the people involved, the process is much easier to work and know the structure" (2, PANP)</p> <p>"Like I think I understand the structure right now but it's taken a long time and it shouldn't take that long. There should be a more formal instruction on how that works" (2, PANP).</p>		More meetings to get to know each other.
Liability and payment issues			No suggestions were given at the time of the interviews.

As Table 4.1 indicates, the suggested ways to address the identified challenges all point to the need for dialogue and meetings to get to know each other, as one interviewee from SE clearly illustrated: "Most challenges are always best faced at the initial stages by communication

and just having meetings” (2, SE). Hence, it is all about building a good relationship, which could also be seen as a way to improve the overall cooperation (see below). To understand and respect each other’s differences is another key factor, especially when dealing with different mandates. As Thomas (2003) points out, understanding each other’s interests is needed for cooperation to work (see section 2.4.3). The findings suggest that there is not much else to do about the challenge of having different mandates than to accept the differences, and both agencies seem to agree that the differences in mandate and objectives will always be there. One interviewee from PANP argued: “Our differences will always be there, you know, in terms of economics, values at risk and politics that go along with fire management” (4, PANP). Similarly, one interviewee from SE claimed:

I think [...] we actually can only go so far because the province is not going to adopt a completely natural ecosystem approach on the landscape outside of the Park where economic development and industry is a mandate of the province of Saskatchewan for the citizens and as led by the government. So you know, we've gone about as far as we can. [...] We would not be able to adopt the same management system as they have in the National Park outside because there are different mandates (1, SE).

Some interviewees also gave suggestions on how to improve the overall interagency cooperation between PANP and SE. One recommendation was to go back to regular meetings between PANP and the higher levels of SE.³⁵ Today there is, as earlier mentioned, more frequent interaction at the local level, especially during fire season (see section 5.2.2.2). One interviewee from SE explained why these meetings are no longer taking place: “Recently we haven't had a lot of meetings because all of us, same folks around the table” (3, SE). However, one interviewee from PANP argued that since the creation of the PANP Fire Management Plan (from 2000) new people have come into both agencies, pointing to the need to go back to having regular meetings (2, PANP). Also, one interviewee from SE requested periodic meetings, at least once a year, that would “cover a range of issues” and “open up an opportunity for broader dialogue” (2, SE). Moreover, having regular meetings also means that the relationship, and the level of social capital that has been built up between PANP and SE over the years, can be maintained more easily. Otherwise the risk is that you need to start all over again when new staff members is entering the group, as Brondizio et al. (2009) point out (see section 2.4.4). If having meetings on a regular basis becomes a well-established event, then it is more likely to prevail. Hence, regular

³⁵ The need for more meetings is also addressed under Interactive in section 5.2.2.2.

meetings could be seen as a future investment. In addition, even though the current relationship seems to be good at the moment there are always things to improve. This was also claimed by one interviewee from SE: “I would say anything can be improved. Now the next question would be by how? [...] I think as long as [...] information is shared, they recognize what our concerns are, we understand their philosophy and we're sensitive to that, it's just something to work through I guess” (4, SE).

Finally, challenges in the cooperation between PANP and SE are also identified in the literature (there referred to as barriers/obstacles) (see Table 2.1). This study confirms, or partly confirms, the barriers³⁶ of conflicting mandates (Buechner et al. 1992); absence of common policy and management goals among agencies (Danby & Slocombe 2002); planning and management is issue driven (ibid.); and changing staff makes it difficult to establish cooperative relationships (ibid.). Moreover, this study contradicts for example: ineffective communication (Buechner et al. 1992)³⁷; the way people think about collaboration and about each other affecting the willingness to collaborate (e.g. mistrust, group attitudes about each other, organizational norms and values, and lack of support for collaboration from higher levels of agency) (Wondolleck & Yaffee 2000); and problems that relate to the process of collaboration (e.g. unfamiliarity with the process, and lack of skills to carry out the process) (ibid.). The absence of these barriers between PANP and SE could be interpreted as strengths in their relationship. Next, the suggested ways to overcome the barriers in Table 2.1 are not presenting any new insights on how to address challenges in the cooperation between PANP and SE (see section 4.4), but some of them correspond with the identified suggestions of how to address challenges in this study, such as maintaining communications (Wondolleck & Yaffee 2000), and building and sustaining relationships (e.g. fostering trust and respect) (ibid.).

³⁶ Note that I here only refer to barriers that are relevant for my study and thus exclude the transboundary water governance issues between Canada and the United States (Norman & Bakker 2005; Norman & Bakker 2009).

³⁷ Buechner et al.'s study (1992) is more comprehensive and includes more stakeholders, whereas I exclusively refer to the cooperation between PANP and SE.

CHAPTER 5: ASSESSING GOVERNANCE FOR FIRE MANAGEMENT PLANNING

5.1 Introduction

This chapter presents the findings from the qualitative assessment of the governance structure for fire management planning in PANP (Objective 3). For each principle a summary table is provided, followed by a presentation of the findings for the criteria and indicators. For a full list of the identified principles, criteria and indicators of adaptive governance, see Appendix C. Also, the interviewees' perceptions of climate change within PANP and at the national level of Parks Canada are provided. The chapter ends with a summary of the key findings.

5.2 Governance Assessment in Prince Albert National Park

5.2.1 Inclusiveness, Responsibility, and Fairness

5.2.1.1 Inclusiveness

Inclusiveness refers to the possibility for all stakeholders, representing a range of perspectives with different interests and values, to participate and have a voice in the fire management planning process. Table 5.1 provides an overview of the findings of the assessment that pertain to Inclusiveness, and details are explained in the text that follows.

Table 5.1. A summary of the assessment of the principle Inclusiveness.

Principle	Criterion and Indicators	Present	Partially Present	Could be improved
<i>Inclusiveness</i>	Representation			
	All stakeholders have the possibility to participate in the fire management planning process.	●		Earlier involvement in the planning process.
	All stakeholders have the right to express their opinions in the planning process, as well as in other fire questions that concern them.	●		
	Participants represent a range of perspectives.	●		

- Information from interviews and document analysis suggests presence or partial presence of indicator.

Representation

According to the interviewees from PANP, all stakeholders (see section 4.2.3.2) who have an interest in the Park's fire management have the possibility to participate in the planning process of this plan. However, this is more on the consultation level with consultation taking place after the planning process has already started. For the local residents, and the general public, there are 'open houses', a kind of consultation where they can give comments on the Fire Management Plan (3, PANP; 4, PANP). With the current Plan being from 2000 it implies that consultation is not carried out on a frequent basis with all stakeholders. Rather stakeholders are consulted only in situations where they are directly affected, for example when a specific prescribed fire is planned (i.e. a potential threat), or when there is a risk for wildfires to escape into neighbouring land (2, PANP; 3, PANP). Also, there are no yearly meetings with all stakeholders where the plan for that specific year is presented (1, PANP). However, the yearly fire plans are shared between PANP and the local level of SE,³⁸ but normally people never meet to discuss; the agencies just exchange plans (3, SE).

The interviewees were also asked if they felt that any stakeholders are missing in the planning process. According to PANP, all affected stakeholders are addressed, but sometimes the interest to attend is low. This is especially the case with 'open houses', but also applies to local landowners and First Nations. For example, one interviewee from PANP argued that local landowners sometimes disagree on the specific features of the plan after its implementation, instead of giving input during the planning process. Whether the low attendance is due to lack of interest or other motives cannot be discerned here without directly asking these stakeholders. Nevertheless, it appeared that relations in the planning process between PANP and SE are well developed. SE was consulted with during the creation of the Fire Management Plan with many meetings between PANP and the higher levels of SE where they had the opportunity to express their concerns (1, SE).³⁹ One interviewee from SE claimed that he/she felt that PANP listened to their concerns; one important concern being the risk of natural fire crossing the borders into the provincial side (ibid.) (see also section 4.4.3). In terms of the more regular planning, SE believed

³⁸ As earlier mentioned, the local level of SE refers to the Weyakwin Fire Base and the Big River Fire Base, and the higher levels of SE refer to the Prince Albert Fire Centre (regional level) and the Provincial Fire Centre (provincial level).

³⁹ PANP was also consulted with in the creation of SE's wildfire management strategies. For example SE listened to and adopted some of Parks Canada's thinking on the natural role of fire (1, SE). However, their planning process is not the focus of this study.

they are included. One interviewee from SE argued that they receive plans for prescribed burning that may affect provincial land and which they can give input on (5, SE). At the local level of SE one interviewee stated that PANP is good at exchanging information about prescribed fires and has also invited them to meetings about prescribed burning, indicating that they want the province to take part in this. However, the liability and payment issues make such collaboration difficult (6, SE). This kind of contact is more at the local level where also more frequent discussions take place about common issues (ibid.). At the higher levels of SE one interviewee pointed out that there no longer are yearly meetings with PANP. There used to be, but these meetings died out and now “we haven't been invited to any of their meetings. But maybe nothing much has changed I don't know, I don't think much has changed” (3, SE) (see also section 4.4.3).

Moreover, the representative from the Waskesiu Community Council gave his/her view of how the consultation works, not just in terms of fire management planning, but in general:

When I say they consult, they come and say ‘okay, here’s what we plan to do. We want to get your feedback. [...] And somebody might say ‘that’s a terrible idea’. ‘Thank you. Appreciate your input. This is what we’re going to do’. You know, so I suppose if they had a hundred percent of people that were opposed to [the plan] they might look at [it]. But often [...] they’ll get what they want out of the consulting group (1, WCC).

The same interviewee also argued that often the special interest groups of residents, that is the people who really want to be involved, have more input than the average person. He/she pointed to a common trait in this kind of events:

It’s the way things work. If you want to get involved then you have more input, but the Park sometimes take that special interest group and say ‘oh that’s what the people are saying to us’. But it’s not what the people are saying. It’s what a very small segment of the people are saying. So certainly we have input. I’m not sure it’s always the people, the average Joe public that got that input (1, WCC).

However, as he/she also noted, “sometimes that’s Joe public’s fault because things come out, ‘I’ll read that later’ or ‘I’ll react’” (ibid.). One example where consultation took place was when planning for the community fuel break.⁴⁰ “That was very well communicated” even though, as

⁴⁰ The implementation of the community fuel break in 2001 around Waskesiu had some opponents from the local community at the time of the making. Nevertheless, the planning and implementation process, as well as the result of the fuel break, is considered a successful project. For example, SE sees it as a model for good implementation of community fuel breaks (2, SE).

he/she stated, “it was a done deal” (1, WCC). Also, one interviewee from PANP gave his/her perception on meetings with the local residents:

It’s kind of crying wolf unless there’s an incident. Unless we’re starting to heat up then we can move in that direction. If it’s been raining for months and you call a meeting to talk about fire there’s not going to be too many people show up or take you seriously at the meeting. When the conditions heat up is the time to do that (2, PANP).

The above findings indicate that all stakeholders, and the public, are consulted with in the planning process. Based on this information, I have considered that participants represent a range of perspectives and that the opinions of stakeholders are heard. However, whether the stakeholders, besides SE, actually have any power is a different matter. It is a different thing to listen to than to act according to the stakeholders’ concerns. The fact that consultation is not initiated at the start of the planning process points to a limited impact. However, it is outside the scope of this study to assess how effective these consultations are from a stakeholder perspective. Also, the fact that consultation with all stakeholders is only carried out at the time of the development of the Fire Management Plan indicates that there is no contact on fire issues with all stakeholders on a frequent basis. The question is if more communication is needed with all stakeholders even at times when there are no direct fire issues to discuss. After all, it is Parks Canada that is the fire manager within the Park and not all practices carried out concern the surrounding area. However, the literature shows that it is important with two-way communication to get acceptance for fire management practices, but also to build trust (Wildland Fire Lessons Learned Center 2010, see section 2.2.2). Thus, as with all kinds of relationships Parks Canada’s relationship to the stakeholders needs to be maintained. Moreover, it is possible that the consultation procedures need to be changed to attract more participants, both in terms of stakeholders and the public. For example, the literature points out that when the public are not involved from the beginning of the planning process it could contribute to the feeling that their participation would not matter since the decisions are already taken and, hence, result in lack of participation (Özerol & Newig 2008, see section 2.2.2); this pertains to stakeholder participation as well. This relates to the comment from the representative from the Council (see above) that when Parks Canada presents a plan they want input even though they have already decided what they are going to do before the consultation. With this in mind it may be worth for PANP to contemplate if earlier involvement could lead to increased participation. Stakeholders could, for

example, be involved in shaping the vision for fire management in the Park, which is in line with Parks Canada's national fire management program's aim for increased involvement of stakeholders beyond consultation (Parks Canada 2007, see section 4.2.2). An example where such proactive fire management planning has taken place is in Banff National Park where focus groups "discussed concepts of fire management, not plans, right at the beginning and then incorporated that into the planning process" (1, PCA). Moreover, making stakeholders more involved could also include better access to all possible fire information. All fire related plans (e.g. annual fire plans) and other information should be shared with the stakeholders. That does not have to be in person, but could be on a website where fire information is available for stakeholders that like to be up-to-date. Just for stakeholders to know that all fire information is 'out there' and that Parks Canada is not trying to hide anything may even contribute to a feeling of trust. This relates to Transparency in section 5.2.1.2.

Ultimately, the question has to be posed whether fire management planning really is an issue where stakeholders and the public can be more involved, for example in decision-making. However, involving stakeholders earlier in the planning process as in Banff National Park (see above) may be worth considering. Moreover, the goal of Parks Canada to move beyond consultation and "actively involve Canadians as full partners" in management of national parks, as stated in the PANP Management Plan (Parks Canada 2008a, p. 17, see also section 4.2.2), may not be realistic in terms of fire management (i.e. implementation of fire plans) other than in fire risk mitigation such as practicing FireSmart (see section 5.2.2.2). The nature of fire put fire management in a somewhat different situation than other kinds of park management where more public involvement would be easier to incorporate. Hence, consultation and information-sharing about fire may be the main ways to include the public in the planning process since the final decision-making should be left to the experts, that is, people within Parks Canada. Indeed, Gooch (2007) stresses that some issues of ecosystem management may be too complex and difficult for stakeholders and the public to be involved with. Fire management could be such a case. It is also a question of accountability and liability, as one interviewee from PANP pointed out: "We are a national park. That means that there are certain laws that we have to follow or policies that we have to follow, and people have to understand that too. And so within the confines of those that's where [...] you have the discussion" (6, PANP).

5.2.1.2 Responsibility

Responsibility includes the issues of legitimacy (i.e. the governing body has the legal authority to manage fire while following laws and regulation); accountability (i.e. the governing body is accountable to stakeholders and higher-level authority, and the responsibilities are clearly defined); transparency (i.e. fire management information is easy to access and the reasoning behind decisions taken are traceable); and information-sharing (i.e. effective information-sharing mechanisms are in place providing stakeholders and the general public with fire information, and there is frequent information-sharing among stakeholders). Table 5.2 provides an overview of the findings of the assessment that pertain to Responsibility, and details are explained in the text that follows.

Table 5.2. A summary of the assessment of the principle Responsibility.

Principle	Criteria and Indicators	Present	Partially Present	Could be improved ⁴¹
<i>Responsibility</i>	Legitimacy			
	The governing body has the legal right to make decisions and manage fires.	●		
	The governing body adheres to laws and regulations in the planning process.	●		
	Decisions taken are consistent with the mandate and objectives of fire management.	●		
	The governing body's authority is accepted by the stakeholders.	—		
	Accountability			
	The governing body is accountable to all stakeholders, including local residents, and the higher-level authorities.	●		
	Area of responsibility for each participant is well-defined and documented.		●	Clarify responsibility area for all Park staff.
	Each participant sticks to his/her commitment.	●		
	Transparency			
	Information on fire management is easily accessible for stakeholders and the public whenever requested.		●	Fire information is not easily accessible.
	The governing body reports the performance,	●		

⁴¹ The difference between improvements for the 'present' indicator and the 'partially present' indicator is that the latter need to improve to reach the 'present' level, whereas for the 'present' indicator improvement means taking a step further, beyond the minimum requirement.

	including failures and achievements, in annual reports, state-of-the-park reports etcetera.			
	It is possible to see why/how a decision was taken.	—		
	Information-sharing			
	Local residents and visitors in the area receive updated wildfire information presented in a straightforward manner through different media, and/or at information centres.	●		
	It is possible for local residents, visitors and other concerned citizens to directly turn to officials to ask questions about the fire situation, or ask for help.	●		
	There is frequent information-sharing between the governing body and stakeholders (i.e. between PANP and SE), both in the planning process and in the actual wildfire situation.	●		

- Information from interviews and document analysis suggests presence or partial presence of indicator.
- There are no data or not enough data to make a judgement. The indicator was not addressed in the interviews, or a follow-up question did not give full information.

Legitimacy

The legal aspect in terms of fire management in PANP is clearly defined. Parks Canada has the legal authority to manage national parks in Canada. As stated in section 4.2.2, the directives of fire management are set at the national level of Parks Canada and then incorporated into the fire plans at the park level. Since the mandate and objectives of fire management are reflected in the plans, as long as the decisions taken are following the plans, there will be consistency in terms of decisions reflecting the mandate and objectives of fire management. The plans are subject to review from higher levels of Parks Canada which assure that the planning process follows the national directives (see section 4.2.2). In addition, the national fire management program is internally reviewed (e.g. the Fire Management Program Audit). The fact that it is a federal agency makes it subject to external auditing as well, such as from the Office of Auditor General of Canada. Whether Parks Canada's authority is accepted by the stakeholders can only be assessed by directly asking stakeholders about their opinion and is hence beyond the scope of this study. Nevertheless, the representative from the Waskesiu Community Council claimed that the residents of Waskesiu trust Parks Canada in their fire management job, "that they are going to do the right things out there" (1, WCC). Also, one interviewee from PANP believed that the stakeholders accept them as the governing authority (6, PANP).

Accountability

Parks Canada is accountable to all stakeholders, including local residents, and this accountability is at the park level (6, PANP). As mentioned in section 4.2.3.2 the actual accountability lies with the Superintendent who is accountable for all activities within the Park. The Superintendent is also accountable directly to the CEO for Parks Canada who is accountable for operations in all Canadian national parks (2, PANP) (see section 4.2.1). The Superintendent has delegated the responsibility for fire management to the manager of the Resource Conservation section, who delegated the responsibility for the operational side of fire management to the Fire Management Officer and the responsibility for keeping the fire program within the Park in effect and plans up-to-date to the Fire Vegetation Specialist (ibid.).

The area of responsibility for each fire staff⁴² member in PANP is defined and documented. Taking the responsibility for the assigned area whether seen internally, or externally between PANP and SE, does not seem to be a problem. Here the border agreement makes the roles clearer, and the ICS system (see section 2.2.2) has made joint fire operations easier with clearly defined roles and responsibilities. However, in a fire situation within the Park, it is indicated that staff members from other functions sometimes do not know exactly what their responsibilities are. This is something that has to be clearly stated and documented, as one interviewee argued: “I think we could become more efficient [...] if we better clarified how different sections could help in a fire” (6, PANP).

Transparency

In terms of transparency, the information on fire management in PANP is in theory accessible. There is an information act, *Access to Information Act*, which Parks Canada has to follow. In terms of general information about Parks Canada there are pamphlets, information briefs and other kinds of documents available for the public (3, PANP). However, according to some interviewees from PANP certain park specific information is not easily accessible, for example the cost of fire management; this is confirmed by a representative from the Waskesiu Community Council. Nevertheless, if there is a request for information that is not available, the public can make an inquiry directly to the Park staff and they will provide that information (5, PANP); “there’s nothing to hide” (6, PANP). A personal reflection is that finding information on

⁴² Fire staff refers to the actual staff of PANP that deals with fire management, that is, parts of the Resource Conservation staff.

the Internet is difficult. For example, the fire management plans are not available, neither for PANP nor for the national level. Also, the PANP website does not appear to be up-to-date. Moreover, information management has “actually been identified as one of the top four corporate risks⁴³ for Parks Canada” (6, PANP). Indeed, Parks Canada acknowledges that information management is an essential part of their mandate: “The ability to effectively identify, capture, manage and report pertinent data and information is critical for Parks Canada to effectively manage all program areas and meet legal requirements. Parks Canada has, therefore, recognized this as a key corporate risk” (Parks Canada 2010, p. 18).⁴⁴ Next, PANP reports on its performance in various reports, such as the State of the Park Report, After-action-reviews (i.e. written after each fire incident and serve to learn from past mistakes to improve future fire management practices), and Escape Fire Situation Analyses. However, one interviewee indicated that the reports are not expressed in terms of achievements and failures: “I don't think we think of it in that way. Related to wildfires it is just a question of how many, where, how did we manage it, and what were the costs” (6, PANP). There are also indications that the reasoning behind a decision is possible to follow, at least for specific fire situations such as presented in the Escape Fire Situation Analyses which “outline how, why, who and when we attack the fire” (ibid.). To fully assess this last indicator more investigation needs to be carried out.

Information-sharing

Effective information-sharing with the local residents and visitors during a wildfire situation requires planning and well-established mechanisms for communication. Responsible for this part in PANP is the Communication section (5, PANP), and the fire staff are generally not involved. According to one interviewee, the communication mechanisms are in place when the “fire situation becomes fairly extreme” (ibid.). Communication staff set up information booths with maps and updated information, put information on the website, and have media releases (3, PANP; 1, PANP). There is also available information in the Visitor Centre. Also, warnings, closures and/or fire bans are posted around the Park (4, PANP). Local residents and visitors can also turn directly to Parks Canada staff to ask questions or ask for help. Furthermore, it may be worth looking into further communication channels between the public and PANP, such as a 24-

⁴³ The other key corporate risks are: competitive position; environmental forces; and delivery and management of infrastructure projects (Parks Canada 2010).

⁴⁴ For suggested measures to mitigate this risk, see Parks Canada 2010, p. 18.

hour phone line and public announcements given by a local radio station as in the Lost Creek Fire (Kulig et al. 2008, see section 2.2.2). Moreover, how the public perceive the information-sharing, and if it is presented in a straightforward manner as both Taylor et al. (2007) and Kulig et al. (2008) recommend (see section 2.2.2), was not discerned in this study.

Information-sharing between PANP and SE seems to be frequent, both in terms of sharing plans and during a fire situation. Frequent information-sharing is crucial not only to fulfill the expectations of being a good cooperating partner, but also from an emergency perspective where a fire can cross borders or result in smoke issues as pointed out by Miller (2003) (see section 2.2.2). One interviewee from SE illustrated this: “If we have large fires or something that’s going on out there [we] make them informed also so they know [...] how close it is to their park, if they have some other resources or something that we may be running short of” (5, SE). He/she also argued: “I think they probably have access to everything that we do [...] everything is shared and that new information [e.g. weather data] is past on too to them” (ibid.). Similarly, another interviewee from SE claimed in a context of sharing weather information and fire weather indices:

All the outputs that we have are certainly available to them and they do use that information. [...] If they've got a fire, if they want a special spot forecast for that particular location we'll get our meteorologist to provide that to them. Our information is web-based so they are able to tap into it [...]. We certainly don't exclude them from having information, that's not our intent. We want them to be as efficient as possible (3, SE).

One interviewee from PANP confirmed this information: “That’s one thing that we work closely with, [...] with weather networking, that we are part of their overall networking also”⁴⁵ (3, PANP). He/she added: “When we’re getting into wildfires or prescribed fires we’ll ask them for spot forecast which they provide us” (ibid.). However, most of the information-sharing on a daily basis takes place at the local level. One interviewee at the local level of SE stated:

I think we've got a really good working relationship and we're always on the phone [...]. We don't do it all the time but we try and do it, and let them know what's going on in our area. Like if our hazards are getting high I tell them we've got this crew on, I've got

⁴⁵ Parks Canada has purchased three weather stations within PANP that are linked to the provincial system: “So the weather is coming into our provincial system and then the National Park has access to the weather prediction system” (1, SE).

men up here, I've got a helicopter [...]. And sometimes they'll do the same thing to us too (6, SE).

Information between PANP and SE is shared in various ways, mostly by phone and e-mail (1, PANP), but also in person at meetings, at conferences, in working groups (4, PANP; 3, SE) or park staff stopping by when they are in Prince Albert (3, SE). Hence, both formal and informal contacts are taking place. One interviewee from PANP illustrated how the informal contact works: “I think most of the people involved have been around long enough to know specifically who the person is that deals with whatever information you’re looking for; you’d just call them up directly” (5, PANP). This informal communication could be seen as an indication of social capital that has built up throughout the years, resulting in a good relationship between the two agencies (see section 5.2.2.2). Moreover, whether information-sharing to other stakeholders than SE is on a frequent basis was not addressed in this study, other than in a context of consultation during the planning process (see section 5.2.1.1).

The findings above point out that Parks Canada needs to improve the level of transparency in terms of accessibility of fire management information. However, it seems as information management is something that Parks Canada nationally is aware of as a significant aspect that needs to be addressed. Thus, PANP should make all information on fire management easy to access; then it is up to each individual to judge what is of interest for him/her. If there is information missing, for example about spending, the public could become suspicious that Parks Canada is trying to hide information, even though they do not have that intention. However, there may be cases where information is not possible to share due to confidentiality concerns, but that should then be clearly stated.

5.2.1.3 Fairness

Fairness in this study means that the governing body, Parks Canada, must be fair and treat stakeholders with equal respect. Another aspect is the safety issue where planning for fire management must not compromise any group/individuals’ safety. Table 5.3 provides an overview of the findings of the assessment that pertain to Fairness, and details are explained in the text that follows.

Table 5.3. A summary of the assessment of the principle Fairness.

Principle	Criterion and Indicators	Present	Partially Present	Could be improved
<i>Fairness</i>	Equity and respect			
	Equal respect and consideration is given to stakeholders' views and rights.	—		
	Planning for fire management take into consideration all risks and does not compromise any group/individual's safety.	—		

— There are no data or not enough data to make a judgement. The indicator was not addressed in the interviews, or a follow-up question did not give full information.

Equity and respect

Indicators of fairness relate to inclusiveness (see section 5.2.1.1), but there are also additional indicators. However, these indicators were not addressed at the time of the interviews; rather the following information is based on document analysis and one follow-up question. One aspect that is difficult to assess is whether PANP gives equal respect and consideration to all stakeholders' views and rights. Such an assessment would require interviews with all stakeholders, such as First Nations that were not part of this study. However, since PANP includes all stakeholders they appear to treat all affected groups of people fairly, though one interviewee claimed: "We likely provide more technical information to fire management partners, e.g. the province" (6, PANP). Next, in the planning process PANP is taking various risks into consideration. For example, when planning for prescribed fires the stakeholders that are directly affected will be consulted (see section 5.2.1.1). They also have values at risk, even referred to as priorities of protection (see section 5.2.2.2), that the plans take into account. In terms of human safety, the number one priority of protection, this priority applies to all social groups. However, the fire fighters' safety always comes first and thereafter the public's safety (2, PANP, see Priorities for protection under section 5.2.2.2).

5.2.2 Strategic Vision, and Performance-oriented

5.2.2.1 Strategic vision

Strategic vision refers to having foresight in the planning process, including a long-term perspective and a clearly stated and shared vision, with leadership that guides the fire management planning in the right direction to reach the fire management goals. Table 5.4

provides an overview of the findings of the assessment that pertain to Strategic vision, and details are explained in the text that follows.

Table 5.4. A summary of the assessment of the principle Strategic vision.

Principle	Criteria and Indicators	Present	Partially Present	Could be improved
<i>Strategic vision</i>	Foresight			
	A developed sustainable long-term fire management plan exists.	●		Incorporate climate change in the fire plans.
	A vision is clearly stated and agreed upon internally (i.e. shared vision).	●		
	Leadership			
	A leader or leaders is guiding the fire management planning process.	●		
	The leader possesses the appropriate leadership skills.	—		
	The leader is acknowledged by all participants.	—		

- Information from interviews and document analysis suggests presence or partial presence of indicator.
- There are no data or not enough data to make a judgement. The indicator was not addressed in the interviews, or a follow-up question did not give full information.

Foresight

As mentioned in section 4.2.2, all plans guiding fire management in PANP are based on national policies and practices, and the overall Park vision, or goal, has to be coherent given these directions. This also indicates that the vision is shared within the national fire program of Parks Canada. Moreover, it is not enough to have a long-term perspective if the vision is not clear; the vision need to be something concrete to which actors can strive. As can be seen in section 4.2.3.1, the goal is both clear and has a long-term perspective with the overall fire management strategy “to eventually allow fire to occur naturally within the landscape of the Park, but under prescribed conditions” (3, PANP). Also, one interviewee at the national level of Parks Canada gave a comment on the vision of Parks Canada: “I think Parks Canada has a clear vision about fire management. I mean, for us fire’s an ecological process and a lot of the protected areas that we have depend on fire in order to be sustainable in the long term” (1, PCA). An interesting aspect here is how climate change will affect the efforts to achieve sustainable parks, for example, if it will change the natural ecological process? In fact, interviewees claimed that PANP is not yet incorporating climate change projections into their fire management

planning process (1, PANP; 2, PANP). Thus, to not plan for a changing climate in fire management may challenge the efforts to achieve sustainable parks (see also section 5.3).

Leadership

There are leaders within Parks Canada guiding and steering the fire management planning, both at the national level and within PANP, with the national level's leadership directly affecting the local level. At the national level there is one person responsible for coordinating fire management planning efforts across all national parks and to make sure the plans are consistent with each other (1, PCA). Within PANP the leadership corresponds with the responsibility for the fire management program in the Park, that is, the Fire Management Officer and the Fire Vegetation Specialist (2, PANP) (see section 5.2.1.2).

To ask directly about a person's leadership skills, and if a leader is acknowledged by all actors, would be to ask sensitive questions since it would mean pointing to a specific person. To avoid that situation, the interviewees were asked to identify the qualities of strong leadership, and if they feel these qualities exist within Parks Canada. Whether they acknowledge the leader was never addressed in the interviews. The collected qualities of strong leadership mentioned by interviewees from PANP are: being a good listener; the ability to communicate effectively both with decision-makers and fire fighters; having a strong science background; understanding of the fire process; being experienced; being flexible (i.e. adapt to the situation); the ability to take decisions that correspond with the mandate and vision of Parks Canada; and having good organizational skills. One interviewee also mentioned needed leadership qualities in the interaction with SE: "It needs to be the ability to adapt of both sides to the other's mandate and objectives. [...] The leader has to have the ability to compromise but also has to be able to make a strong argument for [...] the mandate of the Park, to make sure that that's clearly communicated" (5, PANP). In addition, the collected qualities of strong leadership mentioned at the national level of Parks Canada are: specialist knowledge and understanding of the fire process; good communicator including being able to convey his/her knowledge to the team members; being a good team player; having a consistent approach to fire (e.g. be able to deal with a calm fire the same way as an active fire); setting the example; and providing sense of purpose and motivation for a fire program. The interviewees at the national level believed the qualities of strong leadership exist within Parks Canada. One comment was: "I think one of our successes is that our leaders, we've got to have many instances of individual leadership and group leadership, [...]"

have got that ability to have that type of leadership and I'd have to say that type of resource it's been our success" (1, PCA). The same interviewee also emphasized the importance of a good leader for the fire team to work efficiently:

It doesn't matter if we've got helicopters, it doesn't matter if we've got bulldozers or water bombers. For me it's always been what's the makeup of the team that's managing the incident, and how well those guys display those leadership traits will dictate what happens at that incident (1, PCA).

This comment is directly linked to the characteristic of social capital (see section 5.2.2.2). Furthermore, not all of the interviewees from PANP were asked the question whether the qualities of strong leadership exist within PANP. Those who were asked agreed they exist, however, referring to the qualities he/she mentioned in the previous question. One interviewee illustrated that the fact that one of the leaders, the Fire Management Officer, was away during a period of intensive wildfires in 2009 and that they "still were able to handle them effectively" shows that "there is in general the leadership necessary and that the leadership, the skills and expertise has been passed on to other players that are subordinate to them" (6, PANP). However, without consensus what the qualities for strong leadership are, no conclusion can be drawn about what qualities a leader within PANP fire management possesses. Instead these qualities could be seen as providing a list of qualities that are important for fire management.

Finally, some of the interviewees at the higher levels of SE were also asked the question about the qualities of strong leadership. The purpose was to see if their view on leadership is different from Parks Canada, and if there is something Parks Canada can learn from SE. The collective qualities of strong leadership are: being a good team player; being open minded and objective; being grounded in science; being aware of citizen's needs and wants; being collaborative and visionary; being able to empower the team to keep on that path and keep moving in the same direction; being flexible; being a good listener; and the ability to communicate (i.e. articulating the issues and convince others to follow). Hence, overall it appears as SE has the same view as PANP on leadership.

5.2.2.2 Performance-oriented

Performance-oriented refers to being effective and efficient in fire management, including the aspects of following the fire management plans, having capacity, being cost effective, having effective communication and social capital, as well as being prepared for

wildfires and ready to take action. Also, cooperation across jurisdictions and coordination in planning with higher-level authorities is necessary for effective fire management. This requires effective communication and a high level of social capital. Table 5.5 provides an overview of the findings of the assessment that pertain to Performance-oriented, and details are explained in the text that follows.

Table 5.5. A summary of the assessment of the principle Performance-oriented.

Principle	Criteria and Indicators	Present	Partially Present	Could be improved
<i>Performance-oriented</i>	Effective and efficient			
	Participants follow the fire management plans in order to meet the objectives and achieve the goals.	●		
	The capacity to undertake required fire management in terms of financial, technological, and human capacity is adequate.		●	Big fire years: not enough resources.
	Training opportunities exist to develop technical skills.	●		
	Cost effectiveness measures are taken.	●		
	The level of social capital internally is satisfactory and enhances the capacity for people to work together.	●		
	Internal communication is satisfactory, including frequent meetings and distribution of accurate reports.		●	Written communication.
	Preparedness			
	Services, such as fire weather forecasting and forest fire danger rating, are used to predict wildfires.	●		
	Inventories of human and physical resources are regularly carried out.	●		
	Priorities for protection of values at risk exist.	●		
	Public education is carried out to make individuals aware of fire risks and to inform them how they can mitigate the risks. This includes implementation of FireSmart.	●		Enhance the FireSmart program.
	Interactive			
	Cooperation agreements exist with other fire agencies, including resource sharing.	●		
	Planning for fire management is effectively coordinated vertically and horizontally.	—		
	Communication across jurisdictions and with higher-level authorities is satisfactory.		●	More meetings with the higher

				levels of SE.
	The level of social capital is satisfactory and facilitates cooperation.	●		

- Information from interviews and document analysis suggests presence or partial presence of indicator.
- There are no data or not enough data to make a judgement. The indicator was not addressed in the interviews, or a follow-up question did not give full information.

Effective and efficient

To be effective and efficient it is necessary to follow the fire management plan in order to meet the objectives of fire management. However, to measure whether the fire management that is carried out in PANP follows the Fire Management Plan or prescribed burn plans is complex. One way would be to see if the goals of fire management have been achieved. However, it is possible to follow plans but still have not reached all the goals if they are long-term goals. In such cases other measures are needed, such as determining if the appropriate practices are in place to reach the desired goals. A thorough assessment of this issue has not been carried out in this study. The assumption is, nevertheless, that the Resource Conservation staff in PANP are following the plans, based on the fact that PANP is accountable to the higher levels of Parks Canada, and that existing monitoring and feedback mechanisms give the staff a chance to adjust practices that are not consistent with the objectives in the plans (see section 5.2.3). Despite the argument above, one interviewee was asked whether he/she felt that PANP is achieving the goals and objectives of fire management. He/she argued that “our goals are not really measurable”, but nevertheless gave examples of objectives that PANP partially have met in terms of fire management, such as to develop and implement hazard reduction strategies (not completed), to develop a containment perimeter around the Park, more prescribed burns, and to “allow fires to run their course” (have made progress but would like to do more) (2, PANP).

Moreover, being effective in fire management requires adequate capacity. As a way to measure the level of capacity in a qualitative way, the interviewees were asked about challenges in implementing the objectives in terms of different kinds of capacity, such as financial, technological, and human capacity. However, they did not need to address all kinds of capacity and therefore their answers do not provide a full assessment of the level of capacity, rather they only serve as indications. Some of the challenges mentioned are: coordination of resources under big fire years; the reduced number of fire fighters within Parks Canada; reduced budget; the weather condition in general; prescribed burns being at times difficult to deliver (i.e. it needs to be the right weather and fuel conditions); informing the public of the benefits of fire; fire staff

get burnt out in times of multiple fires; and institutional capacity (“we are a small organization and fire management is a hugely demanding job” (1, PANP)). Also, some interviewees were implicitly asked if the financial capacity is a challenge. Overall, money does not seem to be an issue, even though one interviewee at the national level of Parks Canada mentioned that the budget has been reduced (2, PCA). One interviewee from PANP claimed: “We financially don’t see restrictions on our ability to manage fire” (1, PANP). Another interviewee stated that now with fixed funding from the national fire program, as compared to earlier when it was emergency funding for wildfires, it is possible to do business planning and “identify prescribed fire and funding them knowing what we have” (3, PANP). The same interviewee also argued that with the ecological integrity statement and the increased acknowledgement of the need to get fire back on the landscape, fire management within Parks Canada has got “the political backing [...] all the way from the CEO down to the levels and the people that are in the positions that can make that happen” (ibid.). However, these statements refer more to ‘normal’ fire seasons. During big fire years the financial capacity is a challenge. Another aspect is whether there are enough fire fighters with the necessary skills available in the Park. One interviewee argued: “There’s probably been times when we get a fire burst and we haven’t. But by and large I think we do. I mean we are able to tap into other resources and other Parks and other avenues for resources if we need. So I don’t think we are limited, no” (5, PANP). Nevertheless, during big fire years this can be a challenge, as another interviewee claimed: “We can’t afford to necessarily plan for our worst year, and that’s why you would sometimes import people from the United States or wherever because we just can’t afford to keep those around” (4, PANP).

To offer technical training for fire staff is a way to enhance the efficiency in fire management. In PANP technical training opportunities is primarily offered to the Resource Conservation staff, but when required other staff can also get training (2, PANP). The fire fighters in the Park get training every spring, and the fire managers “are trained in areas of fire behaviour so we make sure they maintain their levels of fire behaviour certification” (1, PANP).

There are cost effectiveness measures in place in the Park. Prescribed burning is, according to one interviewee, measured on a cost per hectare basis (4, PANP). Wildfires are more difficult to measure “just because there’re so many values at risk that you could lose” (ibid.). Another interviewee gave a comment that illustrates this complex situation:

A situation might come up, or we have one of our back country cabin that has been threatened by a fire and you got to realize that it's pretty easy to spend forty, fifty thousand dollars on aircraft and resources in a blink of an eye and the cabin is only worth ten so on a small scale you look at cost effectiveness [to] say we're not gonna go to the effort to save that. On a broader scale I think that cost effectiveness as a criterion in making the decision becomes less important. I think that once you approach the boundary and start looking at values at risk that don't necessarily fall under our jurisdiction, cost effectiveness tends to play second fiddle to politics. [...] There are instances where we spend more money to suppress fire than what could be potentially lost if we not (5, PANP).

Moreover, since PANP is part of Parks Canada's national fire management program, it is ultimately the overall fire cost for Parks Canada that matters. One way of making it cost effective is for Parks Canada to distribute its resources, including fire crews, over the country (6, PANP). Another significant example of being cost effective is the sharing of resources through the MARS Agreement. In this way the user only pay for the days they have access to the actual resource (ibid.).

Social capital is an important aspect of adaptive governance and can, as the literature points out, enhance the capacity for people to work together (see section 2.4.4) and, hence, is important for effective performance. To find out if social capital also is an important part of fire management the interviewees were presented a definition of social capital (i.e. 'social capital' refers to levels of trust, common rules, norms, and networking among individuals and/or groups), and then asked if they see social capital as a pre-condition for effective performance. All interviewees answered affirmative on this. However, few of them made further comments and the ones who did referred mostly to trust. To find out more, a second question was asked about whether there is sufficient social capital to facilitate consensus-making and trust-building. The answers here were also affirmative and, again, most comments relating to trust. However, not all were reflecting on the internal trust, whether among the Resource Conservation staff or from the other functions within the Park, but rather they also spoke of the trust the public and other stakeholders have in Parks Canada. One comment was: "Yeah, I think there's a fair amount of trust. [...] I think that there's trust and recognition of skill by others towards the resource management group" (6, PANP). Another comment that related to the stakeholders' trust was: "The stakeholders that we have, like the members of the public, I think that we are given their trust. They don't want to talk to us. They just want us to look after them. They don't want [...] to be involved with the day-to-day operations. They just want to know that they are being looked

after” (4, PANP). This comment confirms what the representative from the Waskesiu Community Council said about the residents trusting PANP in fire management issues (see Legitimacy in section 5.2.1.2). One interviewee at the national level of Parks Canada gave a more illustrative answer to whether the presence of social capital is a precondition for effective performance:

Strongly agree, strongly agree. Yeah, if it wasn't for the social capital that you describe, and that sounds exactly like our strong fire management network, you can't have a success in fire management. You could have an individual success, you know, a person could do well in any particular park managing a fire, but unless you've got that social capital that brings the group together then you're not going to have a successful project, fire or incident (1, PCA).

Another interviewee at the national level answered the same question: “Yes, I would think so because [...] the strength of the fire program is it's always been very grassroots sort of driven by the practitioners in the field units. And we've always been good about sharing information and leaning on each other, so yeah, I would say that” (2, PCA). The same interviewee pointed to two things that contribute to trust-building within the national fire management program: the fire incident management teams, and the yearly fire command team meetings. The latter has “a lot of socializing and a lot of bonding, team building in the evenings when you're trading sort of war stories. [...] Because we have those two things I think there is a lot of trust and there really is a sense of family within the program” (ibid.).

A problem with asking about social capital is that few, if any, from PANP knew about this concept prior to the interviews. Hence, giving them a definition and then asking questions based on that can easily result in leading questions. A reason that many answers only related to trust could be because I tended to emphasize the word ‘trust’ and that was something to which they could easily relate. Nevertheless, the answers at the national level of Parks Canada clearly indicated that the characteristics of social capital exist and are important within fire management, even though they may not use that concept themselves. With this in mind, it appears that the level of social capital is satisfactory within PANP and that social capital is needed for effective performance. Next, social capital with respect to the cooperation between PANP and SE is reflected later in this section, under Interactive.

Effective communication is another important aspect of effective performance. Effective communication within the Park requires both effective internal communication and effective

external communication. The external communication is covered under Interactive. According to one interviewee, the internal communication during fire season “works really well. We’ve got a small pool of people so it’s pretty hard not to know what’s going on” (5, PANP). However, when it comes to communication through written documents there are things that could be improved in terms of reviewing and reporting incidents, as one interviewee claimed: “I think we’re a little weak on our follow-up. Like we don’t do the After-Action-Reviews as quickly as they should be done and as thoroughly as I think we could” (ibid.). To not follow up directly after the fire incidents may lead to the same mistakes being repeated, instead of learning from them. This is directly linked to Transparency, see section 5.2.1.2. Seen to the overall communication within the Park one interviewee argued:

I think it's kind of average. I think it could be improved. At certain levels I think we have a fair amount of communication amongst the managers. I don't know that we have sufficient communication between the different functions so that different people know what's happening in each section (6, PANP).

With the findings presented above, it appears that PANP is fairly effective and efficient. Being part of Parks Canada’s national fire management program means that PANP needs to follow the directives set at the national level which, at least theoretically, ensures the effectiveness in fire management by following the fire plans. It also gives them advantages in terms of access to resources, both from the other national parks and through the MARS Agreement, contributing to cost effectiveness. They also have the financial capacity through the program. Nevertheless, there are factors, such as weather conditions, that fire management cannot do much about. Also, during a big fire year getting enough resources will always be a challenge. Thus, it appears overall that PANP has adequate capacity, but with the challenges that were mentioned the assessment is ‘partly present’ rather than ‘present’ on this particular criterion. However, without effective communication and a satisfactory level of social capital in fire management these benefits would be less efficient. The point the interviewee at the national level made on social capital, and its crucial role for successful fire management, suggests that social capital is a key factor in effective fire management. Thus, the importance of social capital should be more emphasized in planning for fire management; the characteristics of social capital may be there without people thinking about it. Also, being aware of its importance makes it easier to maintain. Practicing ‘business as usual’ when the level of social capital is high and relationships are built

up, may result in a decreased level of social capital when changes occur, such as when new people are entering the group. Hence, it is important, as Brondizio et al. (2009) point out (see section 2.4.4), to maintain and sustain the levels of social capital.

Preparedness

Being prepared for wildfires is part of the planning process and involves various actions. One is to use fire services, such as fire weather forecasting, and forest fire danger rating, that can help predict wildfire events. The interviewees all confirmed that PANP is using such services. They also work closely with SE and have access to their forecasting system, or could ask SE for spot forecasts, as described under Information-sharing in section 5.2.1.2. PANP also have access to Parks Canada's own system. Another way to be prepared is to have inventories of human and physical resources. PANP is regularly carrying out such inventories according to all interviewees. However, since PANP is part of the national park network and relies on resource sharing, they have a relatively small supply of resources, as one interviewee argued: "I mean for us it's pretty easy 'cause we're a small jurisdiction here so we have got one crew" (5, PANP).

Next, it is also important to have priorities for protection to avoid confusions once a wildfire has started. All of the interviewees mentioned human life as the number one priority, and as number two properties or facilities/infrastructure. Also a third priority was mentioned – ecological values (2, PANP). One interviewee gave his/her reflection on the primary priority: "Definitely it's always going to be around human life and that human life is two-fold. Human life of fire fighters first, and human life of the public of people that use the area. So we'll never put people at risk to protect people at risk" (ibid.).⁴⁶ Moreover, in terms of protecting properties the Park is prioritizing properties owned by others (e.g. lease holders, the province) before their own properties, as illustrated by one interviewee: "We have lots of resources out there, cabins and that. [...] We do make an effort to protect them, but we would make a much bigger effort to protect them if they were owned by others" (1, PANP).

Public education is crucial to enhance the awareness of wildfire risks and to inform how to mitigate the risks. PANP uses both a proactive way of educating (e.g. FireSmart, see below) and a reactive way (5, PANP). The reactive education is part of the information-sharing that

⁴⁶ These priorities of protection are not completely matching the values at risk presented in the Fire Management Plan. There the top three values at risk are: human safety, commercial forest reserve lands surrounding the Park boundary, and Waskesiu townsite (Weir & Pidwerbeski 2000, p. 2).

takes place during a fire event (see section 5.2.1.2). One interviewee explained that when they get into a serious fire hazard the Park's Communication section "start to make sure that people are aware [...], keep the campfire or no campfire, or be extra careful with this or we might even close an area down" (5, PANP). Next, part of the proactive education is public contact and the distribution of various documentation that inform the public on fire management and risks, such as the information provided with the fire permit (1, PANP). Other examples of public education are: using information bulletins; Park staff talking directly to people at the campgrounds about making sure they extinguish fires; and broader public consultations (see section 5.2.1.1).

Implementing FireSmart is another aspect of preparedness, and as mentioned above, part of the public education. FireSmart has been implemented in the Park and can be seen as an ongoing project. As mentioned in section 2.2.2, there is no legal requirement for local residents to implement FireSmart practices. One interviewee claimed: "We try to encourage it but [that's] all we can do" (5, PANP). However, the land surrounding the leases is Parks Canada's responsibility and "we still got a lot of work to do in the community ourselves" (1, PANP). There are also FireSmart efforts carried out on the local landscape. Whether FireSmart is working is another aspect. One comment was: "There's certainly been effort in town by some property owners to make sure that their properties are more in compliance with those FireSmart objectives, but [...] there's still more to be done. It's better than it was" (5, PANP). Another interviewee argued that "FireSmart works well within this community during periods of high hazard" but "during periods of low hazard people start forgetting" (2, PANP). In terms of FireSmart on the landscape one interviewee argued:

We have done a lot of FireSmart or fire management around [...] the community. [...] Haven't had a fire where we actually had to use it, but it's working. We changed the forest cover, we changed species composition and it is maintained every year. We're working to maintain it and I think that worked very, very well. But we've not had a chance to test it (1, PANP).

Another interviewee gave a deeper insight to how FireSmart should be perceived before judging whether it is working:

FireSmart, to the government agency responsible for the lands around those facilities, is limiting the potential of a wildfire or a forest fire burning into that community. And so I think what we've done here will not stop a fire, it will allow us to stage a defence. [...] Well done FireSmart, it provides the time or the break in fire intensity to allow

suppression programs to become effective. So if you look at our fuel break it's full of grass, it will burn well. But I'd much rather be fighting a grass fire adjacent to a community than a fully involved forest fire because you'll lose the community. We could very well protect the whole community so our landscape FireSmart is working very well (2, PANP).

Trying to get local residents in Waskesiu to be FireSmart is the main way the Waskesiu Community Council is directly involved with fire management in the Park (1, WCC). The representative from the Council believed the residents have accepted FireSmart, but he/she was not so sure they always follow it: "That's another thing. People accept things and say it's a good thing. It's like speed limit in town. It's a good thing, but do I follow it? [...] But by and large when you remind them they think about it, and they follow it I think reasonably well" (ibid.). His/her impression was that since the implementation of FireSmart the fire hazard situation has been improved: "I think so. Certainly we've cleaned up some of the areas" (ibid.). One problem in the collaboration with Parks Canada is that the Council would like to collect garden waste or building materials more often than the Park is willing to:

We're trying to say 'okay, if we can do FireSmart program twice a year', then we say to the residents 'okay, all you have to do is put it out on the street and they'll pick it up on this weekend'. But to get that to happen is very difficult. And part of it is their union and all of those types of things (1, WCC).

He/she added: "We've never been able to do it spring and fall. They have so much to do. They don't have time" (ibid.).

As the findings above indicate, PANP has taken some measures to be better prepared for wildfires, such as using fire services, having priorities for protection, and inventorying resources. However, the latter is not a significant issue for PANP since they do not have many Park based resources; rather they get resources through the MARS Agreement or from the Parks Canada network. Also, to mitigate the fire risks through public education is part of being better prepared for fire. Informing about the ecological benefits of fire is important to change people's perception of fire as something negative that has to be suppressed. As Hesseln (2006) points out (see section 2.2.2), the public expects fire fighters to protect their property from fires and, hence, they do not take the responsibility to mitigate the fire risk on their properties themselves. Also, with more urban people moving to the WUI areas, or staying as summer residents such as in Waskesiu, it is crucial to make them aware of the fire risks through public education and to

inform them how to mitigate the risks on their property. Thus, FireSmart is a significant proactive effort to mitigate fire risks in Waskesiu. However, some improvements are needed. For example, Parks Canada needs to collaborate better with the Waskesiu Community Council so, as the representative from the Council stated above, garden waste and building materials can be collected more frequently. It is imperative to make such actions work to facilitate for residents to practice FireSmart. However, as long as it is on a voluntary basis it will always be residents that do not FireSmart their property. In order for it to be truly effective it either needs some kind of monetary incentives to encourage property owners to follow FireSmart, as has been suggested in the literature (e.g. Taylor et al. 2006), or to make FireSmart a legal requirement.

Interactive

The only local fire cooperation agreement is between PANP and SE and is a border agreement that includes a detection and fire suppression cooperation between the two agencies within 10 kilometres on either side of the Park border. For more on this see section 4.4.1. There are also agreements at the national level that concern the Park. The main one is the MARS Agreement through CIFFC that involves resource sharing (see section 2.2.2). One of the interviewees stressed the importance of CIFFC in coordinating resource sharing across jurisdictions in that they handle a lot of the bureaucracy that otherwise would be needed to go through: “Instead of me making a hundred phone calls I make one phone call to them” (4, PANP).

Being part of Parks Canada’s national fire management program directly implies that planning for fire management in PANP is coordinated vertically. PANP has to follow Parks Canada’s policies and the Directive, and there are also mechanisms in place that secure that PANP is following the directives in the planning process. For example, as earlier mentioned, there is a reviewing process both in terms of developing the Fire Management Plan and the prescribed burn plans (see section 4.2.2). Whether this process is effective cannot be assessed here since the issue was not brought up at the time of the interviews. Moreover, there is no horizontal coordination of fire management planning at the local level for PANP other than within the confines of the local agreement with SE. Other stakeholders are only involved in the planning process through consultation and information-sharing (see section 5.2.1.1). Instead, it is at the national level that most interaction with other fire agencies takes place. However, one interviewee from SE requested more cooperation in fire management planning:

I would have hoped that there would have been a greater level of cooperation at the planning level between the Park and the province, and the reason I'm saying that is so we have a firm understanding of how we can manage fire rather than just worrying about how we're going to respond to, who's going to have what resources (2, SE).

Effective communication is a significant component in interagency cooperation, and some comments on how the communication works between PANP and SE have already been presented under Information-sharing in section 5.2.1.2.⁴⁷ From a SE perspective most of the interviewees felt the communication with PANP is good, but also explicitly argued that the communication could be improved. In most cases they referred to the need for more meetings. For example, one interviewee pointed to the need for more meetings on the pre-planning stage: "We could do a bit more communicating with some meetings that we haven't held for a while to do with pre-planning for the upcoming fire seasons, and also for discussion on our fire management policies and strategies on each other's landscape if there's anything changing" (1, SE).⁴⁸ Note that this relates more to the higher levels of SE. As already mentioned, there is more frequent information-sharing at the local level between the two agencies (see section 5.2.1.2). Another interviewee argued:

Well, there's always room for improvement. You can never say that it's working perfectly all the time. That's not true. [...] As far as higher level involvement with Parks we haven't had a lot lately. [...] There haven't been a lot of changes so I guess there just hasn't been a need to meet. But maybe we should try and have a yearly meeting or whatever. Maybe there are some things we're missing [...] There's been no requests for meetings and that, but it's probably something that could be improved (3, SE).

One interviewee at the national level of Parks Canada suggested how interagency communication in general can be improved:

Where we're not communicating well I think we need to put some emphasis on breaking down barriers and making sure that we are communicating well, especially not during the wildfire incident. [...] The worst time to talk to another agency is when fires are trying to go from your jurisdiction to theirs. Things tend to be a little hot then so good to have the discussions and the planning when there's no fires going on (1, PCA).

⁴⁷ Effective communication was also addressed under Effective and efficient in section 5.2.2.2, but then in regards to communication within PANP. I here chose to separate communication within PANP from vertical and horizontal communication.

⁴⁸ There used to be an operational review meeting every spring prior to every fire season to review new equipment, crews and processes. Also, the SE general meetings to which PANP was invited ceased and instead they "allowed the meetings to go out to all of the [fire] districts" (1, SE).

The quality of communication with the higher levels of Parks Canada was not addressed at the time of the interviews, but one response to a follow-up question was: “It is pretty good, but not good enough I would say. Though measures have been taken recently to address that” (6, PANP). Whether this response refers to communication within Parks Canada in general, or to communication within the national fire management program is not clear. Next, communication between the different national parks is efficient according to interviewees at the national level of Parks Canada. One comment was:

I would say absolutely. We keep an up-to-date personnel directory with fire people from across the country that's available on our [...] web based system that [...] any of the fire guys can access. So that's how we sort of trade information. [...] We're not a very hierarchical sort of organization. [...] People I think are very comfortable talking with one another about any sort of issues (2, PCA).

The earlier mentioned fire command team meeting “is another great opportunity for us to have those same sorts of conversations in a very casual way” (2, PCA). Another comment was: “Communication is pretty good. We’re small, we talk, we’re mutually supportive when we talk to each other and we work together in the field so that really helps” (1, PCA).

Just as effective vertical and horizontal communication is important for effective outcome in cooperation and coordination, it is essential with a high level of social capital among the actors.⁴⁹ In terms of cooperation with SE one interviewee from PANP pointed to the importance of social capital:

Yes, absolutely. [...] Some of our informal resource request, rather than going up to the national duty officer we’ll go directly to whatever fire manager that be sitting at the desk in the province. We certainly find that if you got a good [relationship] with [the] manager at duty desk that person might be more familiar with how we approach fire and more comfortable with it. And I think that goes a long way into whether our requests are received or not (5, PANP).

Also SE gave their view on social capital in regards to the cooperation with PANP. One comment was: “I think so, yeah. ‘Cause I think when you've got those social interactions I think

⁴⁹ Social capital was also addressed under Effective and efficient in section 5.2.2.2, but then only social capital within PANP was described. Here the social capital that exists in vertical or horizontal interaction is illustrated.

[...] you feel more comfortable with these individuals and [...] you know how they are going to react” (6, SE). Another interviewee gave his/her view:

Oh yeah for sure. [...] I've had many, many meetings with the National Park. I think we have built up a certain level of trust and respect. We respect what they are doing and where they are coming from. You know after some rocky times you learn from your difficulties. [...] They don't seem to be changing their staff as much as they used to so they're there long enough. [...] Some of them have been there for many, many years (3, SE).

Whether PANP and the higher levels of Parks Canada together have built up a satisfactory level of social capital was not addressed at the time of the interviews. However, one interviewee from PANP claimed in a follow-up question that it is “generally good” (6, PANP). Next, the representative from the Waskesiu Community Council was asked if trust exists between the Council and PANP. He/she answered: “If you would have asked me that ten years ago I would have said there’s absolutely no trust amongst the people and the Park. It’s getting better. There’s still lots of distrust, but it’s better” (1, WCC). He/she mentioned an incident some years ago when the residents wanted to spray spruce budworm and public meetings were held, but the Park had already decided not to spray:

So the people got together and really got their arms up and contacted politicians. [...] And nine months later we sprayed spruce budworm. [...] It was a really dividing point so Parks Canada had to work very hard at getting the trust back. And I think they’ve done a good job. Our Superintendent right now is a very good guy. Well spoken, really talks to the people, talks to them at their level. [...] They’ve done a better job. So there is [...] a reasonable degree of trust (1, WCC).

An interesting aspect is if the improved relationship was a result of structural changes within the Park’s organization, or if the reason was that new people came into the organization. The representative from the Council gave his view:

A little bit of both, but more the people. [...] I think the idea that ‘we can make a decision and it doesn’t matter what you say, we’re going to do it’. They’ve realized they can’t do that. But they’ve certainly done a job of finding the right person to take this position (1, WCC).

He/she also thought PANP listens more to the residents now (ibid.).

As stated in section 4.2.2, Parks Canada acknowledges the importance of cooperation with other agencies and stakeholders to reach their management goals. Also, having a landscape focus in fire management requires horizontal cooperation, especially since fire does not stay within fixed borders (Miller 2003). This suggests that within Parks Canada there is an awareness of the importance of functional interactions both internally and externally. However, coordination of planning horizontally is not taking place because of different jurisdictions. That one interviewee from SE would like to see more cooperation with PANP at the planning stage is interesting and worth looking deeper into. Moreover, communications with SE seem to be reasonably effective, but as interviewees at the higher levels of SE pointed out there could be more meetings. Having more meetings appears to be the general suggestion when it comes to addressing challenges in the cooperation (see section 4.4.3). More meetings also contribute to maintaining the level of social capital that has been built up throughout the years. Indeed, Thomas (2003) argues that frequent interaction is required to reach a high level of social capital (see section 2.4.4). The findings from the interviews indicate that the current level of social capital between PANP and SE is satisfactory and facilitate cooperation, especially at the local level where more of the daily contact takes place during fire season. For example, the informal resource request that sometimes takes place, as illustrated above, indicates that the social capital has reached a level where, as Johnston et al. (2008) argue, social capital may facilitate access to information and resources that would otherwise not be accessible. Next, the comment from the representative from the Waskesiu Community Council about improvements in the relationships with Parks Canada and that they listen more to the people today, point to the case of trust-building after a period of some turbulence. It also shows that having the right people in the right positions is crucial, and that with new people in an organization the level of social capital can increase, as opposed to a situation where the level of social capital is high and, as argued by Brondizio et al. (2007) (see section 2.4.4), may decrease when new people enter the group. The importance of social capital was also discussed under Effective and efficient above.

5.2.3 Adaptiveness

Adaptiveness refers to being able to adjust to changing conditions, such as climate change. This is the ‘adaptive’ part of adaptive governance, and is strongly linked to adaptive management as illustrated in section 2.5. It includes a learning and experimental component and knowledge-building where the newly acquired knowledge is incorporated into policies and

practices. However, to be adaptive the governance structure needs to be flexible to accommodate learning processes and be able to adjust to new knowledge. Table 5.6 provides an overview of the findings of the assessment that pertain to Adaptiveness, and details are explained in the text that follows.

Table 5.6. A summary of the assessment of the principle Adaptiveness.

Principle	Criteria and Indicators	Present	Partially Present	Could be improved
<i>Adaptiveness</i>	Learning and experimental			
	Participants are open for new ideas and willing to try new fire practices.	●		
	‘Lessons learned’ is an important component in fire management.	●		
	Mechanisms for monitoring and evaluating system feedback exist.	●		
	Knowledge-building			
	Policies and practices are continuously upgraded and reflect the latest knowledge and lessons learned.	●		
	Used knowledge reflects multiple ways of knowing.	—		
	Flexible			
	The governance structure is flexible, both in terms of policy and organizational structure.		●	Make governance structure for planning and policy more flexible.
	The governance structure is reviewed regularly to determine if changes are needed.	—		

- Information from interviews and document analysis suggests presence or partial presence of indicator.
- There are no data or not enough data to make a judgement. The indicator was not addressed in the interviews, or a follow-up question did not give full information.

Learning and experimental

Being open for new ideas and willing to try new fire practices is an essential part of being adaptive. It appears that Parks Canada, and PANP, is overall open to new ideas and willing to try new practices. One illustrative example where Parks Canada has adopted new practices is the use of prescribed fire. One interviewee from PANP pointed to the case that while trying to get more fire on the landscape they often are “the proponents of some of these wacky ideas”, with other agencies being either resistant or receptive to what Parks Canada is doing (5, PANP). However, it is not always possible to adopt new approaches even if individuals in their mind are open for

new things, as one interviewee from PANP illustrated: “Well, willing to and given the go ahead to spend the dollars is a different [thing]. We don’t always have big budgets” (4, PANP). This point to the aspect of being open in your mind to try new things, but other factors such as the financial capacity and/or institutional inertia (see Flexible below) makes it difficult to actually do it.

The willingness to try new ideas is closely linked to learning from past experiences. Parks Canada acknowledges the value of learning from past experiences and they have also adopted the practice of adaptive management in which learning is an important component (see section 2.3 and section 4.2.2). One interviewee at the national level commented on their use of adaptive management: “That comes right out of our policy. The idea is not to wait until we know all the information, but to continually be collecting and adapting as we learn more” (2, PCA). Another interviewee at the national level gave his/her perception of learning: “Yeah, I fully subscribe to the continuous learning, continuous improvement, don’t assign, it’s not about blame, it’s not about finding somebody to nail on the cross, it’s keep making things safer and more efficient” (1, PCA). The same interviewee argued that “one of the successes of the Parks Canada program is that we have a culture of continuous learning and the folks are humble enough so [...] they do communicate new things and they adopt new things” (ibid.). He/she added: “So we don’t hold on to, you know, old concepts or old ideas just because we’re stubborn. We’re not a very stubborn group” (ibid.). Moreover, he/she also claimed that Parks Canada’s fire management program is striving to improve practices through learning from past incidents by exploring the High Reliability Organization (HRO) concept.⁵⁰ He/she explained:

After every event you sit down and ask what worked, what didn’t work, what would I do different? [...] And if you apply that to every incident you have and then institutionalise that by changing your policies and changing the way you do things collectively and sharing that information so that a person doesn’t have to make the same mistake in another incident, then, you know, you tend to improve your organization over time. You become safer and much more efficient, so we’re just sort of going down that road (1, PCA).

However, the same interviewee also pointed to one difficulty with this way of continuous learning:

⁵⁰ For more on the High Reliability Organization (HRO) concept from a fire perspective, see the Wildland Fire Lessons Learned Center: <http://www.wildfirelessons.net/Home.aspx>

It's good in principal. It's tough to apply because especially after an incident where people did their best and, you know, you're talking about pointing out to someone that you didn't do a very good job there, how would you do it differently? [...] You really have to be humble and cultivate humility in order to be able to take on some of those changes (1, PCA).

Other components of adaptive management are monitoring and evaluating system feedbacks. Parks Canada has monitoring and feedback mechanisms in place, both at the national level and within PANP. Monitoring and feedback refer both to policy and planning, and to the practices of fire management. In terms of policy and planning, monitoring and feedback is carried out at the national level (1, PANP). The National Fire Management Committee has a yearly meeting where it reviews the year and makes policy in terms of national strategy and financial management. There is also a yearly meeting for fire managers from all national parks where they discuss experiences from past fire season, as well as resourcing issues and changes in policy or procedures (ibid.). Moreover, there is also nationally monitoring of fire behaviour and fire effects. For example, "areas burnt are measured by satellite imagery and then classified by depth of burn or by intensity of burn" (ibid.). Another national feedback mechanism relates to health and safety whereby the Safety Officer looks at operations from a safety perspective; "If there's an unsafe condition there has to be immediate feedback and fix" (1, PCA). Feedback is also given at the national level at the fire command team meeting where lessons from the past fire season are shared - "what worked, what didn't work, and what would you do different" (1, PCA) – followed by discussions and feedback (2, PCA) (see section 5.2.2.2). There is also feedback given after each fire at the park level in form of fire reports, such as the After-Action-Reviews (see section 5.2.1.2) where they are "trying to pull as much information out of everything that we do just to make ourselves better" (ibid.).

At the park level, within PANP, both prescribed fires and wildfires are subject to monitoring and feedback. The monitoring of a prescribed fire is carried out before and after the fire to see whether the objectives are achieved (3, PANP). In terms of wildfires the Park monitors and assesses how successful they are "in getting our resources and everything else we need to get together" (ibid.). In addition, PANP map all fires and they assess, as explained by one interviewee, "whether we have met our targets as in area burned or not over periods of time, and we assess whether the fire that did occur was really representative of fires that may have burned in here, and so were they of a similar intensity to wildfires or not?" (2, PANP). Based on the

monitoring information they then give recommendations for future fire management: “If we’ve found that through monitoring that we weren’t achieving what we were intending to do we would modify how we’re doing things to better meet our goals” (2, PANP). Also, the management plans are subject to monitoring and feedback where they look at whether they accomplished the goals and how effective the strategies were in achieving the goals (5, PANP). There is also feedback given after an interagency fire, as explained by one interviewee from PANP:

A lot of times that there was an interagency fire that involved both of us we’ll set up a meeting and [...] we’ll have a critique of the whole situation and see what can be done better and what was done right, what was done not so well and make recommendations (3, PANP).

With the findings presented above in mind, an interesting reflection is whether Parks Canada’s adaptive management approach is what Noble (2010) refers to as active adaptive management or if it is the passive adaptive management approach (see section 2.3). Or could it be that what Parks Canada refers to as adaptive management in fact is not adaptive management at all? Since Parks Canada tries to learn from failures (i.e. lessons learned), this points to the case of some kind of adaptive management. However, it is more likely that they use the passive approach; that is, the use of monitoring to follow up one kind of management practice to see if it meets the objective rather than testing several hypotheses at the same time (Noble 2010). To find out with certainty whether Parks Canada practices true adaptive management or not could be valuable. If it turns out that what they call adaptive management in fact is something else, it is likely that they are missing some important features that could improve their management in adapting to changing conditions. Seen from an organizational perspective, Parks Canada has the right conditions to make adaptive management work: a mandate exists to take action in the face of uncertainty; sufficient stability is present to measure long-term outcomes; mechanisms are available to transfer the results of adaptive management to broader policy and management practices; and managers and planners who work with interests in a cooperative environment (Noble 2010) (see section 2.3). Whether they also treat management and policy as experiments was not assessed in this study, but since they in general are willing to try new ideas and also try to learn from earlier mistakes, it at least points to the case of being experimental. Finally, one important aspect that was not touched upon in the interviews is that the nature of fire sometimes

makes it difficult to try new practices from a safety perspective. Thus, fire management is more restricted in terms of trying new practices than other kinds of management may be. This is directly linked to the accountability and liability aspect in a similar way as the case of including stakeholders in the fire management planning (see section 5.2.1.1).

Knowledge-building

The next criterion of Adaptiveness is knowledge-building. Parks Canada is upgrading policies and practices when new knowledge is acquired. However, practices are upgraded more frequently than policies.⁵¹ Upgrading of policies is carried out at the national level of Parks Canada and then diffused to PANP, whereas changes in practices can also take place at the park level. One comment from PANP was: “Policies has not been changed very often. Techniques and practices, yes. That’s to training. When people get trained to a new level of something, [...] if we see advantages to changing something we will do that” (1, PANP). One example where new knowledge has been incorporated and led to updated policies and practices is prescribed burning. One interviewee explained:

15 years ago people weren't doing prescribed burns and now we're trying to use prescribe burns to minimize fire hazard, but also as a way to achieve ecological results. [...] It's an example of Parks Canada adapting a technique and trying to incorporate it into their general operation (6, PANP).

Nevertheless, one interviewee pointed to the case of new technology not always being incorporated into fire practices: “So the technology is changing and we’re not. [...] There’s different technology, different methods and I don’t think we are totally up on them, on what’s out there” (4, PANP).

Fire management is traditionally strongly science-based. However, different kinds of knowing, such as local knowledge, could be of value.⁵² As the literature points out (e.g. McLain & Lee 1996; Jacobson et al. 2009), local knowledge is an important part of adaptive management and in monitoring environmental change (Nelson et al. 2007) (see section 2.3). The interviewees

⁵¹ This study does not intend to assess how often policies and practices are updated, but rather look at if they are updated at all.

⁵² Part of the vision for 2020, as presented in the PANP Management Plan, is incorporating traditional knowledge into science and decision-making (Parks Canada 2008a).

were hence asked: “Do you incorporate local knowledge in wildfire management?”⁵³ One answer was: “Yes, basically we want all knowledge and then come up with the best strategies with that in mind” (2, PANP). The same interviewee explained this comment further: “Local knowledge still has to be incorporated with [other kinds of knowledge]. So local knowledge might be ‘we never have a big fire here’. That’s because our local has been here for twenty years. Twenty years beforehand they had nothing but big fires. So we consider local knowledge in the context of other kinds of knowledge” (ibid.). Another interviewee gave his/her view:

I would say we do incorporate local knowledge. [...] Like say it’s a prescribed burn that is near the boundary. A lot of times you have like long-term residents that are nearby that know the area better than we do for sure, that are gonna know where maybe there’s an old logging camp that we don’t know about that we are gonna check in on. [...] We got the technical data that shows us what a fire look like that happened fifty years ago, but they’re gonna know about that fire. They’re gonna know where it started, where it moved. So I mean that kind of stuff we do incorporate into our planning process (5, PANP).

The above comments on local knowledge illustrate that the way local knowledge is used is more in terms of getting the local context. This suggests that practicing fire management with the best available scientific knowledge (see Parks Canada guiding principle 6, Appendix D) does not necessarily need to exclude other kinds of knowledge. Instead local knowledge and scientific knowledge could be seen as complementing each other. Fire management is of such character that a strong scientific knowledge is needed, but applying it without understanding the local context may imply that science will not be used to its fullest capacity. This is where local knowledge comes in. However, despite the comments above from a few interviewees that point to the case of using local knowledge, this study cannot truly discern if local knowledge is frequently used in fire management in PANP; for this more data is needed.

Flexible

Having a flexible governance structure refers both to having flexible policies and flexible arrangements among actors, and is an essential part of practicing adaptive governance. The interviewees from PANP were asked if they consider the governance structure for fire management to be flexible. Since Parks Canada is the governing body in the Park and in focus

⁵³ ‘Local knowledge’ was not specified in the question. Only when the interviewee asked for clarification it was explained that all local knowledge, not only Aboriginal knowledge, is considered in this study.

here, it is the flexibility of its organization and its policies that was accessed. Most of the interviewees referred to the actual fire situation and argued that the nature of fire is such that one has to be flexible and adapt to the fire behaviour. Thus, this relates more to the actual management of fire, not the governance structure. Nevertheless, there were also a few comments on the actual governance structure. One comment that referred to the organizational part of governance was:

As far as our structure in the Park, it's actually pretty flexible. Because, like I say, we got a kind of a small group of people to worry about that kind of fill in for each other as needed. And we have to fill in for each other as needed 'cause not everyone is here all the time. So in that respect we are quite flexible. And that we can all do each other's jobs, and that works well (5, PANP).

Another interviewee's comment pointed towards a flexible governance structure within the Park and within Parks Canada overall:

I would think that it's fairly flexible, because I think it has to be flexible to a certain extent because we're dealing with external partners. So you have to be willing to listen to what they have to say. It's not like we're just our own kind of empire and we ignore what people say in the community here or outside the Park. [...] And because we're dealing with a national fire program I think we've got a little bit more leadership in fire management than we might have if it was strictly managed within a Park. Because when you're right in a Park you tend to get people who have been there for a long time, and they get set in their ways. They've done their plan, and nobody should touch my plan. Whereas here we've got more professionals that are addressing these things, and they're adapting, looking at new literature, new approaches of doing things, new ways of doing things, and then that's getting placed into the planning processes and it becomes an expectation of the plan to incorporate these new features (6, PANP).

He/she also argued that practicing prescribed burning has contributed to a more flexible fire management: "My sense is that [...] because of the prescribed burning approach, it forced us to be more flexible, more kind of creative, more willing to listen to what other people have to say" (ibid.). However, another interviewee had a somewhat different opinion and claimed: "I think that [...] fire management policies, procedures, planning is pretty rigid" (1, PANP). He/she explained further:

I find fire management is a very rigid structure, rigid organization and a lot of it is based on past experience, and not a lot is based on future expectations. So I really think that it could be a lot of value in an organization that is better at being adaptable and predicting

and adapting to future changes, 'cause we are always playing catch-up. Fire strategies try to set long-term goals but for the most part we are looking at current situations and how do we do a better job today than what we do. And you talk to fire managers and [...] a lot of it is based on what I learned and what I experienced and what I've seen (1, PANP).

Nevertheless, the same interviewee agreed that they are flexible to the actual fire situation:

Fire is an extreme event and it can, especially in the boreal forest, be changed rapidly, and so our organization is excellent at being adaptable to the event. Very, very good at that. And I think we do an excellent job, but it's far less adaptable when it comes to policy and planning and long-term goals and measurables and monitoring (1, PANP).

In terms of whether the overall governance structure of Parks Canada is flexible one interviewee at the national level stated:

Yeah, absolutely. I mean when you consider the land base that we are responsible for and across the country [...] there are multiple field types, different terrain, different weather systems that we have to operate within. And we are a small organization when you compare us, in terms of the number of people and the budget that we have, to some of the other agencies responsible for fire management. We've actually had to be quite flexible and quite adaptive and [...] the idea is that we're always trying to learn from what we've done (2, PCA).

Another interviewee at the national level argued:

I have to say the governance of a fire management agency like Parks Canada which has so many different jurisdictions within one jurisdiction [...] that we have to have a flexible planning process and a flexible way of cooperating. [...] You need that flexibility in order to meet the majority of needs of all the members of the fire management network (1, PCA).

The same interviewee explained the aspect of flexibility from an operational perspective of governance:

When it comes to actually managing a prescribed fire or a wildfire, you need an extremely flexible system, management system in order to make that work. [...] We use incident command system to do that and it has the flexibility in order to work for us. It also has the flexibility to move between jurisdictions in that once the fire becomes large enough that multiple jurisdictions have to cooperate. They have to understand common language, you know, common terminology. They have to understand common structures in order to work together effectively (1, PCA).

He/she argued that before ICS (see section 2.2.2), which was introduced about ten years ago, the governance structure was more rigid with each jurisdiction having their own fire management system (1, PCA). Thus, ICS has increased the flexibility in managing fire.

Another aspect of flexibility is that an individual can have a flexible mindset and be open to try new ideas, while the governance structure as a whole may be rigid. One interviewee from SE pointed to the difference of people's thinking being flexible as compared to actually changing the fire program. "I think knowledge building is one thing, adapting your organization to that knowledge is quite another" (2, SE). He/she continued:

I think governments are notoriously slow to change. I think it takes some pretty good rationale and analysis and support with sound thinking and evidence to change a program, and programs that don't require funding, that require thinking, are easy to change. Programs that require increased levels of funding as an adaptation to some new knowledge are really quite a different matter (ibid.).

He/she used fuels management as an example where the thinking has changed in the province, but it has not been fully implemented mostly because of lack of budget capacity. As he/she stated: "It's one thing to change the thinking, it's one thing to adapt your thinking, it's one thing to adapt your procedures, another thing sometimes altogether different when it comes to try increasing your resource levels" (2, SE). This relates to what Briassoulis (2004) says about institutional change being a long process because of the institutional inertia accommodating change. It also relates to what Young (2002) refers to as path dependency, which may result in mismatches between ecosystems and institutions (see section 2.4.3).

With no clear consensus, it is difficult to assess whether the governance structure of PANP is flexible or not. It is clear, however, that they are flexible to the actual fire situation, which should point to the governance structure being at least partly flexible since being flexible in managing fires requires at least to some degree a flexible governance structure that can accommodate adaptive management and other adaptive practices. Also, at the national level of Parks Canada the governance structure appears to be more flexible, something that is required when dealing with a network of national parks and being part of other national networks (e.g. CIFFC). It also points to the case of individuals within the national fire management program being flexible and open to new ideas. This is in line with what the interviewee from PANP claimed when saying that being part of the national fire management program makes them more

flexible since the leadership at the national level, being adaptive and looking at new approaches, will incorporate new insights into the local fire plans. As Clark (2002) argues, people with a rigid perspective will not be able to adjust to new situations (see section 2.4.2). The comment on policy and planning being ‘pretty rigid’ somewhat contradicts this suggested flexibility, but it also points to the complexity in trying to assess whether a governance structure is flexible just by using semi-structured interviews, such in this study. For this, other tools are needed. The suggested rigidity may also be related to what one interviewee from SE meant by individuals being flexible in their thinking, but governments being slow in incorporating changes. Nevertheless, the overall judgement of the governance structure of PANP is that it is partly flexible, but there are indications that certain aspects are still rigid as pointed out above.

Finally, the indicator of regularly reviewing the governance structure was not addressed at the time of the interviews. A follow-up question was sent out and according to one interviewee the overall governance in the Park is discussed on a regular basis, but in regards to governance of fire management it is not discussed “regularly enough” (6, PANP). Nevertheless, further assessment is needed to get a clearer picture of whether this indicator is present or not in PANP.

5.3 Perceptions of Climate change

With the predictions of a changing climate in PANP in mind it is interesting to look at the interviewees’ perceptions of climate change and the reason for why models, or the projections for climate change, have not yet been incorporated into the Fire Management Plan (see section 5.2.2.1). An indication from one interviewee is that even when they will review and update the Plan the strategies will not reflect climate forecasting “because climate forecasting is so coarse” (1, PANP). This is not to say that they are not aware of the concerns of climate change within the Park. One interviewee pointed to the prediction of shift of grassland to the north due to warmer and drier climate (see section 3.3), and also that fescue grassland has moved into the Park from the south. With fescue grassland being rare in Canada today this ecosystem is perceived as important and something Parks Canada would like to see more of. From this perspective, the same interviewee argued that “climate change is good news with respect to fescue grassland” (2, PANP). However, for park management in general climate change is considered. For example, the State of the Park Report from 2005 and the PANP Management Plan both include climate change. They point to the predictions of increase in extreme weather events and call for a

flexible and adaptive management approach to be able to address these potential changes (Parks Canada 2005c).

In regards to planning at the national level one interviewee admitted that climate change considerations are not specifically incorporated into the fire management planning. Rather it is seen as one factor among a number of factors (e.g. insect and diseases, fuel accumulation) that has resulted in more fires; “but it’s certainly something that we are trying to be mindful of” (2, PCA). Another interviewee also stated that climate change has not been incorporated into fire management planning at the national level. However, they have been looking at fire suppression versus a fire restoration policy in terms of how much carbon is released into the air and came to the conclusion that using prescribed fires today is actually beneficial to the management of carbon; “We think that the only way we can actually manage fires in the future is to use fire” (1, PCA).

With the information received from fire staff in PANP in mind, it appears as they do not see climate change as an issue that requires action today, rather many years will pass before they need to deal with it. For example, one interviewee gave as example the northward migration of aspen: “It’s going to take a while and I think we have several hundred years before we have to be concerned about that situation” (2, PANP). Until then, the use of adaptive management, including monitoring, could be seen as a safeguard to detect changed conditions: “If our monitoring is detecting a concern and we feel that concern is related to our management we’ll adapt our management to reflect that concern at that time” (ibid.).

Another interesting point that was made is that warmer weather in the boreal forest has actually reduced fire (2, PANP), that is, a different scenario than what the literature predicts (see section 2.2.1). This notion points to the problem with climate change predictions, the uncertainty factor, which also one of the interviewee at the national level of Parks Canada emphasized: “That climate is going to warm, yes, but how it actually affects fire we’re not a 100 percent sure. I mean if you have more extreme climate variations then, you know, we might get worse wind events, we might get more rain in certain parts of Canada, we may get less rain” (1, PCA). Nevertheless, he/she acknowledged the predictions of longer burning seasons and more extreme events in western Canada. The same interviewee also pointed to the ecological perspective and the prediction of species migration, touching on the issue of static protected areas (see section 2.2.1):

We are gonna have species migration, so how are we going to manage that in a static protected area? It's going to be interesting especially if it's something like fires. Fire is a restoration process, it's going to reset the ecological clock in a lot of instances. What happens if you reset the ecological clock when all the edaphic factors are changing at the same time? There's gonna be different moisture regimes and it's gonna be different soil temperature regimes and different hydrology based on different rain flows. So I'd have to say it's going to be a fairly [...] complex system to micromanage, to see how we're going to deal with climate change (1, PCA).

Nevertheless, as he/she argued, even after a shift in vegetation it will still be fire prone vegetation; "so although the species may change the natural processes won't" (ibid.). Last, the comments above point to a complex scenario whatever changed conditions a changing climate will bring. It is therefore imperative to have, as Scott and Lemieux (2005) point out (see section 2.2.1), the strategies and the right tools in place to be able to adapt to changing conditions. Thus, even though PANP has not incorporated climate change in the fire plans their use of adaptive management, including monitoring, suggests that when changing conditions occur they will be able to detect them fairly early, at least in theory.

5.4 Summary

This chapter presented the results of the assessment of the governance structure for fire management planning in PANP. Overall PANP appears to have many of the characteristics of adaptive governance already in place: stakeholders are included in the fire management planning, but more in terms of consultation; legitimacy and accountability; information-sharing in fire situations; foresight and leadership; mechanisms to be more effective and efficient (e.g. cost effectiveness measures, training opportunities); a satisfactory level of social capital - both internal and external with SE; aspects of preparedness (e.g. weather services to predict wildfires, public education, FireSmart); cooperation agreement with SE; and components of learning and experimental, including the practice of adaptive management. However, there are also some improvements needed, such as to clarify responsibility areas in a fire situation for all Park staff; increased level of transparency in terms of accessibility of fire management information; written internal communication in terms of following up fire incidents; to make the FireSmart program more efficient; improved communication with the higher levels of SE by having more meetings; and to make sure the governance structure for planning and policy is flexible. Also, it may be appropriate to involve stakeholders earlier in the planning process. Some of the indicators were not touched upon at the time of the interviews due to a revision of the criteria and indicators later

in the study, and requires further research. This mainly includes the aspects of fairness and transparency.

Finally, linked to the assessment of the governance structure is PANP's perception of climate change. Even though PANP has not incorporated projections of climate change in the Fire Management Plan their use of adaptive management suggests that they will be able to detect changing conditions related to climate change, at least in theory.

CHAPTER 6: CONCLUSIONS

6.1 Summary of Findings

An important part of this study was to develop principles, criteria and indicators of adaptive governance for fire management planning (Objective 1). These are presented in Appendix C. This framework was then used as a tool to assess to which extent fire management planning in PANP is consistent with the features of adaptive governance (Objective 3), and to see if there are things that need to be improved to be more effective and adaptive. Although this approach has its limitations (see section 6.4) it serves well as a tool to get a first indication of the quality of a governance structure. In addition, the governance structure of PANP was described (Objective 2), and suggests a multi-level governance with vertical (i.e. with the regional and national levels of Parks Canada) and horizontal (i.e. with stakeholders in and near the Park; SE being the main partner) interaction. PANP is also connected to other national parks, and to CIFFC and other agencies/organizations through the national fire management program (see section 4.2.3.2).

Altogether, the findings indicate that the governance structure for fire management planning in PANP already has many of the aspects of adaptive governance in place, such as inclusiveness (although could be improved); legitimacy and accountability; foresight and leadership; a satisfactory level of social capital; aspects of preparedness; a cooperation agreement with SE; and the learning and experimental component. However, some improvements are needed, mostly in terms of communication and information-sharing, but also to increase the flexibility in the governance structure in terms of policy and planning (see section 6.2). Most of the needed improvements refer to being ‘effective’ rather than ‘adaptive’. This does not necessarily mean that PANP is better at being adaptive than effective. Rather the needed improvements relating to ‘effective’ were easier to discern with the data from the interviews. There are also fewer criteria relating to the ‘adaptive’ part of adaptive governance.

The study also looked at the interagency cooperation between PANP and SE (Objective 4). My assumption before the interviews was that because the two agencies belong to different

jurisdictions there would be major obstacles to cooperation. Findings showed that having different mandates because of the different jurisdictions is the biggest challenge, but it does not prevent cooperation. Throughout the years both agencies have worked out ways to deal with the differences, while still respecting the jurisdictional sovereignty. The creation of the border agreement is one example. There has also been dialogue and meetings to learn about the other agency's mandate. This has also resulted in the built-up of a working relationship and a satisfactory level of social capital. It was also stated in some interviews that where they are now is how far they can come in terms of addressing this challenge. Other challenges originate in having different mandates, such as using different fire management strategies, and liability and payment issues. It appeared that the interviewees were well aware of the challenges that exist and how to address them. Nevertheless, some improvements can still be made, such as more meetings with the higher levels of SE, to get to know new staff, and to inform the other agency what staff is on duty to address the challenge of knowing who to contact (see section 4.4.3). Overall communication and having more meetings seem to be key factors in addressing challenges in cooperation. Also, even though a good working relationship exists today, it is important to maintain it. Hence, maintaining a continuous dialogue and having meetings at all levels are crucial. The recommendations for improvements in the interagency cooperation (Objective 5b) are presented in section 6.2.

Another purpose of this study was to advance the understanding of adaptive governance in a setting characterized by uncertainty and changing conditions, such as fire management planning. This study shows that certain features from the literature (see section 2.5) are applicable, such as being able to deal with uncertainty and surprise (e.g. Folke et al. 2005), interactions on multiple levels (i.e. multi-level governance) (e.g. Folke et al. 2005; Stockholm Resilience Centre 2007), adaptive management (e.g. Folke et al. 2005; Gunderson & Light 2006), to be better prepared for crisis (e.g. Gunderson & Light 2006), and accepting disturbance on an early stage (e.g. Folke et al. 2005) (i.e. prescribed burning). However, some features are not applicable, at least not at the park level, such as integrative planning with stakeholders (e.g. Stockholm Resilience Centre 2007) (i.e. belonging to different jurisdictions implies different mandates), and establishing a shared vision among stakeholders (e.g. Leach et al. 2007) (i.e. different mandates make shared vision difficult to achieve).

A significant finding of this study was the importance of social capital in fire management, both internally and externally. Trust was particularly emphasized by interviewees. Since social capital is all about the personal chemistry and how well people can work together, a high level of social capital is essential. This was clearly stated by one interviewee at the national level of Parks Canada: “If it wasn’t for the social capital [...] you can’t have a success in fire management. You could have an individual success [...], but unless you’ve got that social capital that brings the group together then you’re not going to have a successful project, fire or incident” (1, PCA; cited in section 5.2.2.2). However, maintaining social capital, especially in the face of staff changes, is an ongoing challenge. Also, with the suggested improvements in cooperation between PANP and SE being linked to communication and having more meetings, it indirectly points to the importance of having a high level of social capital within and among agencies that facilitates cooperation and effectiveness.

Moreover, it appears that the people within Parks Canada’s national fire management program are receptive to new ideas and practices, and also try to be in the forefront. Indeed, the representatives from the national level gave the impression of being open-minded and willing to try new ideas. The old perception of Parks Canada being a stiff organization may no longer be true, at least not for managing fire. The fact that they are looking into the concept of High Reliability Organization (see Learning and experimental in section 5.2.3) shows that they are striving for new tools and approaches to manage fire. Also, that Parks Canada was among the first to adopt prescribed burning points to a flexible agency. Nevertheless, with new people coming into the organization the situation could change. Hence, this points to the importance of having the right people in the right positions. Indeed, it is important for an agency like Parks Canada to have the right people in the right place to move the agency forward. Again, it becomes obvious that the social aspect is a crucial part in any organizations capacity to evolve. If there is no will to change (i.e. a rigid organization) then things may stay the same, or it takes much longer time to implement needed changes. In a world of uncertainty it is important to adjust to the changes that take place, and then the right people need to be there to guide the rest of the organization forward. This also points to the need for a high level of social capital.

Finally, no one really knows what effects future climate change will bring. What we do know though is that fire agencies need to be prepared for any eventuality. A good start is to make sure that the organization is effective and adaptive, and that well-developed plans are in place.

Maintaining and retaining social capital may be a key factor to future success in fire management planning, both from an intra- and from an interagency perspective.

6.2 Recommendations

The findings from the assessment of governance structure of PANP point to the need for the following improvements to be more effective and adaptive (Objective 5a):

- Consider earlier involvement of stakeholders in the planning process to be more inclusive. PANP also needs to meet more frequently with all stakeholders to maintain relationships, not only at the time of consultation. PANP should also share all possible fire information with all stakeholders.
- Clarify and document the roles and responsibilities for all park staff to avoid confusions. This is part of enhancing the overall internal communication between Park functions.
- Enhance the accessibility to fire management information for stakeholders and the public. This includes a more functional website with updated information.
- Incorporate climate change considerations into the planning process, such as adaptive strategies.
- Make the written internal communication more effective by following up fire incidents, such as After-Action-Reviews, more quickly. Without a quick follow-up process the same mistakes may be repeated instead of learning from them.
- Maintain the level of social capital that has been created.
- Enhance the FireSmart program within the townsite of Waskesiu. For example, collect garden waste and building materials more frequently.
- Establish more frequent communication between PANP and the higher levels of SE, including more meetings.
- Make sure the governance structure in terms of policy and planning is flexible.

In terms of the interagency cooperation between PANP and SE the recommendations are (Objective 5b):

- Go back to yearly meetings between PANP and the higher levels of SE.
- Maintain the relationship at all levels through regular communication, including meetings.

- Give updated information in terms of personnel (i.e. who is on duty) to the other agency so that employees know who to contact.
- Get to know new staff members in SE and/or PANP through meetings and other activities to start building a good relationship.

6.3 Significance of Study

The most important contribution of this study is the development and application of principles, criteria and indicators of adaptive governance to fire management planning. More specifically, this framework can be used as a tool to assess the governance structure of fire agencies and to make fire management planning more effective and adaptive to changing conditions, such as climate change. The issue is important considering that wildfires are expected to be more frequent and intense in the future due to climate change. It is also of relevance for fire management due to the unpredictable nature of fire. This calls for a flexible and adaptive management approach, something that an adaptive governance structure can offer. Moreover, this study also intends to advance the understanding of adaptive governance. By including characteristics of good governance (see section 2.4.1) in the definition of adaptive governance it provides greater detail about the characteristics of adaptive governance, and also facilitates the development of explicit criteria for evaluation of governance structures and processes. Another contribution, directly linked to this, is the richer explanation and demonstration of the application of adaptive governance to assess fire management planning and interagency cooperation.

A more local benefit is that the study assesses governance of fire management planning in PANP and provides Parks Canada with recommendations on how to make the governance structure more effective and adaptive to changing conditions. This includes how to improve interagency cooperation with SE. Although the recommendations are site-specific, they are of a general nature and may therefore be useful for other parks and fire agencies as well.

6.4 Limitations and Future Research

This study had limitations that affected the results. These are presented below, together with suggestions for future research.

The complexity of the framework with many principles, criteria and indicators to be assessed called for the need to limit the focus of the study. In terms of cooperation across borders it became clear early in the research process that including all stakeholders would require a

bigger study extending over a longer period of time. Instead, the focus has been on the cooperation between PANP and SE, with the exception of including the Waskesiu Community Council. However, their role in this study is limited. To only include selected stakeholders is a significant limitation since a full assessment of the extent to which fire management planning in PANP is consistent with the features of adaptive governance would have required the perspectives of all stakeholders.

Another limitation relates to the problem of measuring the capacity of various attributes, for example, how to measure effectiveness. In this study it is only the words of the interviewees and the document analysis that are the basis upon which my assessment is based. Moreover, the fact that not all indicators were covered in the questions at the time of the interviews due to a major revision later on (see section 3.4.1) is another limitation. To cover these new indicators of adaptive governance a follow-up of the interviews in person would have been the optimal solution. Due to time constraints for both Park staff and me this was not possible. Instead, as described in section 3.4.2.1, a set of follow-up questions were sent by e-mail. However, only one person answered and thus these particular indicators are not as well developed as the others that were not subject to revision, even though the document analysis did fill some gaps.

With the limitations above in mind, the results can only be seen as giving indications or showing tendencies of certain phenomenon. Nevertheless, the results are still important since they could serve as guidelines as to what could be worth examining further in future research (see below).

Considering the limitation of not including all stakeholders in this study, a suggestion for future research would be to conduct a more comprehensive study where all cross-boundary interactions and stakeholders are in focus. This could give more insight into how PANP's fire management efforts are perceived and what could be improved in the cross-boundary interaction. For example, how effective is the consultation process? Are there better ways to involve stakeholders and the public in fire management planning? Is it realistic to increase the involvement of stakeholders and the public in fire management planning considering the risk of fire and the need for expertise? Similarly, should fire management planning be treated different than other parts of ecosystem management where it is increasingly seen as beneficial to include various stakeholders in the decision-making (e.g. community-based management; public participation; collaboration of various kinds)? Future research could also follow up on the

indicators of adaptive governance where more data are needed to provide a full assessment of the extent to which fire management planning is consistent with the features of adaptive governance.

It could also be of value to look at adaptive governance for fire management in Canada. For example, are there other examples of fire agencies besides Parks Canada that already are using many of the features of adaptive governance? Are there lessons to be learned from them? Also, are there examples of cooperation in fire management across jurisdictions that deal differently than PANP and SE with the challenges of having different laws and mandates? That is, are there better ways to deal with the issue of different jurisdictions?

Finally, as this study indicates social capital is crucial for effective fire management. Hence, it could be of value to look deeper into, for example, what kinds of social capital exist (i.e. bonding, bridging, linking) and how social capital is formed. A better understanding of the structure behind it may facilitate the maintenance or building of social capital by fire agencies.

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Appendix A: Principles and Characteristics of Good Governance

UNDP Characteristics (UNDP 1997) ⁵⁵	Graham et al. 2003	Lockwood 2010 ⁵⁶
<p>Participation: All men and women should have a voice in decision-making, either directly or through legitimate intermediate institutions that represent their intention. Such broad participation is built on freedom of association and speech, as well as capacities to participate constructively.</p> <p>Consensus orientation: Good governance mediates differing interests to reach a broad consensus on what is in the best interest of the group and, where possible, on policies and procedures.</p>	<p>Legitimacy and Voice:</p> <ul style="list-style-type: none"> -Existence of a supportive democratic and human rights context. -Appropriate degree of decentralization in decision-making for PAs. -Collaborative management in decision-making for PAs. -Citizen participation occurring at all levels of decision-making. -Existence of civil society groups and an independent media. -High levels of trust among the various actors. 	<p>Legitimacy:</p> <ul style="list-style-type: none"> -The validity of an organization's authority to govern that may be conferred by law or democratic mandate; earned through the acceptance of stakeholders; and/or earned through long association with a particular place. -The extent to which the governing body's decisions and actions are consistent with its mandate and the objectives of the protected areas for which it is responsible. -The integrity and commitment with which authority is exercised.
<p>Strategic vision: Leaders and the public have a broad and long-term perspective on good governance and human development, along with a sense of what is needed for such development. There is also an understanding of the historical, cultural and social complexities in which that perspective is grounded.</p>	<p>Direction:</p> <ul style="list-style-type: none"> -Consistency with international direction relevant to PAs. -Existence of legislative direction (formal or traditional law). -For national PAs, existence of system-wide plans. -Existence of management plans for individual PAs. -Demonstration of effective leadership – provides a vision for the long-term development of the PA system, mobilize support for this vision. 	<p>Transparency:</p> <ul style="list-style-type: none"> -The visibility of decision-making processes. -The clarity with which the reasoning behind decisions is communicated. -The ready availability of relevant information about a governance authority's performance.

⁵⁵ The order has been arranged according to Graham et al. (2003) to match their principles.

⁵⁶ This column does not intend to match the principles of Graham et al. (2003) to the left. The order of principles presented here is the same as in Lockwood (2010).

<p>Responsiveness: Institutions and processes try to serve all stakeholders.</p> <p>Effectiveness and efficiency: Processes and institutions produce results that meet needs while making the best use of resources.</p>	<p>Performance:</p> <ul style="list-style-type: none"> -Cost effectiveness – efficiency in achieving objectives. -Capacity to undertake required functions. -Co-ordination – ability and capacity to co-ordinate efforts, both within and outside governance. -Performance information to the public. -Responsiveness in dealing with complaints. -Monitoring and evaluation. -Adaptive management. -Risk management – capacity to identify key risks and manage them. 	<p>Accountability:</p> <ul style="list-style-type: none"> -The allocation and acceptance of responsibility for decisions and actions. -The extent to which a governing body is answerable to its constituency. -The extent to which a governing body is answerable to ‘higher-level’ authorities. -Allocation of responsibilities to those institutional levels that best match the scale of issues and values being addressed.
<p>Accountability: Decision-makers in government, the private sector and civil society organisations are accountable to the public, as well as to institutional stakeholders. This accountability differs depending on the organisations and whether the decision is internal or external to an organisation.</p> <p>Transparency: Transparency is built on the free flow of information. Processes, institutions and information are directly accessible to those concerned with them, and enough information is provided to understand and monitor them.</p>	<p>Accountability:</p> <ul style="list-style-type: none"> -Clarity of responsibilities and authority. -Coherence and breadth - the degree to which broader concepts of accountability to the global community, future generations and nature are integrated with more traditional concepts of political accountability. -Role of political leaders – appropriateness of assigned responsibilities, absence of corruption. -Public institutions of accountability. -Civil society and the media – demand for accountability. -Transparency – the capacity of citizens, civil society, media to access information relevant to the performance of PA management. 	<p>Inclusiveness:</p> <ul style="list-style-type: none"> -The opportunities available for all stakeholders to participate in and influence decision-making processes and actions. -The efforts to engage with marginalized and disadvantaged stakeholders.
<p>Equity: All men and women have opportunities to improve or maintain their well-being.</p> <p>Rule of Law: Legal frameworks should be fair and enforced impartially, particularly the laws on human rights.</p>	<p>Fairness:</p> <ul style="list-style-type: none"> -Existence of a supportive judicial context – respect for the rule of law. -Fair, impartial and effective enforcement of any PA rules. -Fairness in the process for establishing new PAs. -Fairness in the management of PAs. 	<p>Fairness:</p> <ul style="list-style-type: none"> -The respect and attention given to stakeholder’s views -Reciprocal respect between higher and lower level authorities. -Consistency and absence of personal bias in decision making. -Recognition of human and indigenous rights. -Recognition of the intrinsic value of nature. -The consideration given to the intra- and intergenerational distribution of costs and benefits of decisions.

		<p>Connectivity:</p> <ul style="list-style-type: none"> -Effective coordination within and between levels of protected area governance. -Coherence in broad policy intent and direction within and between levels of protected area governance. -Effective liaison between protected area authorities and organizations with responsibilities for tourism, forestry, agriculture and fisheries policy, planning and management.
		<p>Resilience:</p> <ul style="list-style-type: none"> -Finding the right balance between flexibility and security. -Incorporating new knowledge and learning into decision making and implementation. -Anticipating and managing threats, opportunities and associated risks. -Systematically reflecting on individual, organizational and system performance.

Appendix B: Principles and Criteria of Adaptive Governance Together with the Influential Literature

The identified principles and criteria of adaptive governance for fire management planning, and the specific elements from the literature that influenced the criteria, are presented below.

Principles	Criteria	Elements from the literature that influenced the criteria
Inclusiveness: - Representation	All stakeholders ⁵⁷ , including local residents, should have the opportunity to participate and have a voice in planning for fire management. Participants should represent a range of perspectives reflecting all stakeholders' interests and concerns in fire management.	-Inclusiveness: The opportunities available for all stakeholders to participate in and influence decision-making processes and actions (Lockwood 2010). -Participation: All men and women should have a voice in decision-making (UNDP 1997).
Responsibility: - Legitimacy	The governing body has the legal authority to manage fire. The actions and decisions taken must be consistent with the mandate and objectives of fire management, while following laws and regulations from higher-level authorities. For effective governance the authority also needs to be accepted by the stakeholders.	-Legitimacy: The validity of an organization's authority to govern that may be conferred by law or democratic mandate; earned through the acceptance of stakeholders (Lockwood 2010) -Legitimacy: The extent to which the governing body's decisions and actions are consistent with its mandate and the objectives of the protected areas for which it is responsible (Lockwood 2010). -Legitimacy: The governing body's direction and actions are consistent with directions set by higher-level governance authorities (Lockwood 2010).
- Accountability	The governing body should be accountable to all stakeholders, including local residents, and to higher-level authorities. For effective fire management roles and responsibility must be clear both for governing body and staff, as well as for other involved stakeholders.	-Accountability: Decision-makers in government, the private sector and civil society organisations are accountable to the public, as well as to institutional stakeholders (UNDP 1996). -Accountability: The extent to which a governing body is answerable to its constituency (Lockwood 2010). -Accountability: The extent to which a governing body is answerable to 'higher-level' authorities (Lockwood 2010). -Accountability: Clarity of responsibilities and authority (Graham et al. 2003).

⁵⁷ The concept 'stakeholders' as used in this table refers both to stakeholders and rightholders.

- Transparency	Information on fire management and decision-making, including both failures and achievements, must be reported regularly and be easily accessible for both stakeholders and the public. It should also be possible to follow the reasoning behind specific decisions.	<p>-Transparency: Processes, institutions and information are directly accessible to those concerned with them, and enough information is provided to understand and monitor them (UNDP 1997).</p> <p>-Transparency: The ready availability of relevant information about a governance authority's performance (Lockwood 2010).</p> <p>-Transparency: The clarity with which the reasoning behind decisions is communicated (Lockwood 2010).</p>
- Information-sharing	There must be mechanisms in place to in various ways (e.g. information centres, newspaper, radio, television, Internet) give updated information to local residents and visitors on the current fire situation. There should also be frequent information-sharing to other stakeholders, both in the planning process and in the actual fire situation.	<p>-The importance of responding quickly with accurate information to the public during a wildfire. The information must also be easy to understand, using plain language, and distributed through different communication channels (Taylor et al. 2007; Kulig et al. 2008).</p> <p>-The possibility for the public to ask staff questions through a 24-hour phone line, and at information booths (Kulig et al. 2008).</p> <p>-The importance that fire administration officials receive accurate and frequent fire reports to be better prepared to make decisions (Kulig et al. 2008).</p>
Fairness:		
- Equity and respect	The governing body must be fair and treat stakeholders with equal respect. Also, planning that include safety issues need to consider all groups/individuals that may be affected.	-Fairness: The respect and attention given to stakeholder's views (Lockwood 2010).
Strategic vision:		
- Foresight	The fire management strategies must have a sustainable long-term perspective, including developed policies and practices, and a clear shared vision.	-Strategic vision: Leaders and the public have a broad and long-term perspective on good governance and human development, along with a sense of what is needed for such development (UNDP 1997).
- Leadership	There should be effective leadership (e.g. building trust and consensus) to coordinate the fire management planning and to guide the process forward. The leader must be acknowledged by all participants.	<p>-Direction: Demonstration of effective leadership – provides a vision for the long-term development of the PA system, mobilize support for this vision. (Graham et al. 2003).</p> <p>-Adaptive governance: Key persons in social networks provide leadership, trust, vision, meaning (Folke et al. 2005).</p>
Performance-oriented:		
- Effective and efficient	The governing body must be effective in decision-making and taking actions to produce outcomes that meet the	-Effectiveness and efficiency: Processes and institutions produce results that meet needs while making the best use of resources

	<p>objectives of fire management, while at the same time strive for the most efficient practices possible without compromising the objectives, unless such changes are needed. This requires adequate capacity (i.e. financial, technological, human) cost effectiveness measures, effective communication, and a satisfactory level of social capital.</p>	<p>(UNDP 1997).</p> <ul style="list-style-type: none"> -Performance: Capacity to undertake required functions (Graham et al. 2003). -Performance: Cost effectiveness – efficiency in achieving objectives (Graham et al. 2003). -Accurate and frequent reports regarding the fire situation to be better prepared to make decisions (Kulig et al. 2008). -Trust enhances the ability for people to work together and it also contributes to creating a sense of community (Folke et al. 2005).
- Preparedness	<p>The governing body must be prepared for wildfires and ready to take actions using services (e.g. fire weather forecasting, forest fire danger rating) to predict fires, and having formal preparations in place (e.g. defined priorities for protection, regularly inventory of human and physical resources). Participants should also take all necessary actions to mitigate the wildfire risk (e.g. public education, implementing FireSmart).</p>	<ul style="list-style-type: none"> -Influenced by Saskatchewan Environment 2004; Born et al. 2007; Kulig et al. 2008
- Interactive	<p>Cooperation in wildfire management across jurisdictions is necessary for effective wildfire response (e.g. resource sharing). There must also be effective coordination of fire management planning with higher-level authorities, and with agencies/organizations at the same level. For efficient outcomes communication and the social capital needs to be satisfactory horizontally and vertically.</p>	<ul style="list-style-type: none"> -Performance: Co-ordination – ability and capacity to co-ordinate efforts, both within and outside governance (Graham et al. 2003). -Connectivity: Effective coordination within and between levels of protected area governance (Lockwood 2010). -The importance of communication in interagency cooperation (Kulig et al. 2008). -Social capital facilitates coordination and cooperation for mutual benefit (Putnam 1995).
Adaptiveness:		
- Learning and experimental	<p>Participants must be open for new ideas and try them in a learning-by-doing process to acquire new knowledge within fire management, as long as they do not put people and properties at risk. They need to accept uncertainty as part of the process and try to benefit from it. This involves frequent monitoring and evaluating system feedback, including learning from failures. This process is part of</p>	<p><i>Adaptive management:</i></p> <ul style="list-style-type: none"> -A learning-by-doing process where policies are treated as hypotheses and management as experiments from which managers can learn (Holling et al. 1998) -Monitoring the outcomes to refine hypotheses (Noble 2010). -Learning from failures (Noble 2010) -The ability of institutions to respond to new knowledge depends on their willingness to act on it (McLain & Lee 1996).

	adaptive management.	
- Knowledge-building	Policies and practices must be continuously upgraded and reflect the latest knowledge - scientific, local or other useful knowledge – and lessons learned to improve fire management practices and to be better prepared for future wildfires.	<p>-Resilience: Incorporating new knowledge and learning into decision making and implementation (Lockwood 2010).</p> <p><i>Adaptive management:</i></p> <p>-Adapts policies and actions as new knowledge and understanding are gained (Noble 2010).</p> <p>-Incorporating knowledge from multiple sources makes adaptive management more effective (McLain & Lee 1996).</p>
- Flexible	The governance structure must be flexible to accommodate learning processes and adjust to new knowledge and/or changed conditions. Mechanisms are in place to regularly review the governance structure to determine if changes are needed.	<p>-Adaptive governance: institutional flexibility needed for dealing with uncertainty and change; allows for learning (Folke et al. 2005).</p> <p>-Resilience: the governing body has the flexibility to rearrange its internal processes and procedures in response to changing internal or external conditions (Lockwood 2010).</p> <p>-Resilience: Systematically reflecting on individual, organizational and system performance (Lockwood 2010).</p>

Appendix C: Principles, Criteria and Indicators of Adaptive Governance for Fire Management Planning

Inclusiveness:

Representation – All stakeholders⁵⁸, including local residents, should have the opportunity to participate and have a voice in planning for fire management. Participants should represent a range of perspectives reflecting the interests and concerns of all relevant stakeholders in fire management.

Indicators:

- All stakeholders have the possibility to participate in the fire management planning process.
- All stakeholders have the right to express their opinions in the planning process, as well as in other fire questions that concern them.
- Participants represent a range of perspectives.

Responsibility:

Legitimacy – The governing body has the legal authority to manage fire. The actions and decisions taken must be consistent with the mandate and objectives of fire management, while following laws and regulations from higher-level authorities. For effective governance the authority also needs to be accepted by the stakeholders.

Indicators:

- The governing body has the legal right to make decisions and manage fires.
- The governing body adheres to laws and regulations in the planning process.
- Decisions taken are consistent with the mandate and objectives of fire management.
- The governing body's authority is accepted by the stakeholders.

Accountability – The governing body should be accountable⁵⁹ to all stakeholders (i.e. 'horizontal' accountability), including local residents, and to higher-level authority (i.e. 'upward' accountability). For effective fire management roles and responsibility must be clear both for governing body and staff, as well as for other involved stakeholders.

Indicators:

- The governing body is accountable to all stakeholders, including local residents, and the higher-level authorities.
- Area of responsibility for each participant is well-defined and documented.
- Each participant sticks to his/her commitment.

⁵⁸ The concept 'stakeholders' as used in this thesis refers both to stakeholders and rightholders.

⁵⁹ Accountable means that the governing body is answerable to all stakeholders and to higher-level authority.

Transparency – Information on fire management and decision-making, including both failures and achievements, must be reported regularly and be easily accessible for both stakeholders and the public. It should also be possible to follow the reasoning behind specific decisions.

Indicators:

- Information on fire management (e.g. performance, spending, decision-making) is easily accessible for stakeholders and the public whenever requested.
- The governing body reports the performance, including failures and achievements, in annual reports, state-of-the-park reports etcetera.
- It is possible to see why/how a decision was taken.

Information-sharing – There must be mechanisms in place regarding information-sharing to communities at risk of wildfire, or which already are affected, so that they are provided with accurate information about current situation. There should also be information-sharing to other stakeholders, both in the planning process and in the actual fire situation.

Indicators:

- Local residents and visitors in the area receive updated wildfire information presented in a straightforward manner through different media (e.g. newspaper, radio, television, Internet), and/or at information centres.
- It is also possible for local residents, visitors and other concerned citizens to directly turn to officials to ask questions about the fire situation, or ask for help.
- There is frequent information-sharing between the governing body and stakeholders, both in the planning process and in the actual wildfire situation.

Fairness:

Equity and respect – The governing body must be fair and treat stakeholders with equal respect. Also, planning that include safety issues need to consider all groups/individuals that may be affected.

Indicators:

- Equal respect and consideration is given to stakeholders' views and rights.
- Planning for fire management take into consideration all risks and does not compromise any group/individual's safety.

Strategic vision:

Foresight – The fire management plans must have a sustainable long-term perspective, including developed policies and practices, and a clearly defined vision.

Indicators:

- A developed sustainable long-term fire management plan exists.
- A vision is clearly stated and agreed upon (i.e. shared vision).

Leadership – There should be a leader or leaders to coordinate the fire management planning to get people with different expertise to act together and to guide the process forward. An effective leader facilitates trust building and consensus building. The leader must be acknowledged by all participants.

Indicators:

- A leader is guiding the fire management planning process.
- The leader possesses the appropriate leadership skills (e.g. trust building, consensus building, managing conflict, communicating vision, steering the operation forward, mobilizing necessary resources).
- The leader is acknowledged by all participants.

Performance-oriented:

Effective and efficient – The governing body must be effective in decision-making and taking actions in order to produce outcomes that meet the objectives of fire management. This requires adequate capacity to reach a satisfactory result. Decision-making and planning should also strive for the most efficient fire practices possible, but without compromising the objectives unless such changes are needed (see Adaptiveness).

Indicators:

- Participants follow the fire management plans (including prescribed burn plans) in order to meet the objectives and achieve the goals.
- The capacity to undertake required fire management in terms of financial, technological, and human capacity (e.g. trained and educated personnel) is adequate.
- Training opportunities exist to develop technical skills.
- Cost effectiveness measures are taken.
- The level of social capital internally (i.e. trust, common rules, norms, networks among individuals and groups) is satisfactory and enhances the capacity for people to work together.
- Internal communication is satisfactory, including frequent meetings and distribution of accurate reports.

Preparedness – The governing body must be prepared for wildfires and ready to take actions. Participants should also take all necessary actions to mitigate the wildfire risk.

Indicators:

- Services, such as fire weather forecasting and forest fire danger rating, are used to predict wildfires.
- Inventories of human (e.g. fire fighters, specific skills) and physical resources (e.g. fire equipment) are regularly carried out to see what resources are available and if they are sufficient.
- Priorities for protection of values at risk exist.

- Public education is carried out to make individuals aware of the fire risks and to inform them how they can mitigate the risks. This includes implementation of FireSmart.

Interactive – Cooperation in wildfire management across jurisdictions, both neighbouring and distant, is necessary for effective wildfire response. There must also be effective coordination of fire management planning with higher-level authorities, and with agencies/organizations at the same level. For efficient outcomes the communication and social capital needs to be satisfactory horizontally and vertically.

Indicators:

- Cooperation agreements exist with other fire agencies, including resource sharing.
- Planning for fire management is effectively coordinated vertically and horizontally.
- Communication across jurisdictions and with higher-level authorities is satisfactory.
- The level of social capital (i.e. trust, common rules, norms, networks among individuals and groups) is satisfactory and facilitates cooperation.

Adaptiveness:

Learning and experimental – Participants must try new ideas (i.e. being experimental) in a learning-by-doing process to acquire new knowledge within fire management, as long as they do not put people and properties at risk. Participants need to accept uncertainty as part of fire management (i.e. managing under uncertainty) and try to benefit from it. This involves frequent monitoring and evaluating system feedback, including learning from failures. This process is part of adaptive management.

Indicators:

- Participants are open for new ideas and willing to try new fire practices.
- ‘Lessons learned’ is an important component of fire management.
- Mechanisms for monitoring and evaluating system feedback exist.

Knowledge-building – Policies and practices must be regularly upgraded when new knowledge is acquired and lessons learned in order to continuously improve fire management practices and to be better prepared for future wildfires. Used knowledge should not be limited to scientific knowledge, but participants should be open to other kinds of knowledge such as local knowledge, that can contribute to enhanced capacity to manage fire.

Indicators:

- Policies and practices are continuously upgraded and reflect the latest knowledge and lessons learned.
- Used knowledge reflects multiple ways of knowing.

Flexible – The governance structure must be flexible to accommodate learning processes and be able to adjust to new knowledge and/or changed conditions caused by environmental, economic

and/or social changes. Mechanisms are in place to see if organizational changes or changes in policies are needed.

Indicator:

- The governance structure is flexible, both in terms of policies and organizational structure.
- The governance structure is reviewed regularly to determine if changes are needed.

Appendix D: Guiding Principles and Strategic Direction for Parks Canada's National Fire Management Program

The guiding principles for Parks Canada's national fire management program (Parks Canada 2005b, p. 5):

1. Public and fire fighter safety is the first concern of all fire management actions.
2. National parks and historic sites with fire dependent ecosystems will recognize the role of fire in restoring or maintaining ecological integrity and biodiversity.
3. The Park/Site Management Plan directs the overall fire management program through fire management plans and vegetation management objectives.
4. Management decisions will support the role of fire in the ecosystem, while mitigating wildfire and ecological risks.
5. Communicating strategies (including public consultation, education, and media relations) focus on engaging neighbours, communities, and stakeholders to build awareness and support for fire management program and decisions.
6. Fire is managed using the best available scientific knowledge and the principle of adaptive management.
7. Fire is managed on a landscape basis having regard to the goals and objectives of neighbours.
8. The fire management program is sustainable and based on sound business planning principles.
9. Parks Canada operates an integrated fire organization that utilizes staff who have a range of duties as well as employees solely dedicated to fire management.
10. Fire management planning is integrated with other Parks Canada Agency functions.
11. Fire management is integrated with other Canadian Fire Management Agencies.

The strategic direction for Parks Canada's national fire management program (Parks Canada 2005b, pp. 5-6):

In the governance, planning, delivery, and monitoring of the fire management program Parks Canada will:

1. Ensure an appropriate response to wildfire and a phased approach to fire use through national fire inter-agency and intra-agency resource sharing.
2. Maintain a professional and sustainable fire management capacity.
3. Move from a dependency on emergency response to a strategy of preparedness and risk reduction.
4. Increase through adaptive management the use of fire and fuel management.
5. Seek opportunities for professional and technical development and retention of staff.
6. Maintaining existing and, as funding permits; enhance capacity in areas of fire management identified as a priority.
7. Promote landscape level fire management with neighbours.
8. Engage local and regional communities and public in the development of fire management strategies.
9. Ensure that fire and vegetation management monitoring are based on measurable objectives and integrated with the national monitoring framework.
10. Maintain a strong fire science and technology capacity integrated into the Agency's Science Strategy.
11. Strengthen the relationship and sense of common purpose with central emergency funding agencies.

Appendix E: Interview Questions and Follow-Up Questions

a) Interview Questions for Prince Albert National Park (PANP), the national level of Parks Canada (PCA), Saskatchewan Environment (SE) and the Waskesiu Community Council (WCC)

Respondent's background

PANP, PCA and SE:

What is your job title?

For how long have you worked for Parks Canada/Saskatchewan Environment?

WCC:

What is your position on the Waskesiu Community Council?

For how long have you had that position?

What is the Waskesiu Community Council's mandate?

Governance structure

PANP, PCA and SE:

In this study 'governance' refers to the arrangements among governments, non-governmental organizations, and private actors, and the rule systems (i.e. laws, regulations, standards, policies) under which these actors operate.

PANP and SE:

What wildfire⁶⁰ agencies or other groups (i.e. governmental agencies, non-governmental organizations, private actors) are part of the governance structure of wildfire management in PANP/SE?

Are they all part of the planning process?

PCA:

What wildfire agencies or other groups (i.e. governmental agencies, non-governmental organizations, private actors) are part of the governance structure of wildfire management for Parks Canada?

Are they all part of the planning process?

⁶⁰ The interview questions refer to *wildfire management* because of my lack of knowledge at the time. During the interviews I learned that Parks Canada refers to *fire management* (i.e. including prescribed burning), which is reflected throughout the thesis.

PANP and SE:

I'm also interested to know what laws, regulations and policies that relate to wildfire management planning.

Do you have a document where they are stated?

Is it possible that I can get a copy of it, please?

If not, can you please tell me briefly what laws, regulations and policies you have?

PCA:

Are the laws, regulations and policies of wildfire management the same for all national parks in Canada, or can the parks make their own?

Agreements and Cooperation

PANP, PCA and SE:

What coordinating agreements exist with wildfire agencies?

How are these agreements created?

PANP and SE:

What challenges do you face in the cooperation with SE/PANP?

Are there barriers to cooperation because of the different jurisdictions? Are there any clashes because of different jurisdictions?

How could you address these challenges? How can the cooperation across jurisdictions be improved?

PCA:

What challenges do you face in cooperation between wildfire agencies across multiple jurisdictions?

How could you address these challenges?

When it comes to coordination of wildfire management between the national parks, do you face any challenges there?

WCC:

Is there any kind of agreement between the Waskesiu Community Council and Parks Canada regarding wildfire management?

If so, how was this agreement created?

What challenges do you face in generating collaboration with Parks Canada in terms of wildfire management?

Is there something that could be improved?

Wildfire management

PANP:

What are the goals and objectives of wildfire management planning in PANP?

Do you feel that you are achieving the goals and objectives?

PANP, PCA and SE:

Has climate change been considered in the wildfire management planning?

WCC:

What is the Waskesiu Community Council's perception on wildfire management in Prince Albert National Park?

Do you agree on Parks Canada's wildfire management strategies?

Does the Waskesiu Community Council have any wildfire management policies/strategies (i.e. created by the Council)?

If so, what are your goals and objectives?

To what extent is the Waskesiu Community Council involved in the wildfire management planning in the Park?

Lessons Learned

PANP and PCA:

When did you last have an uncontrolled big wildfire? Tell me more about it (how did it start, how long it lasted, how much land was affected?)

What worked well? What challenges did you face?

What did you learn from this event?

SE:

Could you please tell me about your experiences (good, bad) from collaborating with Parks Canada in a specific wildfire situation?

Where and when was this event?

What worked well? What challenges did you face?

What did you learn from this event?

WCC:

I would like to hear from the Waskesiu Community Council's point of view how you experienced a particular wildfire situation.

Was the Waskesiu Community Council taking active part in the fire situation?

If so, how did you experience the collaboration with Parks Canada?

What worked well? What did not work so well? What challenges did you face?

Questions related to the principles, criteria and indicators of adaptive governance

PANP, PCA, SE and WCC:

Now I will turn to the questions that are linked to my indicators of adaptive governance. One of the things I am interested in is how we plan for specific events such as wildfire. I am using the term ‘adaptive governance’ to mean governance arrangements that are flexible and able to adjust to changing environmental, economic, and social conditions, as well as to uncertainty and surprise. It requires collective action across scales (i.e. federal, provincial/territorial, and local) with flexible and continuous learning. I want to know to what extent planning for wildfire is consistent with the principles of adaptive governance. There are quite many questions but many of them are yes/no questions.

PANP, SE and WCC:

Inclusiveness

Representation:

PANP:

Do all stakeholders have the possibility to participate in wildfire planning that concern them (e.g. attend meetings)?

Are there any stakeholders missing?

Can local residents participate if they wish to?

SE:

Do you feel that you have the possibility to participate in Parks Canada’s wildfire planning process in issues that concern you (e.g. attend meetings)?

WCC:

Do you feel that the Waskesiu Community Council has the possibility to participate in Parks Canada’s wildfire planning process in issues that concern you (e.g. attend meetings)?

Do you have a voice in the planning process?

Can also the individual people you represent participate?

Responsibility

Accountability:

PANP:

Are the areas of responsibility for each planning participant well-defined and documented?

Has there been any problem regarding taking responsibility for the assigned area or do participants stick to their commitment?

Are the local residents responsible for fire hazards on their property?

SE:

In the cooperation with Parks Canada, are the areas of responsibility for each planning participant well-defined and documented?

WCC:

In your collaboration with Parks Canada has there been any problem regarding taking responsibility for assigned wildfire management tasks? (if applicable)

Are the areas of responsibility in the collaboration well-defined and documented?

Are the local residents responsible for fire hazards on their property?

Transparency and information-sharing:

PANP:

Is wildfire information accessible for everyone who wishes to learn more about wildfire issues (e.g. spending, management outcome)?

Is the information easy to access?

Is wildfire information frequently shared across jurisdictions in the planning processes?

How do you communicate with each other?

How do you provide the local residents and visitors with the latest wildfire report?

Is it possible for them to turn directly to officials and ask questions?

SE:

Do you frequently share wildfire information with the Park?

How do you communicate with each other?

WCC:

Do you feel that wildfire management information is easily accessible for everyone who wishes to learn more about wildfire issues (e.g. spending, management outcome)?

Does the Waskesiu Community Council receive frequent wildfire information from Parks Canada in the planning processes? And during the wildfire situation?

How do you receive this information (i.e. way of communication)?

How is Parks Canada giving the local residents and visitors the latest wildfire report?

Is it possible for them to turn directly to Parks Canada and ask questions?

Strategic vision

Foresight:

PANP:

Is there a clear vision for wildfire management that all stakeholders share? Tell me about that.

(If not mentioned: Does the wildfire management plan have a long-term perspective?)

SE and WCC:

Is there a clear vision for wildfire management that you share with Parks Canada?

Leadership:

PANP and SE:

Is there a leader or leaders coordinating and guiding the wildfire management planning within PANP/SE?

If not, do you think a leader would improve the planning process?

What do you think are the qualities for strong leadership?

Do you think they exist here?

Performance-oriented

Effective and efficient:

PANP:

What challenges do you face implementing the objectives (e.g. economic, technological, human, social and institutional capacity)?

PANP, SE and WCC:

Some of my readings suggest that social capital is important for effective performance. ‘Social capital’ refers to levels of trust, common rules, norms, and networking among individuals and/or groups.

Would you agree that the presence of social capital is a precondition for effective performance?

If no, do you think consensus making and trust building are required to perform effectively? If so, how are these facilitated?

If yes, do you think there is sufficient social capital to facilitate consensus-making and trust-building (both internally and externally)?

PANP:

Is the communication channel within the Park efficient, including frequent meetings and accurate reports?

Are technical training opportunities offered? To whom?

In case of fire, what are the priorities for protection?

Do you consider cost effectiveness in the planning process?

How do you measure cost effectiveness?

SE:

Is the communication channel with Parks Canada efficient, including frequent meetings and accurate reports?

In case of fire, what are the priorities for protection?

Do you consider cost effectiveness in the planning process?

How do you measure cost effectiveness?

WCC:

Is the communication with Parks Canada efficient regarding wildfire management issues, including frequent meetings?

Could it be improved? How?

Preparedness:

PANP:

Do you use services that can help predict wildfire events (e.g. fire weather forecasting, forest fire danger rating)?

Do you employ regular inventory of human (e.g. firefighters) and physical resources (e.g. fire equipment) to see if they are sufficient and functional?

Do you have enough fire fighters with necessary skills?

Do you use public education to enhance the awareness of wildfire risks and to inform how to mitigate the risks?

Have you implemented FireSmart?

When? Is FireSmart working?

SE:

Do you use public education to enhance the awareness of wildfire risks and to inform how to mitigate the risks?

Have you implemented FireSmart?

When? Is FireSmart working?

WCC:

Is the Waskesiu Community Council using public education to enhance the awareness of wildfire risks and to inform how to mitigate the risks? Or is it all through FireSmart?

Do you feel that the residents have accepted FireSmart?

Is FireSmart working?

Adaptiveness

Flexible, Learning and experimental, and knowledge-building:

PANP and SE:

Would you consider the governance structure of wildfire management to be flexible?

Are you continuously upgrading policies and practices when new knowledge in wildfire management is acquired?

Do these changes affect the objectives of wildfire management?

Do you incorporate local knowledge?

Are participants open for new ideas in wildfire management planning and willing to try them?

PANP:

Do you have monitoring and feedback mechanisms? Tell me about that.

WCC:

Would you consider the governance structure for wildfire management that Parks Canada is part of to be flexible (i.e. as opposite to rigid)?

PANP, SE and WCC:

We have now touched on ‘adaptiveness’ and I wonder what is your perception of being adaptive: what is an adaptive wildfire strategy to you?

PANP and SE:

My last question is about the Canadian Wildland Fire Strategies, the CWFS that was declared in 2005, I wonder if you are familiar with that?

Have you noticed changes in wildfire planning since the CWFS was introduced?

PCA:

Intra- and interagency collaboration

Are the areas of responsibility well-defined for each wildfire agencies or other stakeholders in intra- and/or interagency collaboration (i.e. between national parks and/or across scales)?

Do all these stakeholders, or representatives, have the possibility to participate in wildfire management planning that concern them (e.g. attend meetings)?

Is there a clear vision for wildfire management planning that they share?

Tell me about that.

Is the communication channel efficient between national parks?

Is wildfire information frequently shared across jurisdictions in the planning processes?

How are the stakeholders communicating?

Performance related questions

Within the governance structure is there a leader or leaders coordinating and guiding the wildfire management planning?

If not, do you think a leader would improve the planning process?

What do you think are the qualities for strong leadership?

Do you think they exist within Parks Canada?

Some of my readings suggest that social capital is important for effective performance. ‘Social capital’ refers to levels of trust, common rules, norms, and networking among individuals and/or groups.

Would you agree that the presence of social capital is a precondition for effective performance?

If no, do you think consensus making and trust building are required to perform effectively? If so, how are these facilitated?

If yes, do you think there is sufficient social capital to facilitate consensus-making and trust-building within Parks Canada?

Adaptiveness and knowledge-building

Would you consider the governance structure of wildfire management to be flexible?

Are you continuously upgrading policies and practices when new knowledge in wildfire management is acquired?

Do these changes affect the objectives of wildfire management?

Are participants open for new ideas in wildfire management planning and willing to try them?

Do you have monitoring and feedback mechanisms? Tell me about that.

We have now touched on ‘adaptiveness’ and I wonder what is your perception of being adaptive: what is an adaptive wildfire strategy to you?

In my readings I found information on the Canadian Wildland Fire Strategy (CWFS) from 2005.

Are you familiar with the CWFS?

Have you noticed any changes in wildfire management since 2005?

PANP, PCA, SE and WCC:

These were all the questions I had for you.

Do you have any questions or comments you would like to add?

Can I contact you again if I need to ask further questions?

Is there anyone else I should contact? Are there any other sources of information (e.g. reports or policy statements) I should be aware of?

b) Follow-Up Questions on Wildfire Management Planning in Prince Albert National Park

About stakeholders

Is there any active forestry today around the PANP?

Do you consult with any forestry company today? Weyerhaeuser?

Are there private land owners around the Park that you consult with? Or is it all Crown land? If so, are land managers leasing the land from the province?

I want to make sure I have covered all stakeholders in the fire management planning, are the others Saskatchewan Environment, rural communities, First Nations (Montreal Lake and Little Red River Cree Nations), Waskesiu Community Council? Any missing?

Legitimacy

Would you consider Parks Canada's authority to manage wildfire in the Park to be accepted by stakeholders? (I know this is a question to ask stakeholders, but I want to hear if you have a sense of how they perceive Parks Canada)

Accountability

Is the Park accountable to all stakeholders, including local residents? Or is that accountability at the national level?

Transparency

How do you present performance in terms of fire management (including achievements and failures)?

Do you have annual reports (annual reviews)? Are they available to the public? Available to stakeholders?

What kind of wildfire information is accessible to the public (not during the actual fire event)?

In regards to decision-making is it possible to follow the reasoning (how/why a decision was taken) behind decisions taken?

Fairness

Would you consider that equal respect and consideration is given to stakeholders' views and rights (i.e. that all people are treated equally)?

Communication

Do you feel that the communication vertically (national, regional level) within Parks Canada is satisfying? What about the social capital (e.g. trust, common rules, norms, networks among individuals and groups)?

Flexible governance structure

Do you regularly look over (review) the governance structure to see if changes are needed? (I primarily refer to the governance structure for fire management, but also overall in the Park)

Fire Management Plan

Have you start working on an updated Fire Management Plan?

Is the Fire Management Plan annually reviewed?