

# Fuel Management Pilot Project

Prepared for:

Southern Interior Beetle Action Coalition Society



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*Nakusqnuuk*

*Lower Kootenay*

*St. Mary's*

*Tobacco Plains*

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## 1. Executive Summary

Although this case study is specific to developing forest fuel management plan guidelines specific to First Nation reserve lands, similar procedures apply to conducting these treatments off reserve including planning, permitting, coordinating with adjacent land owners/tenure holders, applying for funding, and utilizing qualified professionals.

- Government funding/programs change frequently and it is prudent to contact experienced professionals to assess the economic viability of conducting effective fuel reduction planning and implementation,
- Use qualified Registered Professional Foresters with experience in developing plans and implementing them to ensure that the management objectives that are identified are achieved,
- Develop plans to capitalize on the maximum amount of available funding to offset implementation of fuel reduction treatments as the costs are significant (including taking advantage of capacity building/re-employment opportunities),
- Begin consultations with stakeholders (including residents, adjacent land owners/tenure holders of provincial crown land and government agencies) early in the planning process to acquire the best information for consideration in developing the plans and again prior to implementation for updated information and authorization to proceed.
- Coordinate where possible with adjacent land owners/tenure holders of provincial crown land and government agencies for any planning information they have done in the area so you can use what they have and/or so your plans will compliment existing plans.
- Use government resources including funding agency contacts (e.g. Indian and Northern Affairs Canada/Natural Resources Canada) to assist with funding applications/submissions.

## 2. Introduction

The Mountain Pine Beetle epidemic in the Southern Interior of BC has impacted municipalities, private lands, crown lands and First Nation reserves. The First Nations Forestry Council and other agencies reporting on these impacts shows that forest fuel management is a major concern in MPB impacted First Nation communities (Community Futures Development Corporation of Central Interior First Nations, Mountain Pine Beetle Impact Assessment, 2007). Few First Nations have operational fuel management plans in place and there is a need for funding to develop and implement these plans throughout the BC. It is anticipated that this planning/implementation model will provide guidance to municipalities, regional districts, private land owners, crown land tenure holders, and other First Nations communities within BC on how to mitigate wildfire impacts in the wildland/community interface.



*Whereas*, the BC Municipalities have been able to access provincial funding to undertake wildland urban interface (WUI) fire treatments within their municipal boundaries, and *Whereas*, the provincial government has established programs to address WUI treatment programs to address a two kilometre buffer zone around municipal boundaries, no such programs have been established to address WUI treatments beyond 100m from residences on reserve lands (some of which are immediately adjacent to municipal boundaries. Agencies such as Natural Resources Canada (NRCan) and First Nations' Emergency Services (FNESS) have funding available for landscape level planning and treatments within 100 metres of the community core or on provincial crown lands adjacent to reserves. Nupqu Development Corporation has been working with the Ktunaxa Nation communities in collaboration with contacts from various funding agencies to fund detailed plans and implementation of fuel treatments on reserves outside of the 100 metres around community cores. These areas are often forested lands with varying amounts of MPB damage and severe forest fuels build-up. Implementation of WUI treatments on reserve lands could complement the effectiveness of those municipal and provincial WUI treatments undertaken contingent on effective coordination and adequate funding being provided.

### **3. Project Description**

Southern Interior Beetle Action Coalition Society (SIBAC) contracted Nupqu Development Corporation (NDC) for the delivery of a Fuel Management Pilot Project. This project documents a case study outlining actions taken to implement a comprehensive Fuel Management Plan that includes:

- an identified need for a long-term fuel management maintenance regime, and
- examples of how to coordinate with municipalities, regional districts, private land owners, crown land tenure holders, and First Nation community partners to effect complementary landscape-level treatments that increase the effectiveness of fuel reduction treatments and the value derived from dollars spent.
- an opportunity to share this information through a public demonstration (with various experts in attendance) of various fuel management treatment options and posting on the SIBAC web site (also available in DVD format for distribution).

The Nupqu Development Corporation (NDC) has completed the planning and implementation of detailed fuel management prescriptions on the ?akisq'nuk First Nation and the St. Mary's Indian Band reserves. In addition to the Strategic Forest Fuel Management Plans prepared for treatment of specified areas, Community Wildfire Protection Plans for fuel reduction treatments around community core areas were developed for both communities. This pilot project has allowed for integration with this strategic planning and prescription development resulting in more efficient and effective wildfire protection that addresses forested areas beyond 100m from dwellings.

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## 4. Background

Community consultations and interviews with staff of various agencies and organizations (i.e. local governments, Union of BC Municipalities, Ministry of Forests and Range, First Nations) identified both concerns with potential fire risks and impediments to implementation of Community Wildfire Protection Plans (CWPP), specifically the implementation of Fuel Management Plans (FMP).

While CWPP preparation is well underway, progress on implementation appears slow. Key issues preventing implementation appear to be:

- Capacity at the community level including knowledge of forestry that may limit the ability to engage consulting services.
- Willingness of local governments to undertake Community Wildfire Protection Plan implementation.
- Identification and support for ‘local champions’ to lead Community Wildfire Protection Planning and Fuel Management implementation.
- Coordination across jurisdictional boundaries (i.e. First Nations, Natural Resources Canada, local municipal and regional government, provincial government, non-government organizations).
- Training and certification of personnel in fuel management activities.
- Seasonal availability of support personnel and organizations (i.e. Ministry of Forests and Range and Fire Protection Branch).

## 5. Objectives

Mitigating the risks of incurring significant impacts from wildfire in the wildland urban interface area surrounding communities is the primary objective of a Fuel Management Plan. The forest area surrounding communities provides multiple benefits including wildlife habitat, recreation opportunities, and numerous other ecological and environmental benefits. To address the wildfire hazard in these zones around communities while maintaining the benefits the forest provides requires a strategic assessment of the spatial fuel loading, values to be protected, and options for strategic treatment.

### 5.1 Strategic Assessment

A strategic assessment of the values to be protected includes determining priorities. The Ministry of Forests and Range (MOFR) – Protection Branch has identified human life and property as the highest priorities. To address these priorities, the province of BC has adopted a Firesmart® program that establishes zones of proximity around building structures (10 m, 30 m, and >30 m). Within these zones an assessment of the amount of flammable material is made including building materials, surrounding vegetation and the

horizontal and vertical distribution of forest fuels that would affect the rate of spread of wildfire and the intensity. The rate of spread and intensity of wildfire can be mitigated by strategically reducing the amount of forest fuels and the type of fuels that burn more intensely.

To complement the effectiveness of Firesmart® treatments in close proximity to buildings and other community development structures, the MOFRR has developed other programs that address fuel reduction treatments including:

- the 2 km zone around municipalities, and
- ecosystem restoration of frequent fire-maintained biogeoclimatic zones.
- Coordinating with the MOFRR regarding planning for the implementation of fuel reduction treatments being conducted on areas adjacent to provincial crown lands could provide complementary landscape-level wildfire hazard reduction in the wildland urban interface. An additional potential benefit of coordinating with adjacent landowners/tenure holders is the sharing of information that addresses other values to be protected (FN cultural resources, protection of known wildlife habitat features and rare/endangered plant communities).

## **6. Modeling Comprehensive Fuel Management Plans**

Considerations in developing comprehensive fuel management plans include:

- align First Nation (FN) and government fuel management plans across jurisdictional boundaries
- co-ordinate and prioritize treatment areas on reserve with municipal, regional and provincial government entities planning similar treatments adjacent to reserves,
- undertake fuel management planning outside of the First Nations' community core areas (i.e. 100 meter radius restriction) in order to reduce crown fire potential and surface spread and to increase the residual stand resilience to wildfire,
- determine strategic use of manual and mechanical treatments to maximize value from available funds and with consideration for successive treatments that may be planned (e.g. establishing firebreaks to facilitate prescribed burning of treed thickets as opposed to slashing them),
- develop best practices (including guidelines for implementing treatments that address consultation/communication and considerations for risk management associated with burning of debris),
- integrate First Nation cultural considerations (e.g. promoting conditions that allow for the enhancement of species used for traditional purposes and protection of identified cultural features used for traditional purposes (e.g. sweats),
- utilize First Nations traditional knowledge including historical and cultural use of fire,
- incorporate into landscape level objectives and planning,
- address required maintenance regime options (including the use of prescribed fire)

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- support continued education, research and awareness,
- link to other program initiatives and objectives for more integrated planning and cost effectiveness (i.e. Ecosystem Restoration, invasive alien plant control),
- access and utilize available funding sources including Natural Resources Canada and Union of BC Municipalities,
- develop local expertise and certification for undertaking fuel management planning,
- develop a fuel management demonstration area for public and community education,
- promote and encourage implementation of long-term fuel management/maintenance activities,

Planning and coordination is a critical component to the successful implementation of a comprehensive Fuel Management Plan. Effective CWPP planning and coordination is dependent on having experienced forestry professionals able to integrate identified objectives into an economically viable implementation strategy that addresses site specific factors. To ensure that the best information is incorporated into such a plan (including identification of resources available), effective consultation and communication with various entities is required including:

- Local First Nation Communities (identification of resources available and traditional use knowledge),
- Local First Nation lands and resources governance agency (stewardship principles and traditional use knowledge),
- First Nation Organizations (identification of resources available, e.g. First Nations Forestry Council and First Nations' Emergency Services),
- Municipal Government (coordination with planned CWPP activities and related programs as well as the Official Community Plan),
- Regional Government (coordination/prioritization with planned CWPP activities and related programs such as invasive alien plant control),
- Provincial Government (identification of resources available from, and coordination with, various entities having responsibility for wildfire protection , ecosystem restoration, and invasive alien plant monitoring and control),
- Federal Government Agencies (identification of program funding and resources available, e.g. NRCAN),
- Coordination with local non-profit natural resource stewardship entities (identification of common interests and coordination to enhance effectiveness of treatments, e.g. species at risk and habitat enhancement, Invasive Plant Council of BC),
- Coordination with public utilities (to address removal of danger trees near hydro lines and crossing of rights-of-way with mechanical equipment),
- Forest Industry (coordination where applicable to enhance cost-effectiveness of treatment implementation e.g. purchasing wood fiber to offset cost of treatment),



- Researchers/Specialists (coordination to ensure utilization of most current technologies and integration of research opportunities to insight into the impact and benefit of treatments).
- Trained professionals experienced in forest fuel data collection, layout, data analysis, planning and implementation.

## 6.1 Community Wildfire Protection Plan (CWPP)

A critical component in developing a comprehensive fuel management program is completing a CWPP that includes:

1. identifying priority areas with the highest values subject to the threat of wildfire within and adjacent to the community,
2. identifying measures necessary to mitigate the risks,
3. outlining a plan of action and proposed costs to implement the plan, and
4. identification of potential partners/stakeholders that need to be involved in the planning process.

Priority areas will include the community core, approximately 100-200 meters around homes, schools, administration buildings, other community structure/values at risk, and adjacent lands up to 2 kilometres from the community core and other priority values identified. Because fire does not follow jurisdictional boundaries, the plan area may include not only reserve lands but municipal and regional lands, private lands and provincial or other federal crown lands which in turn may have tenures including timber, mining, water, recreation, guide outfitting, trapping, etc. All of these landowners or tenure holders will have rights and responsibilities and their own land management objectives so it is imperative that they are included in the planning process from the start.

Mitigation of identified risks needs to be determined by a qualified professional with experience in fuel management as well as equipment/operational planning. Mitigation measures may include mechanical fuel treatments (harvesting/mastication), hand treatments (spacing/thinning/brushing), prescribed burning, or infrastructure such as firefighting equipment, sprinkler systems etc.

## 6.2 Forest Fuel Management Plan (FFMP) and Prescriptions

The strategic-level CWPP will identify the wildfire risks and possible mitigations whereas the FFMP is a detailed plan outlining specific treatments, prescriptions, maintenance and costs to implement.

The FFMP will require detailed forest fuel assessments of the project area to determine existing fuel loading (in comparison to the target fuel loading and spatial distribution to



meet identified objectives) and how much needs to be removed. These assessments are the basis for the treatment prescriptions and need to be carried out by registered professionals with experience in forest measurements and planning.

Before beginning the field assessments, existing data should be sourced and reviewed. Organizations may have already done some field data collection/assessments that could be referenced or built upon to cover your project area including:

- First Nations Lands and Resource agencies (areas of archaeological and cultural significance can be field delineated but information specifics remain proprietary),
- provincial strategic wildfire threat assessment maps (REF),
- recreational resort tenure holders of provincial crown lands,
- municipality and regional district planning departments,
- government agencies (e.g. Ministry of Forests and Range, Ministry of Environment, BC Parks, and Parks Canada),
- non-government organizations with land holdings that are managed to achieve stewardship objectives (e.g. Nature Trust),
- non-government organizations without land holdings that collect field data for research, monitoring and treatment (e.g. Invasive Plant Council of BC, and Badgers in BC)
- private landowners or developers.

Many of these organizations have programs that address multiple land stewardship objectives including forest fuel reduction (e.g. ecosystem restoration projects conducted by the MOFR, BC Parks and Parks Canada throughout the southern interior of BC). A potential networking benefit of contacting these organizations is that data collection costs can be mitigated and coordination with other planned treatments may result in more effective fuel reduction treatments on reserve.

Once all available, existing data is gathered and analyzed, you can determine gaps or deficiencies in the data and determine data collection needs. From the assessments, detailed prescriptions can be developed.

It is important for prescriptions to provide direction/rationale for multiple entries (including estimated timeframes to address management objectives, maintenance treatments, and required monitoring e.g. invasive alien plant or wildlife responses). Because of funding limits, market conditions or current state of the forest, it is likely that the desired objective may not be realized with the initial treatment. Opening up the canopy too much, too quickly may result in unanticipated detrimental ecosystem impacts (e.g. changing the moisture regime and associated vegetation complex which may affect rare and endangered plant communities or wildlife habitat). If timber markets are poor, it may be more efficient to complete a spacing or brushing treatment first and hold off on harvesting merchantable stems until markets are favorable. All this has to be weighed against the current fire risk and other management objectives.



### **6.3 Timber Permitting (Indian and Northern Affairs Canada – INAC)**

The permitting process is dependent on how the cut timber is utilized. If merchantable timber is cut and sold or processed for sale off-reserve, then a section 5 Timber Permit is required by Indian and Northern Affairs Canada (INAC). If the timber being cut is non-merchantable or is to be used on-reserve for community members, a section 4 permit is required. It is important to note that even if the material being cut is non-merchantable (too small for processing or even firewood), a timber permit is still required. INAC will provide a Timber Permit Application Guide that outlines the process to obtain the required permit.

Timber permits will be valid for at least one year and expire on March 31. When you are developing your timber permit application, be sure to include all areas that will be treated within the permit timeframe.

#### *6.3.1 Section 5 Timber Permit*

A section 5 Timber Permit requires that timber to be cut and marketed has to be scaled and stumpage must be paid to the federal government. Stumpage rates are calculated by INAC and are based on average stumpage rates over the province. It is possible to recover all or part of the stumpage paid to go towards funding the fuel treatments however there is still a lag-time between payment to the crown and refunding to the band.

#### *6.3.2 Section 4 Timber Permit*

A section 4 Timber Permit can be issued if the trees cut are not sold or processed and sold. They must be utilized on reserve for community use. This permit allows for INAC to waive stumpage collection and therefore scaling is not required, making treatment projects less administrative and more efficient to implement.

#### *6.3.3 Additional Requirement to Accompany Permits*

All timber permit applications (both section 4 and section 5) require:

- Logging plan including logging plan maps
- Environmental Assessment (Canadian Environmental Assessment Act)
- Silviculture Prescription
- Report on Species at Risk (SARA)
- Other applicable professional reports (e.g. Archaeological Assessment).



These documents must be completed by a qualified professional (e.g. a Registered Professional Forester or Forest Technician experienced in this type of work) and are to signed and sealed by a Registered Professional Forester (RPF).

#### **6.4 Recommendations Prior to Implementing Fuel Treatments**

It is recommended that all stakeholders (including pertinent individual community residents) are notified of the plans to conduct fuel reduction treatments to enable input into the process (i.e. collect information that could be used in the planning process) and again prior to implementation of treatments to allow for any updates of information on a site-specific basis. It is also recommended prior to implementation that pertinent reserve residents/landowners sign-off on the prescription and map so everyone is sure of what will be done. During this visit, specific site hazards and important surface and sub-surface features (powerlines, septic systems, berry patches, culturally significant sites, etc.) be identified, re-assessed, documented and effectively communicated to the work crews to ensure safe and efficient implementation.

It is recommended that BC Hydro (or the local utility company) be notified at least a few days prior to the implementation of treatments to request that they fall identified trees that have the potential to disrupt the power supply (e.g. assessed danger trees). There is no charge for this service and enables qualified persons to address falling of identified trees in a safe manner. Depending on the quantity of the work identified along power lines, additional lead time may be advisable to enable coordination with the disposal of these stems.

### **7. Project Funding Opportunities**

During the course of this case study, several funding sources were discontinued and new ones introduced. There have been more funding dollars available for projects off-reserve than for on-reserve treatments (e.g. within BC municipalities, program funding has been provided through the Union of BC Municipalities to address forest fuel treatments within municipal boundaries and the MOFR has provided program funding to address the area within 2 km of municipal boundaries). Funding for on-reserve planning and treatment is very limited and reliant to a large degree on government-funded programs. Until recently, the Mountain Pine Beetle Program through Natural Resources Canada (NRCan) had funded FFMP's and interface treatments around homes. This program is ending on March 30, 2010 and no new funding has been announced. The current economic conditions in Canada (as it affects availability of funding) and the rest of the world (as it affects the demand for timber that could be sold to offset the cost of treatments), have limited opportunities to effect fuel reduction treatments on reserves.

There have been funding opportunities arise to help unemployed forest workers, and forest-dependant communities. These programs are all "one-time" programs so project managers must be diligent in sourcing and understanding the funding as it becomes

available. Timber markets will also drive the viability of some treatments. When markets are good, a well planned project may pay for itself (depending on the volume of merchantable timber to be marketed and the ability to provide capital funding until Indian and Northern Affairs finalizes reimbursement).

## **8. Preparing CWPP's and FFMP's**

It is important to utilize available government funding to prepare Community Wildfire Protection Plans and Forest Fuel Management Plans including doing as much planning, layout and permitting with the available funding so that when the implementation funding comes available and/or economic conditions are appropriate to allow implementation to proceed, the projects are ready to go (“saw-ready”). Many of the First Nation funding sources allow for applications from Bands, Tribal Councils and First Nation Businesses. To maximize the funding and the benefit to the communities, all the planning and layout for this project was completed under Nation Council funding. This allowed for the maximum community funding to be applied directly towards treatments (i.e. FN employment).

### **8.1 Benefits/Anticipated Outcome**

Wildfire risk and occurrence does not respect administrative boundaries. An example of how to implement fuel management in a cost-effective manner that integrates efficiencies, incorporates partnerships across various jurisdictional boundaries, and identifies considerations including issues that would be required to address a maintenance regime would be beneficial in promoting wildfire protection in other areas of the province. Additional benefits anticipated include:

- Capacity building of FN individuals through skills training, mentoring under the tutelage of professionals and certification of personnel.
- Potential development of a sub-regional fuel management implementation team.
- Development of a fuel management zone demonstration area.
- Promotion of fuel management activities including encouraging the identification of ‘local champions’.
- Examples of effective, mutually beneficial partnerships between First Nations and non-First Nations communities, private landowners, provincial crown land tenure holders and the federal government.
- Potential for synergistic integration with other initiatives (i.e. ecosystem restoration, species at risk habitat enhancement, invasive alien plant monitoring and control coordination),
- Demonstration of the long-term financial benefits achieved from government investment into the planning and implementation of wildland urban interface treatments.



- Providing opportunities to demonstrate to the public on-the-ground fuel management treatment areas, site-specific implementation variability (e.g. riparian/critical wildlife habitat areas versus zones in close proximity to residences), review treatment method costs (e.g. manual brushing versus mechanical) and identify the benefits of treatment versus no treatment.
- Recognition of the need to implement a long-term coordinated management regime that could include well planned and cost-effective periodic brushing/prescribed burning (spatially and site-specifically appropriate), invasive alien plant control and

## 9. Field Tour of Interface Treatments

A field tour was conducted at one of the fuel reduction demonstration areas on the ?akisq'nuk First Nation reserve. The demonstration area was in an area that had permanent residences and seasonal recreation residences and administrative buildings. Management objectives included:

- recreation (treatment area included a campground/recreation day use area),
- wildlife habitat (including, retention of potential cavity nesting large diameter snags/trees, identification and protection of wildlife features such as badger dens and ungulate winter range/promotion of preferred browse species and indigenous plant species to maintain natural biodiversity),
- ecosystem restoration of interior Douglas fir open forest and open range site series,
- protection of riparian values (including stream, lake and wetland habitats)
- wildland urban interface fuel reduction, and
- invasive alien plant control (monitoring for presence/absence and limiting mineral soil exposure).

Attendees included:

- Ministry of Forests and Range resource professionals involved in ecosystem restoration, invasive alien plant monitoring and control, ungulate management, aboriginal liaison and wildfire protection,
- Ministry of Environment professional biologist involved in habitat protection/enhancement programs,
- representative from adjacent communities' fire departments,
- East Kootenay Invasive Plant Council representative,
- ?akisq'nuk FN community members including the Chief, members that participated in the implementation of the fuel reduction treatments, economic development officer, campground staff, and residents of the community,
- First Nation Forestry Council staff,
- Southern Interior Beetle Action Coalition executive,
- Canadian Columbia River Inter-Tribal Fisheries Commission professional staff,



- Tembec senior planning staff (experienced in wildland urban interface fuel reduction treatment implementation in the East Kootenay Region).

The purpose of the field tour and discussion with invited participants was to showcase planning and implementation efforts, provide a forum for professional input and discussion on improvements that could be implemented to produce a more comprehensive and effective fuel management planning process including:

- communicating/coordinating future efforts with adjacent land owners/tenure holders should be done to maximize the cost-effectiveness of fuel reduction treatments on a landscape level,
- consensus that a long-term maintenance regime should be part of a more comprehensive fuel management plan,
- long-term maintenance regimes should address monitoring for presence of invasive alien plants and effective methods of control should be detailed including timing of measures to be taken,

The project was well received by all in attendance and highlighted the resources available from the represented organizations. Further information is available by contacting the authors of this report.

## 10. Developing a Long-term Maintenance Regime

When developing Forest Fuel Management Plans, it is important to consider the long-term requirements for fire-maintained ecosystem maintenance as fuel management is not comprehensively addressed with the initial fuel reduction treatments. Registered Professional Foresters (RPF) experienced in this planning discipline can address the short and long-term management objectives in collaboration with the land owner/tenure holder and other professionals/experts as required.

Forest succession refers to the dynamic ecological changes in ecosystem structure, function and species composition over time as a result of which one group of organisms succeeds another through stages leading to a potential natural community or climax stage<sup>1</sup>. Factors that contribute to forest succession (ecosystem structure and function) and increase the wildfire rate of spread and intensity over the long-term include forest ingress and ingrowth. Forest ingress refers to the establishment of natural regeneration in an opening (usually from adjacent forest seed dispersal). Ingrowth (growth of trees within a forest or larger openings adjacent to a forest) refers to the number or volume of trees that have grown past a predetermined threshold in a set period. The threshold forest successional stages that affect wildfire behaviour in order of increasing significance are:

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<sup>1</sup> Dictionary of Natural Resource Management, Julian and Katherine Dunster, UBC Press, 1996

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1. Seedling stage (affects horizontal ground fire rate of spread and intensity)
2. Sapling stage (affects ground fire rate of spread and intensity to a greater degree and provides a vertical fuel link from the ground fuels to the sub-canopy)
3. Pole stage (provides vertical and horizontal fuel link to the canopy)

Species composition affects the rate of spread and intensity of wildfire. Because of the importance of maintaining species diversity (for wildlife habitat and ecosystem balance), a strategic analysis is important to address management priorities on a localized and landscape level scale.

?akisq'nuk First Nation and the St. Mary's Indian Band reserves have extensive treatment unit areas beyond 100m from dwellings identified for future fuel reduction and ecosystem restoration activities. Current uneconomically viable log market conditions and lack of sufficient government funding to implement prescribed treatments at this time have resulted in the postponement of these treatments. MPB damage continues to impact the communities and the elevated risk of wildfire associated with excessive fuel loading continues to present a significant threat to these communities. In an effort to coordinate with adjacent landowners for the purpose of maximizing the effectiveness of fuel reduction treatments and the value derived from dollars spent, the ?akisq'nuk First Nation (AFN) has signed a Memorandum of Understanding (MOU) with NDC and the adjacent Fairmont Resort.

### 10.1 Monitoring

Objectives of monitoring (e.g. frequency and concerns) need to be established prior to implementing an effective maintenance regime. Objectives to address concerns could include assessing responses to the initial fuel reduction treatment:

- controlling the spread of invasive alien plant species (likely to result from more light reaching the forest floor in areas with known infestations),
- monitoring native plant responses to initial treatment and estimating the timeframe for follow-up treatments.

Methods of monitoring can be a combination of both cursory (e.g. invasive alien plant species rates of spread) and detailed inventory (e.g. vegetation growth/forest fuel loading). Without periodic monitoring to determine how the forest structure and species composition is changing, ingrowth and ingress will likely affect the wildfire dynamic with 10-20 years.

### 10.2 Field Data Collection

Field data collection needs for determining an appropriate long-term maintenance regime will be dependent on the identified management objectives. Options for implementing the maintenance regime will be contingent on restrictions identified (e.g. significant

wildlife/plant community habitat areas or seasonal operating restrictions to accommodate nesting birds or cavity nesters).

Information collected as part of the initial fuel reduction treatment should be reviewed to determine additional field data collection needs (e.g. field located/global positioning system - GPS prescribed burn boundary delineation). It is recommended that integration of efficiencies be considered when collecting field data as this can be a costly process (e.g. collecting information on the presence of invasive alien plant species when collecting forest fuel data allows for a planned response to mitigate their spread).

### 10.3 Maintenance Operations/Considerations

Prevention is preferred as an approach to wildfire management. Where pre-emptive action can be taken to reduce the wildfire rate of spread and intensity (i.e. keep the fire on the ground and out of the canopy) the ability to control detrimental impacts is enhanced.

#### 10.3.1 Strategic Brushing

Strategic brushing could allow for recruitment of younger trees, to replace overmature stems and allow for a diversity of habitat for wildlife. Brushing can also address selective removal of stems to create necessary firebreaks in the canopy (that may have resulted from expansion of tree crowns in response to initial fuel reduction treatments of opening up the canopy to light). In addition to changes in the horizontal fuel connectivity (in the canopy), changes in the vertical fuel connectivity (i.e. fuel ladder) should be addressed. Options for dealing with the debris from brushing include manual piling and burning or chipping dependent on economics, access and management objectives. If the maintenance regime includes prescribed burning, the brushing debris could provide necessary fuels to carry an effective controlled burn.

#### 10.3.2 Prescribed Burning

Planning a prescribed burn as part of a maintenance regime could be a cost-effective way to address management objectives including:

- reduction of excessive ground fuels on a frequency that allows for controlled low intensity ground fire (including grasses, shrubs and tree ingrowth),
- reduction of excessive fallen/suspended coarse woody debris (potentially resulting from forest health factors including windthrow events, disease infestations or insect epidemics resulting in significant tree mortality) ,
- rejuvenation of fire-maintained vegetation (e.g. Saskatoon).

#### 10.3.3 Invasive Plants and Other Potential Adverse Impacts

Where treatments to open the forest canopy to mitigate wildfire impacts have the potential to cause other adverse impacts (e.g. increase the rate of spread of invasive alien

plant species or diseases like dwarf mistletoe) field data should be collected to better assess the risk and consequence to enable informed management decisions.

#### 10.4 Protection Planning

Since wildfire initiation and rate of spread cannot be controlled, part of any comprehensive Fire Management Plan should address protection measures as part of an on-going maintenance regime. Components of fire protection could include:

- public information (e.g. objectives of conducting treatments and maintenance, where to get additional information and who to contact in case of emergency),
- training options to address emergency preparedness response to wildfire including initial attack options (location and numbers of the closest trained fire response teams and their contact numbers),
- access restrictions and outdoor fire bans during periods of high and extreme fire risk.

#### 11. References:

- First Nations Community Wildfire Protection & Fuel Management: Compendium of Roles & Responsibilities, First Nation Forestry Council. ([http://fnforestrycouncil.ca/initiatives\\_fuel.php](http://fnforestrycouncil.ca/initiatives_fuel.php)), accessed June, 2009.
- MOFR Fuel Management web page, (<https://ground.hpr.for.gov.bc.ca/index.htm>), accessed July, 2009