

## Cariboo-Chilcotin Agriculture/Wildfire Preparedness Project

### Planning Process Description

#### Prepared for

BC Agriculture & Food Climate Action Initiative  
Cariboo Cattlemen's Association

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## Executive Summary

Between March 2015 and June 2016, Compass Resource Management, B.A. Blackwell & Associates, and H. Bayliff engaged ranchers in the Cariboo-Chilcotin region in a planning process to identify the opportunities and barriers to more effective wildfire risk management. The purpose of this document is to describe the steps of the planning process we used, which focuses simultaneously on ranchers' values and on a deep understanding of forest condition and wildfire behaviour.

For our purposes, we define wildfire risk as the likelihood and consequences of wildfire at a specified location under specified conditions. This definition emphasizes an understanding of risk in terms of two components, likelihood and consequence.

We used a three step process:

1. A series of workshops to identify the values most important to the ranching community, and to understand the consequences of fire,
2. A set of technical analyses and individual ranch assessments to help understand the relative likelihood of fires of different types and origins as they would affect the values identified in the workshops, and
3. A final round of workshops to identify the opportunities for and barriers to implementing risk management strategies appropriate to the sources and scales of wildfire risk.

Interactions at the workshops between the ranching community and the Province helped to build a common understanding of their mutual concerns and important barriers to the implementation of appropriate risk management actions.

Choosing the best wildfire risk management approach in any context should be guided by a good understanding of the assets or values that matter most and a good spatial understanding of the sources and mechanisms of exposure to wildfire. The planning process we describe here can be applied in other fire-prone agricultural regions of the province to contribute to smart choices about managing wildfire risk.

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## 1 Introduction

The Cariboo-Chilcotin region experiences wildfire on a regular basis. Because ranchers there are often geographically isolated and because their ranch assets are distributed across a fire-prone landscape, the ranching community in the region is, in general, exposed to a high level of risk. Between March 2015 and May 2016, Compass and B.A. Blackwell & Associates and H. Bayliff engaged ranchers in the Cariboo-Chilcotin region in a planning process to identify the opportunities and barriers to more effective wildfire risk management. The project was sponsored by the BC Agriculture & Food Climate Action Initiative (<http://www.bcagclimateaction.ca/>) and the Cariboo Cattlemen's Association with four broad goals:

1. Minimize the damage to agricultural productivity and agricultural infrastructure associated with wildfire events,
2. Strengthen (agriculture-specific) information and resources to assist producers with wildfire mitigation, preparedness and recovery,
3. Improve collaboration to support agriculture with wildfire preparedness, mitigation and recovery,
4. Identify costs, issues and barriers around implementation of mitigation and preparedness measures.

The process we used to accomplish these goals is unique in that it maintained focus simultaneously on ranchers' values – the things that are important to them and to their businesses – and on a deep understanding of forest condition and wildfire behaviour. Though the outcomes of this project are specific to the conditions in the Cariboo and the details of cattle ranching, the approach we followed could be applied to any agricultural sector in a wildfire-prone landscape.

The project resulted in four primary deliverables:

1. A summary of wildfire-related resources relevant to preparedness, mitigation, and recovery actions for ranches,
2. A ranch-level wildfire preparedness planning template to aid the transfer of wildfire preparedness and mitigation lessons to other ranches in the Cariboo-Chilcotin,
3. An evaluation of the policy opportunities and barriers to more effective wildfire risk mitigation activities for ranches, based on research, information provided by the project sponsors and input gained in the process workshops, and
4. A summary of the transferable planning process to help guide similar planning processes in other regions.

This document is the fourth deliverable. It describes the steps of the planning process we used, such that they could be applied elsewhere in new contexts. It describes the conceptual basis of our approach to risk and risk management, and places the steps we took in the Cariboo-Chilcotin region into a greater context that is consistent with that conceptual framework.

## 1.1 A Brief Primer on Risk and Risk Management

There are many definitions of the term “risk” and there are as many sets of connotations and associations with the word as there are definitions. Therefore, it’s important for us to be clear about what exactly we mean by the word “risk” and its variants and derivatives (e.g., risk management) in this context. For our purposes, we define wildfire risk as the likelihood and consequences of wildfire at a specified location under specified conditions. This definition emphasizes an understanding of risk in terms of two components – likelihood and consequence – and is consistent with the definition of risk used in the scientific literature on risk. Often, these two components are quantified and a mathematical combination of them is used to quantify risk directly and compare risk across locations. However, we find that keeping these elements separate has two key benefits: first, their parallel use retains a clearer focus on the consequences, which are driven by stakeholder values that come into play in other places in the risk management planning process; second, this focus on the interaction of values and likelihood may ultimately imply different management strategies. Figure 1 provides a conceptual framing of the relationship between likelihood and consequence, and indicates how that relationship can translate into management actions.

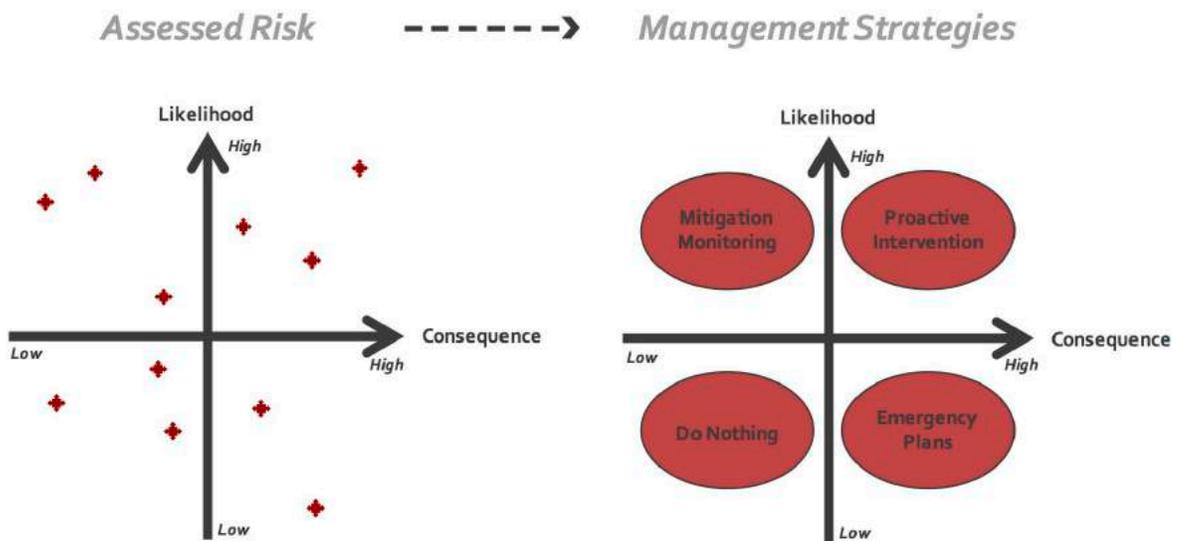


Figure 1. Assessed risk (left) is a product of the likelihood and consequences of a fire, each of which can be expressed generally along a continuum of low to high (left). Different combinations of levels of likelihood and of consequence imply different management strategies (right).

Conceptually, the assessed risk described in terms of the combination of likelihood and consequence in any given context is used to prescribe the most appropriate management strategy, ranging across the spectrum from ‘do nothing’ to monitoring, emergency planning or ‘proactive intervention’. In practice, implementation of this concept requires a detailed spatial examination of assessment results across a full continuum from low to high ratings. For example, in cases where the likelihood of a fire is high and its consequences would be severe (upper right quadrant), proactive reducing the likelihood of a fire or to lessening the consequences (e.g., by removing valuable assets from high likelihood areas) is most appropriate. In the opposite extreme case, in areas where the likelihood of a fire is low or negligible and the consequences of a fire should one occur are minimal (lower left quadrant), the long-term cost to

replace any lost assets is likely to be less than the long-term cost of further reducing risk. In that case, no action provides the best long term results. In this way, a clear understanding of values and consequences alongside an understanding of the likelihood of a fire with a given behaviour can guide the choice of management strategies.

## **2 A Value-Focused Risk Management Planning Process**

Based on this understanding and definition of risk, we developed a wildfire risk management planning process built on a framework that stresses the dual importance of stakeholder values and technical understanding of wildfire likelihood and behaviour. This process, and this document, closely follows the set of questions suggested by the components of figure 1. We use a variety of stakeholder engagement and technical analysis approaches to answer three questions:

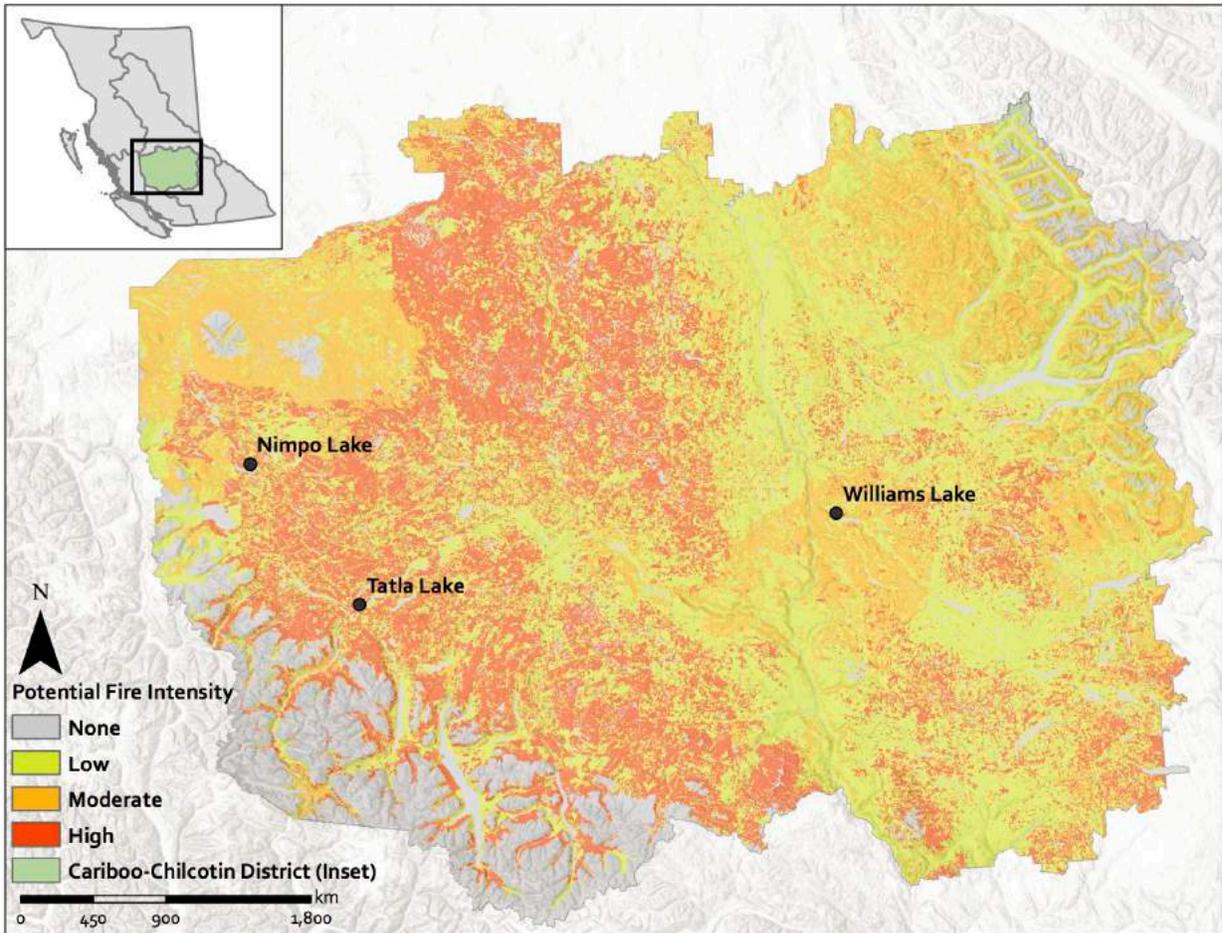
1. What are the important Values at Risk?
2. What is the likelihood of a fire affecting those values?
3. What are the opportunities and barriers to implementing the management strategies suggested by the answers to questions 1 and 2?

Below we describe the process we used to address each of these questions. The intent of this document is to demonstrate the key components of this process, such that the process could be applied to other regions of the province (or other provinces) with a similar need for risk management planning but facing different conditions. In brief, our process relied on a series of workshops to elicit values and concerns key to answering the first question above. A more in-depth set of technical analyses and individual ranch assessments helped address the second question. Then, a final round of workshops served to address the final question. Along the way, a small group of ranchers agreed to serve as test cases for this planning process.

### **2.1 Starting with values**

Stakeholder values should drive any planning process, including one directed toward risk management. Therefore, we began our planning process with a series of workshops designed to elicit the main concerns of the Cariboo-Chilcotin ranching community related to wildfire planning and response.

Conditions important to assessing wildfire risk differ across the Cariboo region, and so we held workshops in Williams Lake, Tatla Lake, and Nimpo Lake, in an attempt to capture concerns that span a range of ranch sizes, forest types, fire frequency and history, degrees of remoteness, and degrees of impact from specific conditions such as pine beetle kill (figure 2). At each meeting, participants saw a short presentation on regionally-relevant wildfire risk considerations and general concepts, but the bulk of the time was spent focused on break-out sessions to identify specific values that ranchers felt were at risk (Values at Risk), as well as concerns around preparedness for, response to, and recovery from wildfires.



**Figure 2. Potential wildfire intensity varies across the Cariboo region (green region, inset), based on forest condition and previous fire behaviour. Initial workshop locations are identified in black.**

In addition to ranchers, the workshops were attended by representatives from the Province's Wildfire Management Branch, the Cariboo Regional District, and the Ministry of Agriculture. This mixture of attendance provided an opportunity for all participants to hear the same set of base information regarding wildfire in the region. More importantly, however, the Province was able to hear the concerns of the ranching community related to wildfire management and likewise, the ranching community was able to hear from the Province about their efforts and limitations in fully addressing those concerns. As a result, the ranching community and the Province were able to start into the planning process from a place of common understanding about the issues facing the ranching community.

The workshops identified several key themes:

- Protecting ranch infrastructure (i.e., buildings in the headquarters area) during a wildfire event is generally considered to be the highest priority. Other important assets include fencing, livestock, stored hay, and the range itself (grass).
- Fuel reduction, especially concerning mountain pine beetle and fuels near assets and evacuation routes, is strongly supported by the ranching community, who want to

have the ability to thin fuels around key areas themselves, but feel they may be restricted by regulations where these areas fall on Crown land.

- The remote nature of many of the ranches (particularly in the western part of the region) necessitates having the capability to generate their own power and have access to water, in the event that a fire disrupts power from the outside.
- Ranches that are particularly remote feel they have a need for more self-reliance through better planning and training for early response to wildfires.

This early focus on values at this stage of the process allows a fuller consideration of risk management planning, which a strictly technical approach might not uncover.

## 2.2 Understanding likelihood

Whereas addressing the first component of risk is a value-focused process, addressing the second component of risk, the likelihood that a fire would affect those values, is a technical task. The goal in this phase of the process was to identify the level of exposure to the Values at Risk.

We began by overlaying maps of potential wildfire intensity across the region with maps of the Values at Risk identified in the workshops. This enabled us to see, in a spatially-explicit way, the connection between likelihood of fires of various intensities and the distribution of Values and Risk (e.g., ranch buildings, fence lines) across the landscape (e.g., Figure 3). Because ranches are spread over large areas and their highest value assets are generally clumped (in the ranch headquarters), we divided our analysis into a broad scale, range-level analysis and a fine scale, ranch-level analysis.

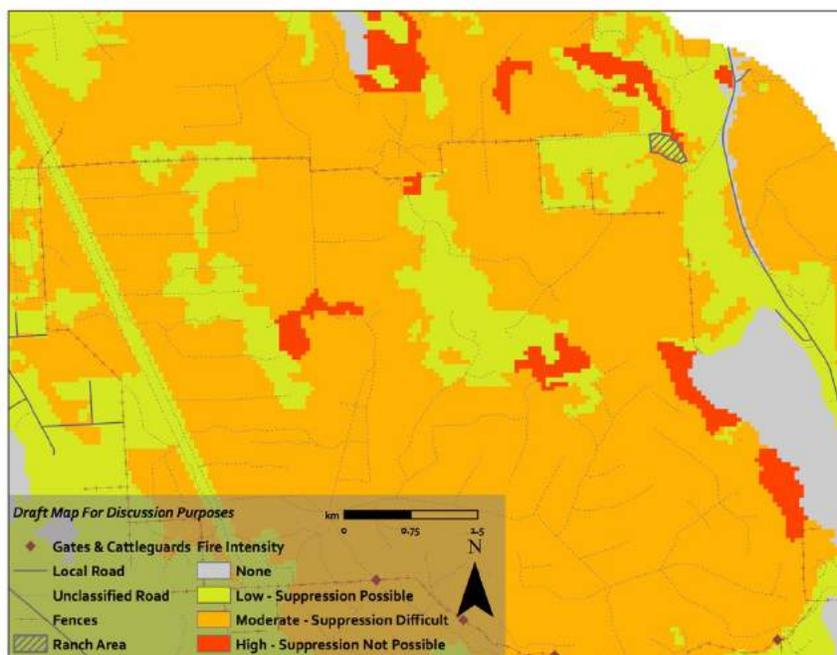


Figure 3. Fire intensity maps showing variability in suppression difficulty and distribution of values (e.g., fences and main ranch infrastructure) across the landscape.

The purpose of the range-level analysis is to answer questions about what kinds of fires different areas of the landscape are likely to experience, and how those kinds of fires interact with the spatial distribution of assets across the tenure. For many of the ranches we worked with directly, most of the range is susceptible to high intensity fires, where suppression would be difficult under the driest and hottest weather conditions. This indicates that for values such as fences that are distributed throughout the range, both the likelihood and the consequences of a fire are high.

The ranch-level analysis was intended to answer similar questions about what kinds of fires the areas in and surrounding the ranch are susceptible to, but also to answer questions about the hazard level from the ranch itself, and the likelihood that fires around the ranch could cause damage.

Unlike the range-level analysis, the ranch-level analysis showed that the main ranch areas we visited are generally not susceptible to the high intensity fires. Additionally, the ranch visits indicated that nearly every ranch conformed to the BC FireSmart guidelines (e.g., keeping distance between buildings and potential sources of fuel, etc.); therefore, the likelihood of fires in the ranch area itself was fairly low for the ranches we visited. However, in nearly all cases, the likely fire intensity of the adjacent landscape conferred a higher likelihood that embers from nearby fires could cause ignitions within the ranch (figure 4). While the relative probability of this kind of event is moderate to low, the consequence is high.

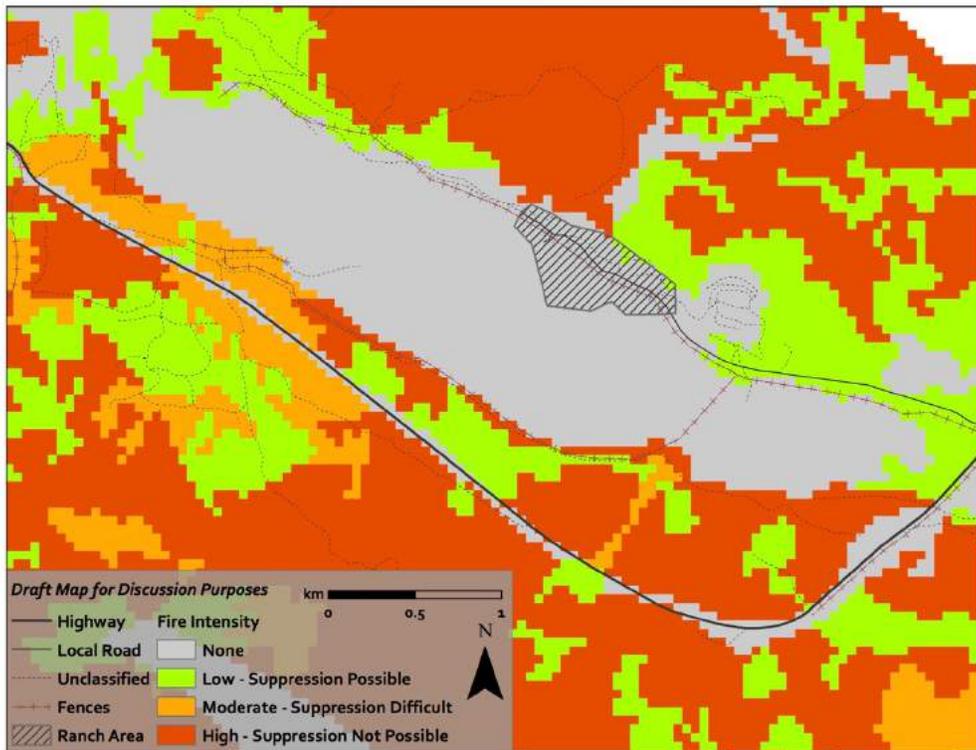


Figure 4. Example of wildfire Intensity in the vicinity (within 2km) of a ranch. Though likely fire intensity is low in and immediately surrounding the ranch, the tenure areas to the north-east and south-west present a threat of ember showers.

Based on this approach and the findings that the range-level and ranch-level risks differ according to their characterization in Figure 1, we structured the next series of workshops to explore the translation from types of risk to management approaches, and the opportunities for and barriers to specific actions within each of those categories.

### **2.3 Choosing the most appropriate risk management strategy**

In this process, the results of the assessment phase suggest appropriate management strategies, based on figure 1. For the case in the Cariboo, the range-level assessments made clear the relatively high likelihood of intense fires and the high consequence associated with losing fencing and other infrastructure around the tenure. This combination of high likelihood and high consequence implies a need for proactive active strategies to reduce fuel loads close to fences and within in the 2km radius around ranch areas. The ranch-level assessments, meanwhile, made clear the relatively low probability of fires burning into the ranch area itself. This combination of lower likelihood but very high consequence indicates that planning for emergencies – such as the possibility of ember showers from nearby fires – may be a more appropriate strategy than proactive interventions.

Specific actions to fulfill any of the strategies indicated in figure 1 will have unique benefits, drawbacks, and hurdles. Therefore, despite the direction that figure 1 provides, there are still choices to be made about how to actively manage the likelihood of fires, for example. The next step in our planning process requires an understanding of what those unique hurdles are, and what actions hold the most promise for the ranchers in this community.

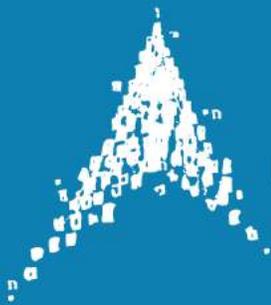
We held a second series of workshops to allow the ranching community and the province to come to a common understanding of the opportunities and barriers around several specific risk management actions. During these workshops, we shared the results of our analysis of the nature of the risk the ranching community faces (i.e., which quadrant in figure 1), and then asked targeted questions about the extent of the barriers to implementing appropriate management actions. For example, in the case of reducing fuel loads near fences, the ranchers and provincial representatives in attendance identified several regulatory and logistical hurdles, including limits on the amount of wood that can be removed from fence right-of-ways and the lack of time that ranchers can afford to spend clearing and disposing of fuels. We then initiated a discussion about the degree to which these hurdles represent real barriers to implementation.

## **3 Applying the planning process to other regions and other contexts**

Choosing the best wildfire risk management approach in any regional context should be guided by a good understanding of the assets or values that matter most and a good spatial understanding of the sources and mechanisms of exposure to wildfire. Based on the intersection of these pieces of information, stakeholders and government agencies can choose appropriate actions and prioritize their efforts in a way that makes sense for their specific conditions.

The planning process we describe here can be applied in other fire-prone agricultural regions of the province to guide smart choices about managing wildfire risk. While it is likely that the specific concerns will differ between agricultural sectors (e.g., dairy, viticulture, or tree-fruit), the process of eliciting values, tying those values to fire likelihood, and structuring deliberation

between the agricultural sector and other relevant agencies about the barriers to effective risk management can ensure that management actions address agricultural values that matter in a way that reflects on-the-ground realities of regional wildfire behaviour.



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