Review of Alberta Agriculture and Forestry's Wildfire Management Program and the 2015 Fire Season

Volume 1: Summary Report

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1. ALBERTA'S 2015 WILDFIRE MANAGEMENT PROGRAM

Background to the Review

Over time, Alberta has developed an extensive wildfire management program that supports a high degree of settlement, public use and resource development activity in the east slopes and northern boreal areas of the province. The program is managed by the Department of Agriculture and Forestry. It is designed to provide for human safety, to protect communities and to mitigate impacts on a range of values at risk all of which are important to the well-being of the province. Overall, the wildfire management program has been well regarded by Albertans and other jurisdictions. The program has undergone a variety of reviews, evaluations and continuous improvement initiatives to help ensure that it remains effective in meeting goals and expectations. Examples of past reviews include:

- Annual reviews carried out subsequent to each fire season.
- The 1998 Wildfire Management Program Review.
- The 2001 Chisholm Wildfire Review.
- The 2011 Flat Top Complex Wildfire Review.

The 2015 fire season in Alberta was severe and highly active in terms of the number and intensity of wildfires and the area burned. Agriculture and Forestry commissioned a review of the program, including an evaluation of the Department's performance during the fire season, in order to consider what could be learned from the events of the season and to position the program for long term challenges. The scope included reviews of:

- The legislation, policy and structure of the wildfire program, as described in various forms of documentation.
- Historical wildfire conditions in Alberta, western Canada and North America, including weather patterns, wildfire indices and related trends.
- The wildfire conditions, behaviour, events and occurrences experienced during the 2015 fire season.
- The functional areas of the wildfire management program, based on data collection, interviews and an evaluation of performance relative to objectives.
- The progress made towards the recommendations put forward by the Flat Top Complex Wildfire Review Committee in 2012.
- Financing alternatives, including revenue generation alternatives and insurance opportunities.

The review was carried out by a multi-disciplinary team of forestry and wildfire specialists as part of MNP's national forestry practice. The Review Team included:

- Rod Simpson, RPF
- Todd Nash, RPF
- Dennis Quintilio, RPF
- Sherra Muldoon, RPF
- Bruce MacGregor, RPFT
- Gary Mandrusiak, RPFT
- Hugh Boyd, RPFT
- Allen Beaver
- Peter Fuglem, RPF (BC - Retired)

Overview and Summary of Findings

The 2015 wildfire season was extreme throughout western Canada and particularly in Alberta. A hot, dry spring with high wildfire hazards created a situation where a large number of wildfires occurred and many of those wildfires grew aggressively. Alberta's wildfire management program is designed to detect wildfire early, and to respond quickly and aggressively – in most cases this is adequate to contain wildfires in the first burning period. The Review Team concluded that Agriculture and Forestry's wildfire management program functioned very well in response to the extreme fire season. The approach to wildfire management is sound, the systems are well developed, personnel are well prepared and resourcing is adequate—all are correctly oriented toward early containment of wildfires.

While resources were stretched to the limit in 2015, and resource sharing agreements were used to their full capacity, wildfires were contained or managed in a way that reduced risk to human life and property and mitigated damages to other values at risk. The program and the organization that delivered it was successful.

The current climate and wildfire science suggests that extreme seasons and wildfire situations similar to 2015 are more likely to occur in the future. Additional contributing factors that did not exacerbate the situation in 2015, such as wind events, could factor into future extreme fire seasons and wildfire events with a much more serious impact. In a province with extensive industrial and urban infrastructure in forest, this accentuates the importance of risk and priority management.

Exhibit 1, on the following page, summarizes the Review Team's recommendations and the opportunities for program improvement identified. Note that some recommendations and opportunities for improvement are fully in the Department's control while others will require the involvement and / or support of other departments and agencies.

The Review Team also examined the department's progress in respect to the implementation of the Flat Top Complex Wildfire Review Committee recommendations. The Team found progress to be reasonable though important ongoing effort is still required and the progress made to date needs to be maintained (particularly given the increasingly severe wildfire seasons).

The report is presented in chapters corresponding to the functional areas and topics reviewed. Chapters include an overview, analysis, findings, conclusions, recommendations and opportunities for improvement. Recommendations are made where findings suggest that some form of action needs to take place to address an issue or area of concern. Opportunities for improvement are made where ideas and suggestions have been recorded or developed that would allow for some degree of enhancement in the program, in keeping with the Department's objective of continuous improvement.

Exhibit 1: Summary of Recommendations and Opportunities for Improvement

Program Theme	Recommendation	Opportunities for Improvement
Wildfire Prevention	**1.** Revisit the province's strategy respecting FireSmart with an increased emphasis on a long term vision for FireSmart within the province, community responsibility, multi-agency collaboration and an outcomes based approach to implementing FireSmart projects. **2.** Develop robust communication plans and protocols for pre-fire season prevention awareness, as well as facts and advisories associated with wildfire events.	**1.** Improve the means of measuring wildfire prevention effectiveness by obtaining more specific data on the results of key activities or more specific feedback on targeted communities and demographic groups. **2.** Expand the provincial wildfire prevention strategic plan to include a three year provincial work plan for implementation by the Wildfire Management Areas. **3.** Enhance efforts respecting vegetation management research and science to offer a rationale for established and new FireSmart applications. **4.** Improve the linkage of FireSmart outputs with wildfire suppression decision making by ensuring that Duty Officers and Incident Management Teams have ready and immediate access to information regarding FireSmart activities in surrounding communities. **5.** Promote increased public engagement and communication regarding the importance of FireSmart and the need for FireSmart to be community-driven. **6.** Investigate the potential for the establishment of a standing FireSmart council representing various communities and organizations for review, engagement, education and increasing the profile and commitment to FireSmart in Alberta. **7.** Investigate the potential for increased effort and funding to six of the seven disciplines of FireSmart (not including fuel modification), to ensure a well-rounded and all-inclusive provincial FireSmart program is delivered. **8.** Move towards a coordinated, dedicated, sustainable and predictable flow of funds to the provincial FireSmart funding program to provide a longer term ability to support FireSmart project funding requests.
Wildfire Detection		**9.** Investigate the development and adoption of improved wildfire detection performance indicators. **10.** Continue to investigate new wildfire detection technology.
Presuppression Preparedness and Suppression		**11.** Review the terms and conditions, the recruitment approach and standards for contracted firefighting crews with an aim to increase recruitment and the number of firefighting crews available. **12.** Continue to review and implement improvements to equipment contracting practices and guidelines.
Policy and Planning	**3.** Develop and implement a formal wildfire risk management framework.	**13.** Prepare communications and briefing materials to increase the level of awareness of government representatives about wildfire and wildfire management. **14.** Expand efforts within the departments of Agriculture and Forestry and Environment and Parks to link wildfire management with planning under the Land Use Framework, Forest Management Agreements and other relevant planning initiatives. **15.** Incorporate wildfire management policies and objectives into public education and awareness communications, as part of the Department's communications initiative.
Resource Sharing and Mutual Aid		**16.** Continue to work with other jurisdictions, through the development and implementation of the Canadian Wildland Fire Strategy and through other opportunities, to enhance resource sharing, particularly with respect to aircraft and the availability of qualified and trained firefighters.
Alternative Revenue and Insurance Opportunities		**17.** Continue investigating opportunities to apply an insurance approach to Agriculture and Forestry's wildfire management program.
Program Costs and Financial Administration	**4.** Establish an analyst role within the Forestry Division that can provide assistance in the area of cost analysis, cost control and efficiency. The individual or group must have capabilities in financial management and operational wildfire program delivery, and must remain at arm's length from the operations.	**18.** Look again at the organization structure in respect to the management responsibility for the wildfire management program's regional business services (such as finance and administration functions) and ensure that there are no impediments that complicate decision making and wildfire management program delivery.

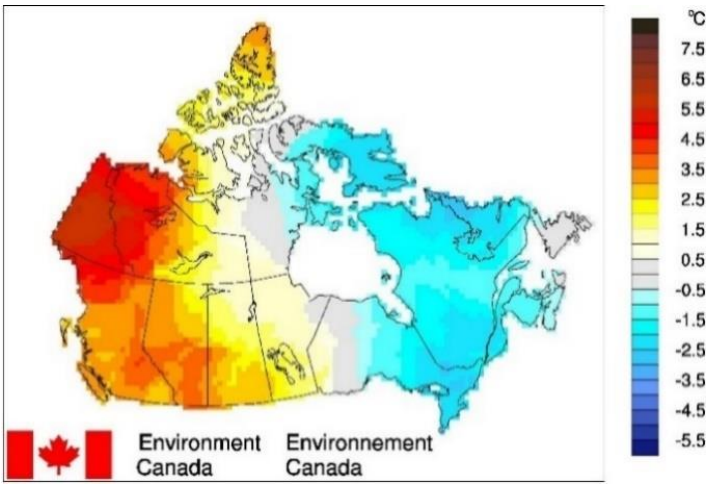
2. THE 2015 FIRE SEASON

The 2015 fire season was dominated by severe wildfire events throughout western Canada and the western United States. By October 31, 2015, 6,765 wildfires had burned 3,969,504 hectares in western Canada compared to the five-year average of 1,051 wildfires burning 976,068 hectares. The fire season was unprecedented in terms of its geographic extent, the number of wildfires and the area burned.

The season began particularly early in western Canada. The challenges experienced early in the season were a forerunner to the ongoing impacts of major wildfire events that extended into September. At one point, three neighboring provinces simultaneously requested additional resources through the Canadian Interagency Forest Fire Centre, a unique occurrence in Canada. Although wildfire occurrence across Canada tends to be variable and episodic, it is highly unusual for either all of western or eastern Canada to experience a significant increase in number of wildfires in the same season.

The cause of the unprecedented wildfire situation in Alberta in 2015 can be traced back to the previous fall and winter. Winter and early spring average temperatures for western Canada were higher than normal as shown in Exhibit 2.

Exhibit 2: Average Canadian Winter Temperatures in 2014/15



Winter and spring average precipitation in 2014/15 were also contributing factors to severe wildfire conditions. Exhibit 3 shows relatively low precipitation levels in the Prairie Provinces which contributed to a dry spring and high wildfire hazards.

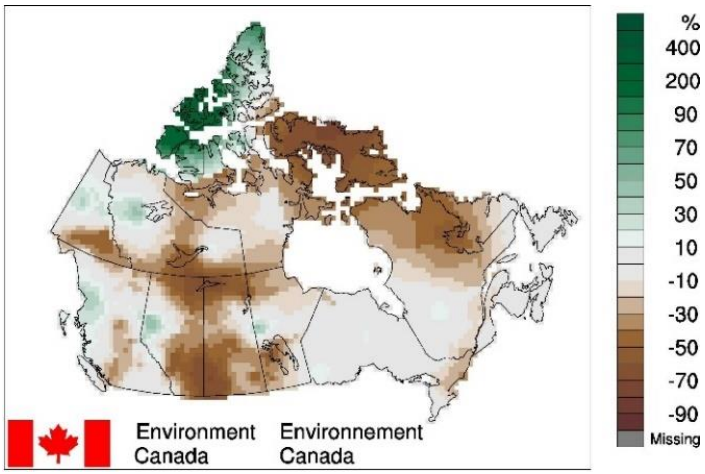


Exhibit 3: Average Canadian Spring Precipitation in 2015

Alberta's specific experience in 2015 featured a large number of wildfires—a total of 1,786 wildfires, a figure which has only been exceeded twice since 1990. The area burned totaled 492,000 hectares, most of which burned in May and June. From April 1, 2015 to July 16, 2015, Alberta recorded 1,440 wildfires that burned over 490,000 hectares; whereas the 5-year average during the same period was 911 wildfires and approximately 260,323 hectares burned.

The severity of wildfire conditions can be summarized in a seasonal severity rating (SSR) that averages the daily severity rating over the year. Exhibit 4 tracks the SSR and shows that the peak in May was far above the 5-year average.

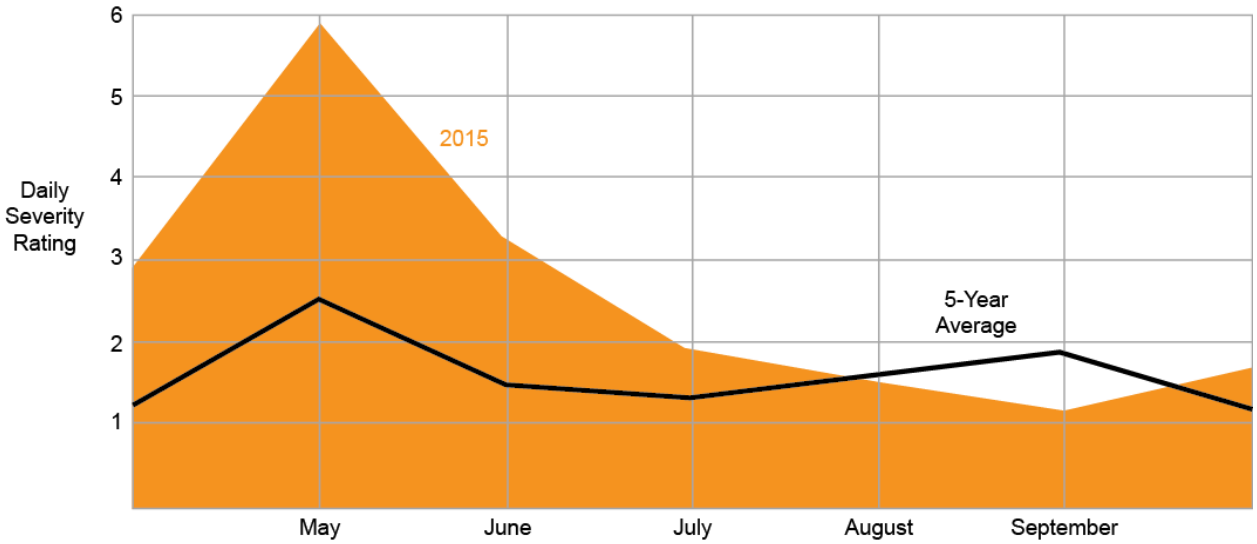


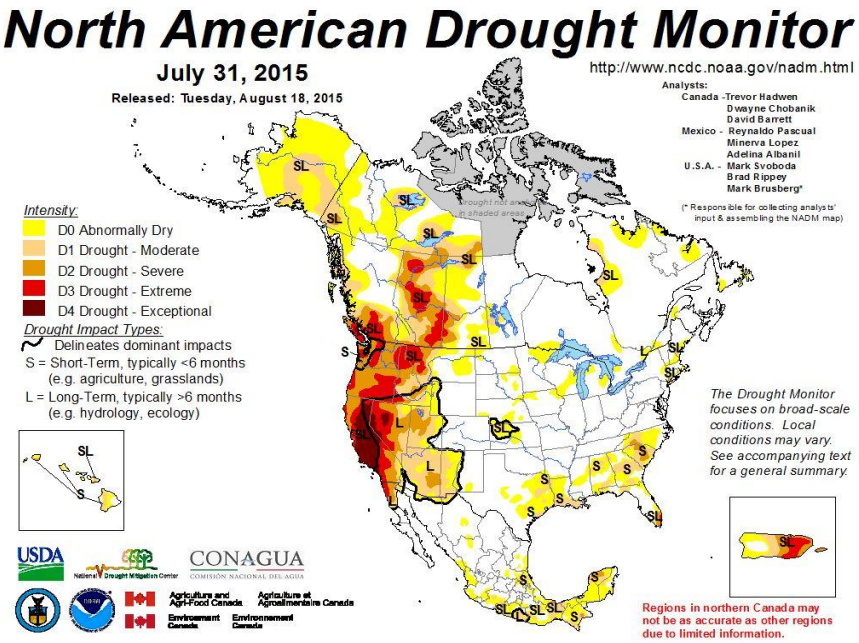
Exhibit 4: 2015 Alberta Seasonal Severity Rating

There is a prevailing view among wildfire scientists and fire behaviour specialists that these experiences may be linked to changes being observed in climate and associated wildfire weather. Climate data

indicates that we are currently experiencing increases in fire season length and periods of extreme conditions. Climate change forecasts imply that we will continue to experience increasing fire season lengths, extreme conditions, area burned and possibly wildfire severity in the next few decades. Following the disastrous spring wildfires of 2011 in the Slave Lake area, Agriculture and Forestry started the fire season on March 1, rather than April 1. This strategy allowed an earlier response to the significant wildfire events in May of 2015.

One possible consequence of climate change being experienced worldwide is drought conditions. Drought has a significant effect on wildfire conditions and has been experienced in the western areas of North America for a number of years. Exhibit 5 shows information from the North American Drought Monitor. Drought conditions are evident throughout virtually all of the western United States and Alberta.

Exhibit 5: North American Drought Situation



Climate change and the effects on fire seasons is being observed around the globe. Fire seasons and wildfire weather conditions in the western United States, Australia, Europe and South Africa are all becoming more challenging. At the same time, population growth in areas where urban and suburban development interfaces with forest and brushland is increasing risks to human lives, communities and infrastructure. Wildfire managers worldwide are having to address this convergence of factors – climate change, wildfire conditions, growing wildland-urban interface and societal expectations – in delivering wildfire management programs.

While climatologists and fire behaviour specialists observe and predict changing wildfire conditions and associated wildfire occurrence, forest ecologists point out that forests, particularly Canada's boreal forests, are products of wildfire. Wildfire is a natural and essential part of the forest ecosystem. The highly variable nature of fire seasons and wildfire occurrence over time creates a mosaic of forest types. This mosaic is represented by complex variations in vegetation associations, age classes, micro fauna, micro

flora, wildlife habitat, water regimes and other attributes. Healthy forest ecosystems and wildfire are linked, yet we live and work in and near forests. This is the challenge that wildfire managers face.

3. A REVIEW AND EVALUATION OF ALBERTA'S WILDFIRE MANAGEMENT PROGRAM

A review of Agriculture and Forestry's wildfire management program was carried out by studying the functional areas that make up the overall program. This was done by describing each subprogram area, collecting information from documentation, databases and interviews, identifying issues and developing recommendations and opportunities for improvement. The following sections summarize the work carried out within each subprogram area.

3.1 Wildfire Prevention Program

The Wildfire Prevention Program encompasses four functional areas:

- Wildfire science and technology.
- Wildfire applications.
- FireSmart.
- Compliance, investigations and communications.

The objectives of the activities delivered under the program are to reduce the number and severity of human-caused wildfires and to mitigate the effects of wildfires on communities. Additional objectives are specific to the activity area and are generally aimed at supporting the main program objective of early containment of wildfires or of providing communications support. Our evaluation focused on three of the functions – wildfire prevention, communication and FireSmart.

Wildfire Prevention

In an average year, the number of human-caused wildfires has been in the range of five to six hundred with peaks in years where burning conditions are more severe. Given the growth in the number of people living near and working in Alberta's forests, it's a credit to Agriculture and Forestry that this statistic hasn't increased. Wildfire prevention is critical – preventing wildfires reduces costs, risks to life, loss of property and resources, and social disruption.

In part, the success of wildfire prevention flows from the strategic and operational planning that takes place and the manner in which these plans are implemented. Currently, Agriculture and Forestry produces an annual strategic plan to guide prevention activities across the province. The plan addresses the three main components of wildfire prevention: education, engineering and enforcement. It is updated annually and renewed every three years. This strategic plan forms a baseline for the ten Wildfire Management Area (WMA) annual plans. Prevention involves identifying key messages, communicating these key messages in various ways and implementing activities that reduce the occurrence of wildfire.

An opportunity for improvement has been identified regarding the timing and relevance of the provincial strategic plan for wildfire prevention in relation to WMA needs. Wildfire Management Areas require a

cohesive provincial work plan that provides consistency in approaches and ties in with the strategic plan. The current form of planning could also be enhanced to better meet the needs and timing requirements for Wildfire Management Area field implementation. This presents an opportunity to expand the provincial strategic plan to include a three year provincial level work plan for wildfire prevention activities to better guide the Wildfire Management Areas in implementing their local wildfire prevention activities.

Communication

Communication activities support provincial and area wildfire management. Communication has become increasingly complex, with a greater demand for timely and comprehensive information. Social media as well as conventional media have evolved quickly, and the public and stakeholders appear to have increased demand for immediate access to information as events occur.

This was evident in the 2015 fire season when wildfire conditions were extreme, large wildfires were visible on the landscape, and some communities were evacuated. Increased public expectations for new information through social media created an opportunity for unreliable sources to gain a foothold on these platforms. Some Albertans felt that more frequent posting from Government could have helped prevent the propagation of this misinformation.

The review identified strengths respecting the Department's communications in the 2015 fire season. The Department regularly provided information to the public regarding wildfire status and the fire season overall through news releases, television and radio interviews, social media and others. The Department's social media sites, in particular, received positive feedback for the information it provides and the accessibility of that information.

The Department's ability to more directly communicate with the public and industry at a local level on matters that are closely associated with their specific interests was identified as an area for improvement. In 2015, the communications approach related to wildfire management shifted towards greater central coordination. A lack of understanding about the changed processes created frustration for staff at all levels. A more comprehensive communications strategy and plan applicable to wildfire operations would help address these issues and improve public service.

FireSmart

The FireSmart program has received increased attention since the 2011 fire season and the losses experienced in the Town of Slave Lake and surrounding communities. Significant progress has been made in terms of expanding the funding available for FireSmart in the province. There is a concern, however, that the approach to FireSmart remains relatively uncoordinated among communities, counties, municipal districts, related associations and provincial government departments. In addition, the buy-in from communities is not as strong in many cases as it needs to be in order to sustain FireSmart as a part of everyday living in a forested environment.

It must be recognized that community FireSmart programs are primarily the responsibility of the community and individual homeowners. These programs can be applied to areas within and outside the Forest Protection Area and in the case of fuel modification, they can involve private land, leased land, land under municipal control, as well as Crown land within a given radius of a community. For community FireSmart programs to be effective, strong leadership and ownership at the local community level is imperative. Support from the province, in terms of expertise and guidance is valuable for community

based programs. Support for the program in terms of a sustained and predictable flow of funding is key to sustaining its effectiveness.

Recommendations

1. ***Revisit the province's strategy respecting FireSmart with an increased emphasis on a long term vision for FireSmart within the province, community responsibility, multi-agency collaboration and an outcomes based approach to implementing FireSmart projects.***

   In the years following the Slave Lake area wildfires of 2011, progress has been made in making funds available to communities to plan and implement FireSmart projects. While this is an important step forward, a broad vision for FireSmart within the province is lacking and a more collaborative and coordinated approach to FireSmart is needed. This requires an increased level of community responsibility in planning, implementing and maintaining FireSmart. It also requires an increased role for other Government of Alberta ministries and external agencies in supporting communities with the implementation.

   The key objective is that the multiple agencies coordinate their efforts to manage FireSmart initiatives within a 10 kilometre radius of each community at risk of wildfire. This next step in advancing the FireSmart Program needs to include the development of a strategy focused on outcomes, the development of a vision and goals respecting the desired FireSmart status of each of the affected communities in Alberta, an inventory and analysis of FireSmart plans and projects completed to date, and the development or enhancement of longer term plans and investments for each community or group of communities.

2. ***Develop robust communication plans and protocols for pre-fire season wildfire prevention awareness, as well as facts and advisories associated with wildfire events.***

   The magnitude of the 2015 fire season in Alberta highlighted the need for a strong communications function within the Department. Well-developed communication plans and protocols are required to enhance opportunities to educate and inform the public and stakeholders of potential risks associated with wildfires. In addition, the plans and protocols should support the ability of the Wildfire Management Areas to provide specific and relevant information to local community members and stakeholders on a timely basis.

Opportunities for Improvement

1. Improve the means of measuring wildfire prevention effectiveness by obtaining more specific data on the results of key activities or more specific feedback on targeted communities and demographic groups.

   While tracking the number of human-caused wildfires is aimed at the broad goal of the prevention program, information addressing more targeted questions regarding specific activities, communities and demographic groups will provide greater insight into the effectiveness of prevention efforts and may help produce better results.

2. Expand the provincial wildfire prevention strategic plan to include a provincial work plan for implementation by the Wildfire Management Areas.

   Currently, Agriculture and Forestry produces an annual provincial prevention plan called a Wildfire Prevention Strategic Plan. It is updated annually, renewed every three years and forms a baseline for the Wildfire Management Area annual strategic plans. There are concerns that the timing and relevance of the provincial plan may not meet all the needs and timing requirements for Wildfire

Management Area field implementation. This plan should be expanded to include a three-year provincial level work plan for wildfire prevention activities to guide the Wildfire Management Areas in implementing their local wildfire prevention activities. This would help provide greater consistency across the province while allowing unique local needs to be met. In addition, the Wildfire Prevention Strategic Plan should tie into an enhanced provincial level communications plan or framework to increase public awareness of the importance of wildfire prevention.

3. Enhance efforts respecting vegetation management research and science to offer a rationale for established and new FireSmart applications.

4. Improve the linkage of FireSmart outputs with wildfire suppression decision making by ensuring that Duty Officers and Incident Management Teams have ready and immediate access to information regarding FireSmart activities in surrounding communities.

Completed FireSmart Community Plans, including Wildfire Preparedness Guides and Wildfire Mitigation Strategy documents, should be readily available in a digital database for use by Duty Officers and suppression teams. The information contained within these plans, such as fuel hazard modification and fire breaks, is critical for prevention, presuppression and suppression requirements. Furthermore, the same up-to-date information regarding all land disturbances within the same geographical area is required. This includes cut blocks, powerlines, well sites and past wildfire sites. Linking the information within a dedicated FireSmart spatial database to the existing spatial fire management system (SFMS) and other decision support tools would allow for improved wildfire suppression strategies and operational decision making.

5. Promote increased public engagement and communication regarding the importance of FireSmart and the need for FireSmart to be community-driven.

A communication plan that defines the immediate and future benefits of FireSmart including the limitations of various FireSmart activities is needed. A clear description of what FireSmart is and what it is not should be included in FireSmart communications.

6. Investigate the potential for the establishment of a standing FireSmart council representing various communities and organizations for review, engagement, education and increasing the profile and commitment to FireSmart in Alberta.

Possible entities to be represented in the standing council would include the Alberta Urban Municipalities Association, Alberta Association of Municipal Districts & Counties, Alberta Emergency Management Agency, the Office of the Fire Commissioner, and an Aboriginal community leader.

7. Investigate the potential for increased effort and funding to six of the seven disciplines of FireSmart (not including fuel modification), to ensure a well-rounded and all-inclusive provincial FireSmart program is delivered.

The extensive effort, dedication, energy and funding that have been allocated to the fuel modification discipline of FireSmart principles in Alberta is commendable; however, other disciplines are also important and require attention.

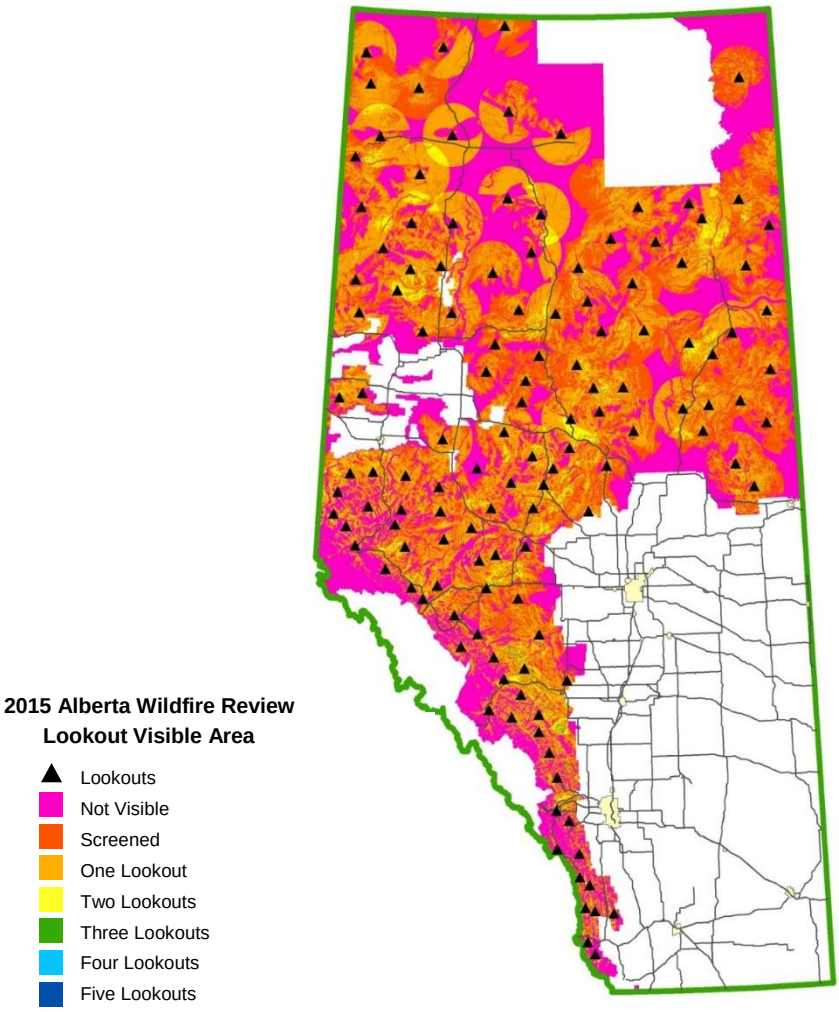
8. Move towards a coordinated, dedicated, sustainable and predictable flow of funds to the provincial FireSmart funding program to provide a longer term ability to support FireSmart project funding requests.

3.2 Wildfire Detection

Wildfire detection is a core part of Agriculture and Forestry's wildfire operations, and the critical first step triggering all subsequent activities in the wildfire management process. The effectiveness of detection has a direct bearing on the success of initial attack and on effectiveness of the overall program. Detection is the crucial link between presuppression preparedness, where resources are engaged on standby and strategically positioned, and suppression activities where the resources are activated. Information collected during the detection process supports decision making regarding initial attack strategies and tactics most likely to lead to the early containment of wildfires.

Detection in Alberta involves a wide range of tools and activities, including lookouts, aerial detection, ground patrols, public reporting and lightning monitoring. Alberta is unique among provinces in its commitment to a network of staffed lookouts, therefore much of the review focuses on the costs and effectiveness of lookouts and possible alternatives. Exhibit 6 illustrates Alberta's lookout network.

Exhibit 6: Lookout Network with Visible and Non-Visible Areas



Agriculture and Forestry's extensive use of lookouts should be considered in light of two factors. First, Alberta is not fully dependent on lookouts for detection, rather Alberta has adopted a multi-pronged approach to detection. Like other jurisdictions, Agriculture and Forestry uses aerial patrols, ground patrols and a range of public reporting to detect new wildfires. The Department's lookout infrastructure and usage adds another layer of continual detection capability for the majority of the province, significantly enhancing the ability to action wildfires when they are still small.

The second factor relates to Alberta's history of settlement, public use and resource development throughout the forested area. In the province's earlier days, most settled areas in and near forests required a lookout that was staffed during the fire season on days of higher hazard to help protect communities. As Alberta grew in terms of settlement and resource development in the forested areas of the province, this led to the detection system evolving around lookouts. The continued high degree of resource development, with many people working in forested areas and living in temporary camp environments, reinforces the need for a detection system based on lookouts that provide continuous coverage.

The costs of lookouts is primarily manpower, which is in the range of $4 million per year – a relatively small amount compared to the costs of presuppression preparedness and wildfire suppression. Given that detection is the first step in the overall wildfire suppression chain of events; given the importance of rapid initial attack to contain new wildfires in the first burning period; given that approximately 30% of wildfires are first detected by lookout operators; and, considering the very high costs of suppression that result when wildfires escape initial attack and grow to larger class status, Alberta's commitment to lookouts and the associated expenditures to operate a network of lookouts is warranted.

Considering the importance of the detection system to the overall wildfire management program, it makes sense to continually investigate and evaluate new technology and approaches to detection, including remotely controlled camera systems and enhanced use of satellite imagery. While this technology and application is yet unproven, continued participation in research and development is valuable as results could enhance the ability to detect wildfires earlier and could help reduce costs of detection.

Opportunities for Improvement

9. Investigate the development and adoption of improved wildfire detection performance indicators.

An opportunity for improvement exists with respect to continual improvement of the detection system as a whole, including the integration of all forms of detection approaches to maximize effectiveness. This effort would include ongoing review and development of performance indicators to support the role of detection in the overall effort to assess and action wildfires when small. Such performance indicators should focus as much as possible on wildfire size at the time of detection in order to better support performance measures related to presuppression preparedness and suppression systems.

10. Continue to investigate new wildfire detection technology.

Continuing to investigate and evaluate new technology and approaches for detection, such as remote camera technology and satellite imagery, would support the opportunity for improvement related to the integration and optimization of the full array of detection approaches available to support overall wildfire management objectives.

3.3 Presuppression Preparedness

The presuppression preparedness aspect of Agriculture and Forestry's wildfire management program encompasses the broadest range of activities in the program and represents a highly strategic area of decision making and policy implementation. Presuppression preparedness involves:

- Fire weather and wildfire hazard forecasting.
- Engaging resources in anticipation of their need for wildfire suppression, including initial attack crews, wildfire suppression crews, airtankers, rotary wing aircraft and other resources.
- Training wildfire management staff, wildfire suppression crews and aircraft related crews.
- Prepositioning resources in relation to hazard and risk.

The objective of presuppression preparedness is to establish an appropriate level of readiness in terms of resourcing and positioning of resources, to enable the rapid initial attack and containment of newly discovered wildfires. The decisions and actions regarding preparedness are made through a Presuppression Preparedness System (PPS) that identifies the resources (crews and aircraft) required to meet objectives at given wildfire hazard levels.

Agriculture and Forestry's PPS is highly evolved and draws on both policy and science to provide direction to field managers. The system is built specifically to support initial attack and to achieve objectives of containing wildfires in the first burning period. Substantial costs are incurred in implementing the PPS and engaging resources on standby. Exhibit 7 outlines the costs of presuppression preparedness in Alberta over the past five years.

Exhibit 7: Presuppression Preparedness Costs

Year	Total Cost ($)
2011	**108,328,623**
2012	**126,450,824**
2013	**100,551,071**
2014	**124,704,840**
2015	**183,431,103**

Presuppression preparedness represents the foundation of Agriculture and Forestry's wildfire management program. The manner in which the Department prepares for each upcoming fire season and the level of preparedness the Department establishes on each day, in accordance with current and projected weather and fire indices, is directly linked to protection objectives established in legislation, policy and standards.

Data presented in the Detection and Suppression chapters all emphasize the strong relation between early action on wildfires and the level of success in containing wildfires. Early detection and rapid initial attack using airtankers, initial attack crews and other resources allows the Department to contain wildfires when they are small, resulting in lower costs per wildfire, reduced losses to values and better protection of communities and homes. Exhibit 8 demonstrates the effects of a strong presuppression preparedness system under some of the extreme conditions encountered in 2015.

Exhibit 8: Impact of an Effective Presuppression Preparedness System

Wildfire Management Area	Selected Days	Containment - First Burning Period	Containment - Second Burning Period
Fort McMurray	May 25, June 24, June 25	72%	88%
High Level	May 25, June 24, June 25, June 26	76%	99%
Peace River	May 25, June 25, June 30	86%	93%
Slave Lake	May 25, June 30, July 1	61%	88%
Lac La Biche	June 25, June 26	87%	87%

Two issues were identified through a review of Agriculture and Forestry's approach to presuppression preparedness. The first relates to the hiring and contracting practice whereby equipment contactors are rotated when engaged on standby. At times, some contractors are hired for one or two days and then released if not needed. Others on the rotation list are engaged for weeks at a time if conditions warrant. This has raised questions of fairness and opportunity. It is noted that the Department recognizes this issue and intends to address it by establishing minimum engagement periods. The second issue relates to a situation where Agriculture and Forestry appears to have maximized the number of contract crews available for presuppression preparedness and suppression activities. This situation is reached in a context where a large number of Aboriginal community members appear to be willing and able to participate as firefighters. Terms and conditions of the contracts may be acting as a barrier to increasing capacity in regards to contracted crews.

Agriculture and Forestry's commitment to a strong presuppression preparedness approach is necessary given the objectives set in policy and the level of settlement and development in Alberta's forested area. The Department's current presuppression preparedness initiatives are fully warranted and necessary. Any changes contemplated to the level of resourcing for presuppression preparedness must be made as a consequence of a policy decision where objectives are changed or redefined.

Presuppression preparedness is an area of the wildfire management program that ties together provincial policies and objectives with standard operating procedures and the various means of accessing resources. The system is sound, taking data and science regarding fire behaviour on the one hand with readiness requirements on the other hand. A strong presuppression preparedness approach to wildfire management improves success rates in containing wildfires when small, reduces costs in wildfire suppression and reduces the probability of catastrophic losses related to uncontrolled large wildfires.

Opportunities for Improvement

11. Review the terms and conditions, and the recruitment approach and standards for contracted firefighting crews with an aim to increase recruitment and the number of firefighting crews available.

Advice from wildfire managers and specialists indicates that the number of contracted firefighting crews available in the province has been maximized given the current terms and conditions of the agreements with contracted crews. This perspective is supported by the data available. These terms and conditions include firefighter wages, benefits, hours, length of employment, fitness standards and other criteria.

Compounding this, the move to Canada wide fitness and training standards for firefighters has eliminated some of the more experienced and capable firefighters from the program. There is value in reengaging with these people as a source of expertise, as elders and mentors on the fireline, and as a compliment to community and individual pride in the firefighter program.

Finally, the downturn in the Alberta economy has also affected the employment options for Aboriginal peoples therefore it may be an opportune time to investigate expanding the wildfire crew program in the Aboriginal communities.

Given the importance of Alberta contracted crews to presuppression preparedness in the province and given the opportunity to expand the level of participation of Aboriginal community members in the wildfire management program, improvements in the terms and conditions for contracted crews could provide multiple benefits.

12. Continue to review and implement improvements to equipment contracting practices and guidelines.

The Department has been reviewing the practice of rotating equipment contracts through a list of local contractors to provide for a greater degree of fairness and equal opportunity. The Department is encouraged to continue with the review and implementation of this and other equipment contracting practices and guidelines to improve effectiveness, efficiency and fairness.

3.4 Suppression

Wildfire suppression is the operational aspect of the wildfire management program and the most noticeable set of activities to the public. Suppression involves mobilizing varied resources to attack wildfires and protect values within Alberta's forests—within and outside the Forest Protection Area. Suppression includes the broad range of activities involved in controlling and extinguishing wildfire, including initial attack and sustained action. Wildfire suppression is closely linked to presuppression preparedness at the initial attack stage. Once resources that are pre-positioned as part of the PPS are mobilized to address new wildfire starts, all activity (and costs) becomes a part of wildfire suppression.

The core objective of wildfire suppression is to minimize or mitigate the impact of wildfires on values at risk. In 2000, Cabinet approved the following priorities for allocating firefighting resources (listed in descending order of priority).

- Human life.
- Communities.
- Watersheds and sensitive soils.
- Natural resources.
- Infrastructure.

The objectives of wildfire suppression are reflected in two main performance measures used by Agriculture and Forestry in the suppression program, each focusing on initial attack. The first is to contain wildfire spread within the first burning period (by 10:00 am the day following initial assessment of the wildfire). The second is to initiate suppression activity before the wildfire exceeds two hectares in size. Exhibit 9, on the following page summarizes results for 2015 in terms of containment of wildfires and shows a high degree of success.

Exhibit 9: Wildfire Suppression Success Rate

Year	Wildfires Contained in First Burning Period (%)	Wildfires Contained in Second Burning Period (%)
2011	96.1	97.7
2012	97.9	98.4
2013	98.3	99.7
2014	99.2	99.4
2015	92.7	95.6

The review and evaluation of the wildfire suppression included the actions and outcomes from two wildfire complexes—the Britnell and Birch wildfire complexes. Overall, the reviews identified the following:

- The overall cost of the program is largely a reflection of the high costs associated with aircraft and firefighting crews. These expenditures are consistent with government's policy and objectives.
- The availability of resources is becoming more of an issue as fire seasons become longer with more severe periods of wildfire hazard.
- The public has become much more connected through social media and they have the expectation of quick and accurate information on wildfire status and threats to communities.

In terms of an overall assessment of wildfire suppression activities, it is recognized that the overall cost of wildfire suppression is high. The costs reflect the large number of wildfires experienced in Alberta compared to other jurisdictions and a high level of values at risk on the forested landscape. Extensive values at risk in Alberta requiring protection through the wildfire management program include a relatively large number of communities in and near forests, a workforce often working and living in remote camps throughout the northern areas of the province, energy and utilities infrastructure, and fully allocated forest resources – all related to the settlement and development of the province throughout the northern and western parts of the province.

The evaluation of the suppression program revealed no systemic issues. The 2015 fire season pushed the system to its limit in terms of engaging resources in a situation where other jurisdictions were also demanding resources. Some wildfires were actioned with limited response due to resource availability; however, these decisions were made within the stated priorities and objectives.

Overall, the standard operating procedures, processes and policies in place to guide wildfire suppression activities are well defined and well implemented. The wildfire suppression activities carried out in 2015 appeared to have been well executed and successful. The experience in 2015 included limited wind events, which likely led to more manageable fire behaviour and less likelihood of extreme events, and supported successful suppression performance.

Recommendations and opportunities for improvement have been identified and relate to communications and wildfire policy. These recommendations and opportunities are addressed in the Wildfire Prevention Section and Policy and Planning sections.

3.5 Policy and Planning

The policy and planning function of the wildfire management program provides overall direction with respect to wildfire management in Alberta, and the high level means by which the direction is implemented. Wildfire management policy links the government's overall goals and strategies to the wildfire management program. Planning systems and initiatives are the enabling tools and strategies that support implementation of wildfire management programs and activities.

In a program delivery sense, policy and planning is carried out by setting overarching goals and the supporting policies, setting and updating standard operating procedures, establishing performance measures, and preparing wildfire risk management plans. In addition, linkages to other provincial landscape management and emergency services plans and policies is established at this level.

The objectives of policy and planning in relation to wildfire management in Alberta can be described as:

- Providing direction to Agriculture and Forestry with respect to wildfire management, that reflects the province's approach to public safety, management of values at risk and risk tolerance. The objective of setting high level policy and direction is to provide a foundation for the program that subsequently informs the structure of the program and the capacity and capability for delivering the program.
- Providing structure for the program in terms of stated priorities, intradepartmental roles, and standard processes and procedures that unite strategic direction, science and the experience of wildfire managers in Alberta.
- Providing linkages with other land and resource management policies and plans to enhance effective decision making, particularly with respect to wildfire prioritization and resource allocation during active wildfire situations.

The current policy and planning framework for the wildfire management program consists of:

- A provincial policy, approved by Cabinet that identifies five broad priorities of protection.
- A set of standard operating procedures that outline processes, procedures, decision support criteria and other operational instructions and guidelines.
- A set of linkages, currently under development, of wildfire management with other provincial landscape and resource management planning systems that identify specific objectives, values at risk and a refinement of priorities from a provincial perspective.
- Regional risk management plans, currently under development that further assesses risks and values at risk at a regional level.

There are opportunities to strengthen the policy and planning framework guiding the wildfire management program to better reflect what the public wants and needs in terms of wildfire management.

Recommendations

3. Develop and implement a formal wildfire risk management framework.

While the program currently operates under a risk management approach, there is no overall framework to guide future development of the program and application of the program in extreme wildfire conditions. The framework should outline the province's understanding and direction

regarding risk, consequences, risk tolerance, priorities and decision authority with respect to wildfire events at the provincial and Wildfire Management Area levels.

Based on a draft risk management framework, Alberta's elected representatives should be engaged to discuss aspects of a wildfire risk management framework and should be asked to confirm a wildfire management policy, including wildfire management priorities and decision authorities.

The risk management system currently being developed by Agriculture and Forestry's Wildfire Management Branch (the Extended Operations Model) needs refining in order to reflect the direction provided by the risk management framework. The organization's objective of adopting a risk management approach to wildland fire management is clear and provides an effective basis for this next step.

The Review Team suggests that the organization adopt a recognized risk management process, framework and system such as the International Organization for Standardization, ISO 31000:2009. The implementation of Risk Management Principles and Guidelines that include a risk assessment and profile structure that detail the risk sources and drivers, control effectiveness and costs plus risk, and control owners is required. This should be applied organization-wide for a holistic application of Wildland Fire Management – Risk Management. This will include social, economic and environmental values in the context of wildfire as both a potentially destructive force and as an 'interacting natural system' as defined in Alberta's Environmental Protection and Enhancement Act, 2014 and the Canadian Environmental Assessment Act 2012.

Accelerating the completion of all ten risk management assessments (regional risk management plans) should be a priority action item for the program. This effort is a key step in completing the implementation of a risk management approach to extended wildfire operations. Review of the value at risk labels should be included to assess both vulnerability and exposure of individual values that would either downgrade or enhance the priority status.

Opportunities for Improvement

13. Prepare communications and briefing materials to increase the level of awareness of government representatives about wildfire and wildfire management.

Confirming or redefining government's position on risk tolerance, potential consequences and protection priorities is an opportunity to articulate a foundation for a risk management framework for the program. This can be done through the following actions:

- *Preparing briefing materials for caucus on the nature of wildfire on forested landscapes generally and on Alberta's landscape specifically.*
- *Preparing a presentation and discussion to caucus that outlines Alberta's forestry context, wildfire management as a discipline of forestry and the current policy regarding protection priorities.*
- *Asking for Cabinet support for a wildfire management policy and a set of wildfire protection priorities for Alberta, either in its current form or in a modified form.*

14. Expand efforts within the departments of Agriculture and Forestry and Environment and Parks to link wildfire management with planning under the Land Use Framework, Forest Management Agreements and other relevant planning initiatives.

15. Incorporate wildfire management policies and objectives into public education and awareness communications, as part of the Department's communications initiative.

3.6 Resource Sharing and Mutual Aid

When wildfire conditions are extraordinary and wildfire suppression resources are limited (such as the conditions experienced in 2015), the Department may import highly trained and experienced firefighters from other jurisdictions to support its wildfire suppression efforts. Importing such resources on a short-term basis enables provincial firefighters to take the required time off and ensures the province is prepared to respond appropriately to the increased number of new wildfires. The Department also exports firefighting resources when requested by other jurisdictions, and wildfire activity, resources and hazard levels in Alberta are appropriate.

This resource sharing is an integral component of wildfire management locally, nationally and internationally that supports the provision of adequate resources to assist with emergency events. The weather patterns in 2015 and the corresponding severe fire season made the use of existing resource sharing agreements to their full capacity an essential strategy.

Mutual-aid agreements exist on a more localized level and are in effect regional approaches to emergency management. Agriculture and Forestry encourages Alberta municipalities to develop regional mutual-aid agreements and plans.

In 2015 wildfire activity in Alberta began early in May, as did the fire seasons in both Saskatchewan and British Columbia. Local resources were quickly committed and all three provinces began requesting additional resources through the Canadian Interagency Forest Fire Centre (CIFFC – members include the Canadian provinces and territories and the federal government) and the Northwest Forest Fire Compact (includes Western Canadian wildfire management agencies and the agencies in the states of Washington, Montana, Idaho, Oregon and Alaska).

As the fire season progressed Alberta had an unprecedented level of imported overhead and firefighters on the fireline, primarily in central and northern areas of the province. Exhibit 10 summarizes Agriculture and Forestry's manpower resource sharing activity that took place in the 2015 fire season.

Exhibit 10: Resource Sharing (Manpower)

Province / Country	Imports	Exports
British Columbia	204	18
Saskatchewan	-	1
Ontario	441	-
Quebec	45	-
Yukon	-	21
Northwest Territories	-	55
Newfoundland	1	-
Nova Scotia	36	-
New Brunswick	28	-
Prince Edward Island	7	-
Parks Canada	6	5
CIFFC	3	1
Australia	47	-
New Zealand	17	-
South Africa	49	-
United States	182	135
Mexico	62	-
2015 Total	**1,128**	**236**
5 Year Average	**485**	**210**

Two primary issues have been identified with respect to resource sharing and mutual-aid. The first is that a higher demand for resource sharing will develop in the coming years as fire seasons lengthen and exhibit more severe burning conditions. Consequently, there is a need for CIFFC to develop agreements with other jurisdictions for resources that meet standards. An example of this is Agriculture and Forestry's use of firefighting crews from as far away as South Africa, Australia and New Zealand in 2015. Additional agreements with other countries may be needed, in turn requiring additional effort to develop common standards and common training.

A second issue identified is the availability of key resources at a western Canadian level. This includes airtankers, rotary wing aircraft and trained firefighting crews that meet agreed upon standards. The current resourcing model is designed around each jurisdiction taking primary responsibility for developing, owning or engaging resources that each feels it needs to meet expected demands in the context of its wildfire management objectives. Mutual-aid and resource sharing is called on when conditions exceed

expectations and internal resources are inadequate. This creates a suboptimal model at best and at worst, a competitive environment for resources. It is clear that a greater focus on collaborative approaches to capacity building is needed, including renewing or increasing key resources. This should involve all jurisdictions including CIFFC, Natural Resources Canada and the Wildland Fire Management Working Group. Strategies such as jointly owned or engaged resources, including airtankers and other critical assets, should be given strong consideration.

Opportunities for Improvement

16. Continue to work with other jurisdictions, through the development and implementation of the Canadian Wildland Fire Strategy and through other opportunities, to enhance resource sharing, particularly with respect to aircraft and the availability of qualified and trained firefighters.

The 2015 fire season created a situation where all western provinces were highly reliant on resource sharing. Over the year 1,128 firefighters were imported to assist with extended wildfire suppression operations in Alberta alone. As a result of the wildfire activity throughout western Canada, 357 firefighters were provided from outside of Canada, which increased costs and challenged logistics. In addition, in order to equip initial attack and suppression actions, Alberta was hiring airtankers and rotary wing aircraft on short term contracts at the same time that other western provinces were importing aircraft. This is becoming more common as climate change affects fire season length and severity. National and international agreements on resource standardization and sharing will become more important as single jurisdictions find themselves unable to secure the specialized resources needed for periods of peak demand. The Canadian Wildland Fire Strategy is one way that this issue is being addressed. Where other opportunities exist to further develop cooperative approaches and resource sharing mechanisms, these should also be pursued.

4. FLAT TOP COMPLEX RECOMMENDATIONS

In May 2011, two wildfires burned into communities in the Slave Lake area destroying 484 single-family dwellings, seven multi-family residences, 19 non-residential buildings, burning nearly 22,000 hectares, and causing the evacuation of close to 15,000 residents. These two wildfires, in addition to one other wildfire in the Slave Lake WMA, became known as the Flat Top Complex. In response to the severity of this wildfire event, the Government of Alberta established the Flat Top Complex Wildfire Review Committee in June 2011.

The Committee organized the review findings into seven themes and issued 21 recommendations. As a component of the current evaluation, the Review Team was asked to review and report on progress made on these recommendations. A detailed description of the recommendations and evaluation findings can be found in the detailed report. A summary of our findings are found below.

4.1 Evaluation of Fulfillment of the Flat Top Review Recommendations

The status of recommendations falls into one of three, colour-coded categories:

1. Met Expectations—Agriculture and Forestry has met the intent of the recommendation.
2. Partially Met Expectations—intent of the recommendation is partially met but with outstanding components needing resolution either by Agriculture and Forestry or others.
3. Ongoing—solution to the recommendation is still being developed.

Overall, our findings indicate that the implementation of the Flat Top recommendations is reasonable and ongoing implementation is required. Furthermore, the progress achieved to-date needs to be maintained amidst increasingly severe wildfires and fire seasons. Of the 21 recommendations made by the Flat Top Complex Wildfire Review Committee, 15 have Met Expectations, four have Partially Met Expectations and two fall into the Ongoing category. Exhibit 11 details our findings.

Exhibit 11: 2011 Flat Top Complex Wildfire Review Themes, Recommendations and Status of Implementation (Note: Agriculture and Forestry's name at the time of the Flat Top Complex Review was Sustainable Resource Development)

Theme - Wildfire Prevention RECOMMENDATION 1: Enhancements to Wildfire Prevention Implement significant enhancements to wildfire prevention measures, including widespread fire bans, forest area closures, fire permit management, and elevated fines during extreme weather and/or wildfire behaviour conditions. Special consideration should be given to prevention activities early in the fire season. In addition, Sustainable Resource Development should enhance communications of these initiatives to stakeholders and the public to gain their support and acceptance.	Status *Met Expectations*	Other comments *Ongoing funding required to continue implementation.*
Theme – Wildfire Prevention RECOMMENDATION 2: Human-caused Wildfires/Limited Liability Fire Control Agreement Enhance wildfire prevention measures to aggressively address the increase in human-caused wildfires. Evaluate the effectiveness and future use of limited liability (as currently expressed in industry fire control agreements) to facilitate effective wildfire prevention by industries operating within the Forest Protection Area.	Status *Met Expectations*	Other comments *Ongoing effectiveness evaluation required.*
Theme – Wildfire Prevention RECOMMENDATION 3: Revised Delivery Model/Enhanced Funding for FireSmart Establish a revised delivery model for a FireSmart program under one provincial framework, including a streamlined and enhanced funding model.	Status *Met Expectations*	Other comments *Ongoing funding required as per 20 year implementation plan for the recommendation.*
Theme - Wildfire Prevention RECOMMENDATION 4: Accelerate Fuel Management Treatments Accelerate fuel management treatments near communities in forested areas that are at risk from wildfires. Priority should be given to thinning or conversion of coniferous stands, particularly black spruce, which threaten community developments (as identified through strategic analysis of wildfire thread potential).	Status *Met Expectations*	Other comments *Ongoing funding required as per 20 year implementation plan as well as ongoing evaluation.*
Theme – Preparedness and Capacity RECOMMENDATION 5: Advance Resource Start Times/Fill Vacancies/Expand Work Terms Advance start times for resources, including crews, equipment and aircraft contracts, to be fully ready for potential early fire seasons. Ensure staff vacancies are filled as soon as possible. Expand work terms to year round for a portion of firefighting crews to support retention and provide capacity for FireSmart initiatives.	Status *Met Expectations*	Other comments *Ongoing funding required to sustain capacity.*

Theme – Preparedness and Capacity RECOMMENDATION 6: In-house Expanded Attack (Unit) Crews Develop in-house expanded attack firefighting crews to provide sustained action capability and other wildfire management functions (modeled after the United States Hot Shot crews and/or British Columbia Unit Crews). These crews will enhance response capability on complicated and difficult wildfires. When not fighting wildfires, these crews can be made available for fuel management and landscape FireSmart activities.	Status *Met Expectations*	Other comments *Ongoing funding required and ongoing evaluation needed to assess need to expand unit crew capacity.*
Theme - Preparedness and Capacity RECOMMENDATION 7: Fire Behaviour Specialists/Wildfire Occurrence Prediction Ensure sufficient fire behaviour specialist capabilities at Sustainable Resource Development's Provincial Forest Fire Centre as part of wildfire weather forecasting, and implement wildfire occurrence predictions to support the Presuppression Preparedness System.	Status *Met Expectations*	Other comments *Ongoing funding required to sustain capacity.*
Theme - Preparedness and Capacity RECOMMENDATION 8: Resource Requests Initiate resource requests in advance of potential demand, especially in anticipation of extreme wildfire risk conditions. Efforts should be made to reduce delays inherent in the resource request and sharing system internally and with other agencies.	Status *Partially Met Expectations*	Other comments *The Department is a major contributor to the National Wildfire Response Plan, and is developing and implementing an internal risk based process.*
Theme - Preparedness and Capacity RECOMMENDATION 9: Structural Protection Work with other agencies (e.g., Alberta Municipal Affairs) to develop a structure protection program in which Sustainable Resource Development's role in structural protection is reduced. This will allow Sustainable Resource Development to focus its resources and actions on wildfire containment. The intended result is an increased role for municipal fire services to provide sprinkler protection for homes. Key components will be the provision of standardized equipment and training for fire departments and focus on proactive deployment under the mutual aid network.	Status *Ongoing*	Other comments *The Department is working with Alberta Emergency Management Agency and the Office of the Fire Commissioner to clarify mandates and roles.*
Theme – Communications RECOMMENDATION 10: Standards/Training for Staff who provide Wildfire Information Enhance standards and training for employees involved in liaison and wildfire management information communications that support operations before, during and after a wildfire event.	Status *Met Expectations*	Other comments *Ongoing training, program support, and funding required to sustain capacity.*

Theme – Communications RECOMMENDATION 11: Fire Weather Advisories Issue Fire Weather Advisories that include wildfire behaviour potential to ensure understanding of the wildfire danger. Fire Weather Advisories should be more comprehensive in terms of distribution to staff, stakeholders and the public, and more interpretive in terms of implications (i.e., what does the information mean and what actions need to be taken). Fire Weather Advisories are a relatively rare event, which makes it even more important that their meaning is easily understood. Stakeholders and the public need to understand that wildfires can start more easily in certain conditions and, if they do start, can spread very quickly.	Status *Met Expectations*	Other comments *Implementation funded within existing budget.*
Theme – Communications RECOMMENDATION 12: Dispatch and Resource Tracking Systems Undertake a review of Sustainable Resource Development's dispatch and resource tracking systems. The Committee believes economies of scale and efficiencies in dispatch and tracking aircraft can be achieved through investment in improved dispatch approaches and technology. Sustainable Resource Development should determine whether other provincially-based emergency and wildfire dispatch methodologies and standards (including training) would be beneficial to its operations.	Status *Met Expectations*	Other comments *Funding required for implementation.*
Theme – Communications RECOMMENDATION 13: Alternative Communication Technologies Enhance communication by fully supporting alternative communication technologies (texting, social networking).	Status *Met Expectations*	Other comments *Ongoing updates required as technology and applications evolve.*
Theme - Organization and Incident Management RECOMMENDATION 14: Reporting Relationship Realign Area wildfire operations to a direct line reporting relationship within Sustainable Resource Development's Forestry Division to provide clearer responsibilities and authorities.	Status *Partially Met Expectations*	Other comments *Business support services are housed in a different ministry. Environment and Parks provides business support services to Agriculture and Forestry Wildfire Management Areas via a service level agreement.*

Theme - Organization and Incident Management RECOMMENDATION 15: Wildfire Management Internal Assessments/Benchmarking Restore regular internal assessments of Provincial and Area implementation of wildfire management strategies, priorities and procedures. Undertake regular reviews and benchmarking of Sustainable Resource Development's wildfire management strategies and firefighting priorities.	Status *Met Expectations*	Other comments *National benchmarking being developed through Canadian Interagency Forest Fire Centre.*
Theme – Organization and Incident Management RECOMMENDATION 16: Incident Command System Work with the Alberta Emergency Management Agency to align implementation of the Incident Command System and the use of Incident Management Teams under a consistent provincial model. This should include development of appropriate training and emergency simulation exercises that are practiced regularly (from tabletop to full simulation exercises related to wildfires).	Status *Met Expectations*	Other comments *Requires ongoing implementation, training and exercises.*
Theme - Post-wildfire Business Resumption RECOMMENDATION 17: Business Continuity Plans Review Sustainable Resource Development's business continuity plans in the context of overall Government of Alberta plans, with particular attention to loss of department infrastructure and support to staff.	Status *Ongoing*	Other comments *Part of the government of Alberta's responsibility.*
Theme - Policy, Procedures and Legislation RECOMMENDATION 18: Wildfire Policies and Procedures Undertake a comprehensive review of Sustainable Resource Development's wildfire policies and associated procedures, especially with regard to priorities, structural firefighting, initial attack, and night-time firefighting, with consideration of staff training and understanding, to ensure consistent interpretation of policies and procedures.	Status *Partially Met Expectations*	Other comments *Awaiting resolution of the comments noted for Recommendation 9 to complete this recommendation.*
Theme – Policy, Procedures and Legislation RECOMMENDATION 19: *Forest and Prairie Protection Act* and Regulations Work with legal counsel to review and update the ministry's Forest and Prairie Protection Act and associated regulations, in context with other applicable legislation, with particular attention to key areas including, but not limited to agency roles and responsibilities (such as Forest and Prairie Protection Act Section 7), evacuation authorities, wildfire investigation, fire control authorizations, administrative penalties, as well as updating definitions.	Status *Partially Met Expectations*	Other comments *Consultation and review process is underway.*
Theme - Research and Development	Status	Other comments

RECOMMENDATION 20: Research, Development and Monitoring Collaborate with research agencies to support research, development and monitoring in key areas highlighted by the Flat Top Complex including, but not limited to the following: • Factors contributing to wildfire threat and structure losses, including wildland and other fuels, social elements, and the contribution of black spruce as a source of extreme wildfire behaviour and spotting; • Community planning and development, including codes and standards that impact building materials and fuels in the community; • Effectiveness and efficiency of FireSmart treatments and decision support tools for FireSmart investments; • Public awareness regarding the potential risk from wildfires and best practices to mitigate this risk, and factors affecting community and resident decisions to implement wildfire risk mitigation activities; • Enhanced fuel characterization to provide improved fire behaviour forecasting; and • Prediction of wind events, including approaches for worst case probability modeling, in collaboration with Environment Canada; apply lessons learned to forecasting.	*Met Expectations*	*Ongoing funding required to address current and future program needs.*
Theme - Research and Development RECOMMENDATION 21: Presuppression Preparedness System/Wildfire Occurrence Prediction Enhance the Presuppression Preparedness System to account for new information from 2011 related to initial and expanded attack requirements, with consideration of the potential use of wildfire occurrence prediction.	Status *Met Expectations*	Other comments *Aligned with Canadian Wildfire Preparedness and Response Plan initiative as well as support and partnership with the Western Partnership for Wildland Fire Science.*

5. ALTERNATIVE REVENUE AND INSURANCE OPPORTUNITIES

As part of the program review, we have considered whether or not there's a role for some form of alternative revenue and/or wildfire insurance arrangement in Agriculture and Forestry's wildfire management program. These two areas of consideration were approached independent of each other.

In terms of alternative revenue opportunities, three possibilities were considered:

- Increasing holding and protection charges levied on the forest industry either through Forest Management Agreements (FMAs) or legislation applicable to timber quotas and permits.
- Charging energy companies holding Crown dispositions a protection charge over and above the current charges applicable to dispositions held under their names.
- Charging all other companies and individuals holding Crown dispositions a protection charge over and above the current charges applicable to dispositions held under their names.

Interviews and feedback from stakeholders communicated clearly that this type of initiative would be met with resistance for a variety of reasons:

- The forest industry is the only industry that currently pays a holding and protection charge and they are required to participate in forest protection through wildfire agreements with the government. Additionally, they regularly assist with forest protection by supporting wildfire training for staff and allowing staff to work for government in certain roles during wildfire emergencies.
- The primary objective of wildfire management is to protect human safety and communities. This service is not one that should be borne by their industries through additional fees, but rather is a core service that government should pay for from general revenues.

Most of the larger commercial users of public resources pay royalties or stumpage for that right. This makes them somewhat unique from a policy perspective. Notwithstanding the valid concerns noted above, at some point government may want to look at the distribution of costs and benefits from its wildfire management activities. However, this cannot be an isolated discussion and should only occur in the context of the overall royalty or stumpage paid by the industry, and the value of any of the management or protection costs that they incur as part of their resource or land disposition.

In terms of wildfire insurance opportunities, information on past wildfire insurance arrangements was studied, current arrangements in other jurisdictions were considered and other insurance strategies were reviewed. In the past, wildfire insurance in Alberta may have been viewed as a means of leveling out annual provincial expenditures. This practice is misleading as the intent of insurance is to provide protection against a financial loss – a hedge against a specific risk or uncertainty. With insurance, funds (premiums) are pooled from insured parties and used to pay for losses that are incurred by a few. The insured parties are protected from the risk of loss for a fee that in turn depends on the probability and magnitude of the collective loss.

A number of examples of insurance for wildfire impacts are available from Alberta's past experience and from other jurisdictions such as Oregon and private land timber holdings. As in all Canadian jurisdictions, Alberta effectively self-insures against many types of loss including wildfire costs. While the Environmental Protection and Enhancement Fund helps administer the funds allocated for wildfire programs, it is not an insurance policy, rather it is a means for allocating or directing certain revenues to

cover the cost of emergencies, and to budget for and administer expenditures. In this regard, it appears reasonably effective.

Three general alternatives for insurance relative to the wildfire management program have been considered for Alberta:

Insuring Against Expenditures – A premium paid in return for coverage of a portion of wildfire suppression expenditures beyond a deductible limit and up to a maximum.

This appears to be a viable insurance structure, although in the past Agriculture and Forestry has felt that the premium is too high relative to the benefits. In the view of the Review Team, the triggers used in the past and those proposed for the future still need refinement. To the extent that the triggers reflect the true source of the risk, the insurance will be increasingly effective. In general, the wildfire environment is operationally complex and it will be challenging to find insurance parameters that make it fair in all circumstances.

Insure Against the Loss of One or More Values at Risk – This is a different concept in that there would be insurance that offsets the potential risk of loss of an asset. In recognition of the potential for multiple, conflicting priorities in firefighting, this might cover losses to forests, infrastructure or other, lower priority values.

It is understood that insurers may be less interested in this option. It is complex and although there is some private timber insurance in existence, this is still a long way from becoming reality for timber on Canadian public land. Where the loss is structural or municipal, conventional insurance already has a role and governments take on disaster relief. Where communities are at risk, the public is best served if individuals, companies and communities all take action to reduce the risk of loss through (for example) FireSmart actions. Timber is no different and rights of holders should be incented to reduce hazard and risk on the Forest Management Agreement timber or other assets.

Insure Against Adverse Weather / Climate Events – Severe weather and climate events drive wildfire costs even when there are no active wildfires. This affects Agriculture and Forestry's presuppression preparedness resource expenditures as well as suppression costs. In this option, a premium would be paid to cover the implications of an adverse weather or seasonal climate event (perhaps defined in terms of the number of consecutive days in an extreme wildfire weather / wildfire risk scenario). The trigger would be the weather event and the insured amount paid regardless of the level of expenditure (the extreme will trigger extensive preparation and expense in any case).

We understand that insurers may be interested in this approach. It is less complex and avoids the moral hazards that exist when trying to insure against program expenditures that are, to some degree, controlled by the insured. There is also a good weather record and a recognized standard for assessing the risk associated with adverse weather and fuel hazards.

Opportunities for Improvement

17. Continue investigating opportunities to apply an insurance approach to Agriculture and Forestry's wildfire management program.

Insurance proposals appear viable and worth greater consideration. It is also reasonable to continue looking at the other options in an effort to identify a model where the premiums reflect evidence of some degree of risk sharing that works for both the province and the insurer. Three or four insurance options could be developed for discussion and testing with reinsurers.

The decision whether to proceed or not then would be a function of the premium and government's assessment of the risk. It would be important to understand the basis for the contemplated payout and its value to current and future budgets.

Insurance has a role to play in the overall approach to risk management and, as noted, to the FireSmart actions taken by individuals, companies and municipalities. This is relevant to the wildfire management program and more broadly to emergencies stemming from other environmental events (flooding, drought, etc.).

6. PROGRAM COSTS AND FINANCIAL ADMINISTRATION

The costs for Agriculture and Forestry's wildfire management program are primarily split into base budget spending and extended/disaster spending. Base budget spending represents all the costs associated with preventing and preparing for fire season operations, while spending of extended funds reflects all of those costs associated with responding to wildfires in a given fire season.

Whether the costs are considered as base budget spending or extended spending, the two combined represent overall wildfire management spending. An overview of the costs of the wildfire management program over the past five years is given in Exhibit 12 and Exhibit 13. Costs used for this review were derived from the department's FIRES database rather than public accounts to allow for more detailed review of costs by activity and program area. Costs derived from the FIRES database do not easily reconcile to figures reported in public accounts – this is outside the scope of the review.

In general, the costs are consistent with the program expectations and defined standard operating procedures. The actions or decisions that lead to an expenditure are well defined in policy and procedures – as a result they are consistent in substance and (to a degree) in dollars. In extreme years the additional costs show up in suppression and to a lesser extent in presuppression preparedness.

Exhibit 12: Wildfire Management Program Costs

Alberta Wildfire Management Costs Over the Last Five Years ($)					
Year	**2011**	**2012**	**2013**	**2014**	**2015**
Total Costs	**257,252,541**	**258,263,254**	**146,132,551**	**185,013,861**	**400,945,838**

Exhibit 13: Wildfire Management Program Costs by Major Program Area

Year	Detection ($)	Presuppression Preparedness ($)	Suppression ($)	Total ($)
2011	12,827,367	108,328,623	136,096,551	**257,252,541**
2012	16,843,973	126,450,824	114,968,457	**258,263,254**
2013	12,790,109	100,551,071	32,791,371	**146,132,551**
2014	15,412,486	124,704,840	44,896,535	**185,013,861**
2015	18,953,676	183,431,103	198,561,059	**400,945,838**

Active years, such as 2011, 2012 and 2015 result in expenditures between $250 million and $400 million or more. In considering costs experienced by other jurisdictions, the costs are comparable to British Columbia and Ontario in severe and highly active years. Exhibit 14 outlines comparative costs.

Exhibit 14: Comparative Costs for Wildfire Management in Canadian Jurisdictions

Province	Program	Actual Expenditures ($ Millions)				
		2011	2012	2013	2014	2015
Alberta	**Wildfire Management**	257	258	146	185	401
British Columbia	**Direct Fire**	53	134	122	298	372
Ontario	**Public Protection Program— Emergency Firefighting**	209	118	92	78	95
Saskatchewan	**Wildfire Management/ Fire Management and Forest Protection**	68	59	59	50	131

In addition to this overall comparison of costs, the costs per wildfire can be compared among the four jurisdictions. Total program costs per wildfire (detection, presuppression preparedness, and suppression) for Alberta over the past five years varied from $158,000 to $357,000 per wildfire, with 2015 at $235,000 per wildfire. The range for B.C. was $74,000 to $215,000 per wildfire. Saskatchewan's and Ontario's costs per wildfire were in the range of $129,000 to $264,000 per wildfire. The costs per wildfire reflect factors such as the location of the wildfire, wildfire conditions, values at risk, and associated firefighting resources (as well as the number and types of wildfires).

While there are opportunities for cost savings in any business or program, identifying and acting on these opportunities in any situation requires accurate cost data that can be matched with processes, outputs and outcomes. In the current financial administration structure supporting the wildfire management program, financial data is difficult to compile and analyze in a timely manner. While a review of financial administration processes and structures is outside the scope of this review, this functional area has an impact on the Agriculture and Forestry's ability to manage costs and gain efficiencies.

Recommendations

4. Establish an analyst role within the Forestry Division that can provide assistance in the area of cost analysis, cost control and efficiency. The individual or group must have capabilities in financial management and operational wildfire program delivery, and must remain at arm's length from the operations.

Costs of delivering a wildfire management program in Alberta are high relative to wildfire management costs experienced in other jurisdictions and relative to other resource management programs delivered by the government of Alberta. While there is a need for a robust wildfire management program in Alberta that serves the entire forested area of the province, and this drives higher costs, there are likely opportunities to control costs and achieve efficiencies in a range of program areas. This opportunity becomes more important as climate change continues to be a factor and longer, more severe fire seasons put higher demands on the province's wildfire management program. It may be difficult for wildfire managers to prioritize cost optimization and efficiency gains when their mandate focuses on meeting higher expectations related to human

safety, protecting communities and mitigating wildfire impacts. Opportunities for cost optimization and efficiency may be best pursued by a small group of individuals that understand finance and operations, and that are arm's length from the operations management and staff.

Opportunity for Improvement:

18. Look again at the organization structure in respect to the management responsibility for the wildfire management program's regional business services (such as finance and administration functions) and ensure that there are no impediments that complicate decision making and wildfire management program delivery.

Feedback from staff in both Agriculture and Forestry and Environment and Parks indicates that the provision of critical finance and administration functions by staff in other departments is an area of concern.

In general, functions that are core to an organization's success are best delivered in-house where production and performance can be managed, and where accountability can be assured. Even if the function isn't "front line", external service delivery only works where the delivery structure / contract results in seamless, unimpeded service. The importance of these principles is heightened where the organization's function is of a critical or vital nature. Accountabilities and priorities must be clear.

Our bias is that the critical nature of wildfire management activities requires that all program functions, including finance and administration, reside under the direct control of wildfire operations at a regional or provincial level. This is consistent with the findings of the Flat Top Complex Wildfire Review Committee and of prior operational program reviews. Having said that, other delivery structures can work and much can be accomplished by committed workers. If the Department's decision is to keep the finance and administration function separate, then as a minimum the structure must not impede or complicate wildfire program delivery. Based on the feedback and our observations, it appears that this is not yet being achieved.

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