Kakisa Fuel Break Recommendations

Introduction

On July 16th, a field review was completed for Kakisa to ascertain the need and potential location for fuel management areas (FMAs) in order to reduce the risk of an interface fire to the community. Potential locations for landscape fuel breaks were also reviewed in the field. Two maps have been provided: Map #1 shows the location of FMAs and fuel breaks within the interface of the community and Map #2 shows the location of a perimeter fuel break requiring further assessment.

Interface Stand Descriptions

Some of the stands immediately adjacent to the community are dominated by deciduous trees and shrubbery with low density inclusions of coniferous species. Other stands have vegetation complexes influenced by high water tables or marshland and have a high degree of snags. Some of the interface stands have already been fully or partially treated. The current conditions of these stands provide some protection to the community but additional work should be considered to further reduce the risk to the community. The following pictures illustrate some of these adjacent low hazard stands.

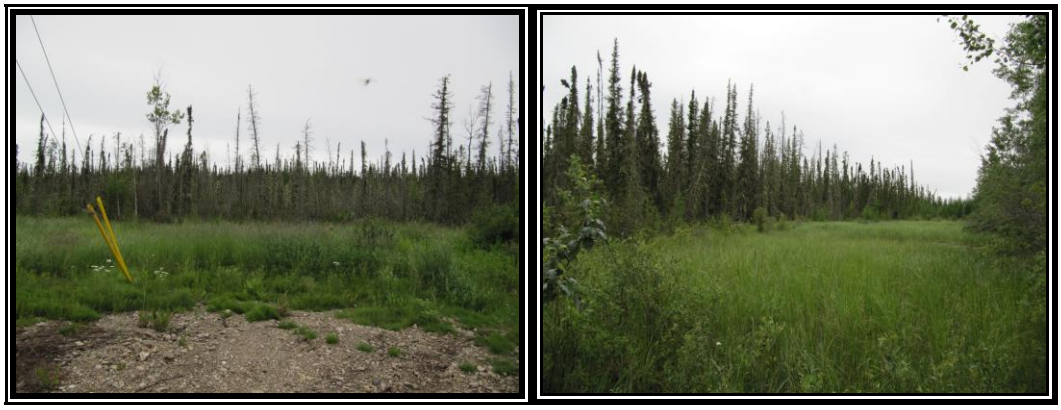

Figure 1. Examples of some of the lower hazard stands adjacent to Kakisa.

Fuel Management Area

Four Fuel Management Areas (FMAs) have been delineated on Map #1 with two of these FMAs (#1 and #3) being partially treated already. The other two FMAs (#2 and #4) being proposed are new treatment areas. These FMAs are shown in Map #1. Additionally, Map #1 shows proposed Fuel Break 'A' that should also be considered in order to reduce the risk to the community.

Fuel Breaks & Management Areas
Kakisa

Fuel Breaks
Fuel Management Areas

0 0.05 0.1 0.2 km
1:5,000

Valhalla Consulting Inc.
Timberline Natural Resource Group

Map #1. Potential FMAs and Fuel Breaks within and around Kakisa.

8-Jan-10

FMA #1

The following pictures show the current ecosystem condition in FMA #1.

Figure 2. FMA #1 showing residual burn piles still to be burnt.

This stand has already been treated but still has piles of debris within it. Additionally, the density is still too high and should be reduced by removal of up to 50% of the current overstory. The resultant lower density stand will have a more open crown and be more resilient to crown spread.

The more open stand will also allow heat and hot gases to escape from beneath the canopy when the piles are burnt within the stand. If the piles were burnt under the current canopy closure, hot gases and heat would be trapped beneath the canopy and likely result in overstory mortality of the residual trees. Similarly, some of the piles are immediately adjacent to residual tree stems and the radiant heat may result in cambial kill for those stems close to piles. Further thinning should target trees around these piles or, alternatively, the piles in the stand, and further treatment debris, could be removed to a central burn area for disposal.

FMA #2

This is a large (~2 ha) dense stand (1500 sph) of mature spruce with a moderately well developed shrub understory and only minor surface fuel loading as seen in the following pictures.

Figure #3. The mature stand of timber within FMA #2.

This stand should be thinned to a density of less than 500 sph using a low thinning strategy while recruiting approximately 100-200 sph in the intermediate layer that have a good success at post treatment survival. Larger pieces removed to meet this Desired Future Ecosystem Condition (DFEC) should be sent to a market if one exists for them. Otherwise, stems should be brought road side and bucked up into fire wood for the community. Surface fuel loading should be piled and burnt in gaps or removed to a central burning area.

FMA #3

This FMA is located immediately adjacent to a treated area behind the Public Works Yard. The treated area is shown in the pictures below.

Figure #4. The treated stand behind the Public Works Yard.

While this treated stand still needs some piles burnt, it is an appropriate DFEC to emulate for FMA #3. The crew should walk through and review this adjacent treated stand to gain an understanding of what the DFEC for FMA #3 should resemble. Again, treatment debris should be piled and burnt in gaps or removed to a central burning area. Larger material can be shipped to market or cut up for firewood.

FMA #4

This FMA is comprised of two sections and is located immediately behind the new development area on the eastern boundary of the community. The treatment of this FMA will provide protection to this newer development. The stand is shown within the following pictures.

Figure #5. The current stand condition with FMA #4.

Treatment of this stand should be similar to that indicated for FMA #3 with the DFEC being similar to that found in the aforementioned treatment area behind the Public Works Yard.

Landscape Fuel Breaks

Currently, there is a linear landscape fuel break immediately south of the village. This is shown in the following pictures.

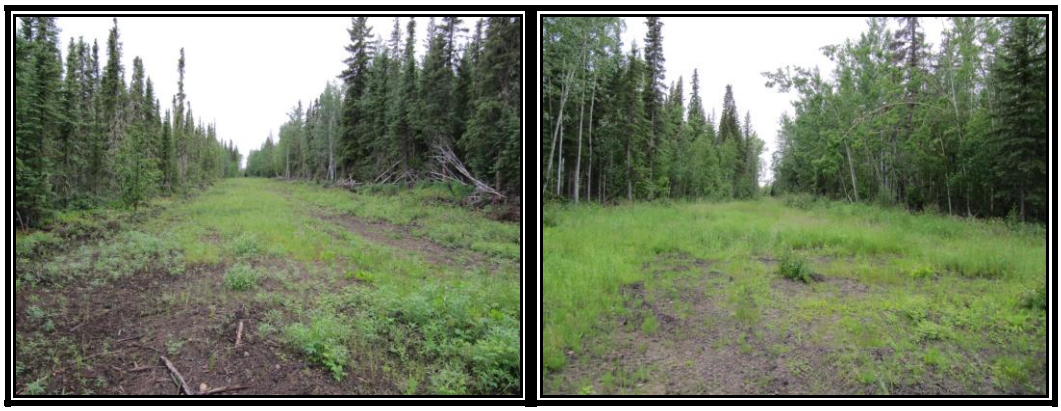

Figure #6. The existing fuel break immediately south of the village.

This fuel break runs the full distance from the lake to the entrance road to the community and, for the most part, it is in relatively good condition. However, as per map #1, its effectiveness could be increased by developing Fuel Break 'A'.

Fuel Break 'A' is a very dense stand of spruce and pine with a moderately high surface fuel loading and a very high degree of ladder fuels as can be seen in the following pictures.

Figure #7. The stand within Fuel Break 'A' showing the high density and high ladder fuels.

The stand within Fuel Break 'A' contains enough fuel loading that, during its burning, radiant heat could easily ignite, or spot into, fuel on the community side of the existing fuel break. This risk would be reduced by treating the stand within Fuel Break 'A' to resemble the stand condition immediately behind the Public Works Yard.

Landscape Fuel Break

To the south of Kakisa there is an open linear feature that extends from the corner of the entrance road to the east of the community all the way to the lake. Map #2 below shows it's location.

Fuel Break B
Kakisa

Fuel Break

0 0.15 0.3 0.6 km

1:15,000

Map #2: Potential location of a landscape level fuel break.

8-Jan-10

This feature, where it meets the entrance road, is shown in the photos below.

Figure #8. The existing perimeter fuel break south of the village.

The feature, as is, provides a good tactical fuel break to the community in the event a wildfire is approaching from the south. However, it should be explored further as to whether its full extent is in similar condition to that close to the community where it was reviewed. This will likely be most effectively completed on ATV (although wet ground conditions may prevent the use of an ATV), a sled or, if necessary, a helicopter.

There was no field review conducted north of the river due to time limitations and lack of access. However, ocular observations from the Kakisa side of the river indicate that there is a significant fuel hazard within the stand.

The river does provide a crown and ground fuel break and dissipation of radiant heat would occur across the water. However, it may be prudent to explore harvesting or treating the stands on this side of the river for some distance from the northern river edge to provide additional protection to the community from a wildfire approaching from the north. However, this venture would certainly be seen as a second priority to the other recommendations within this report, particularly given the prevailing wind directions from south to north.

Coarse Woody Debris

There is limited literature as to the historical loading of CWD in these ecosystems, but ocular observations of existing stands indicates that it is currently in the lower range. However, *Graf et al* (2000) concluded that in the early post-fire stage (<22 years post burn), snags are abundant and CWD is low due to the complete combustion of CWD during the fire and the mortality of overstory trees. In the middle (22-100 yrs post burn) and late stages (>100 years post burn) snag abundance decreases and CWD increases as snags fall to the ground with time.

There is a low abundance of snags or CWD within the FMAs but this may be due to the fact that the stands are relatively healthy and have not yet reached an age where individual mortality is occurring and stem fall down of these dead trees is contributing to CWD recruitment.

Regardless of the reason for its relative absence, coarse woody debris is an important attribute within forest ecosystems that affects flora and fauna (Harmon et al, 1986) and can also impact fire frequency and intensity (Agee and Huff, 1987). While CWD should be recruited, post treatment surface fuel loading should be minimized. As such, maintaining a target range of around 5-10 m^3/ha will likely provide benefit to the flora and fauna on site while not posing a significant hazard to the community as long as pieces are recruited appropriately as described below.

CWD recruitment should target larger diameter pieces (>20-25cm dbh) and should prefer those pieces in the higher decay classes. Pieces should be scattered with a minimum distance of 5m between pieces. All CWD recruitment should be placed flush with the ground and can be bucked up into 2-3 m lengths but need not be separated. The bucking of this material will aid in extinguishment of the CWD should it become engulfed during a fire by allowing crews to easily pull the CWD apart during suppression.

Under no circumstances should any CWD be retained within 30m of structures. If there are valuable pieces of CWD within this distance (of a large diameter and in higher decay classes) these pieces should be moved to a distance greater than 30m from structures.

Flora and Fauna Values

Altering the composition of these stands can enhance or negatively impact the flora and fauna that may exist within the stands. Some fauna prefer an overstory cover of conifers while other may favour stands with a higher deciduous cover. Additionally, the edge effect between deciduous openings and coniferous forests can provide specific habitat for some species. The areas being proposed for treatment are of a relatively small scale on the given landscape and it is not anticipated that there will be negative impacts from treating these small areas as there are adjacent ecosystems of similar compositions and structure within close proximity to these proposed treatment areas.

Upon consultation with the local community, should the proposed treatment areas be known to contain existing flora or fauna species that are important to the livelihood or culture of the community (i.e berry picking areas, trap lines, etc), then further consideration should be given to treating these areas. If there are concerns, then the treatment effects to these species of concern should be explored further before implementation of treatment commences.

Heritage Resources

At the time of reporting, the Kakisa community had not provided any information on the location of their known Traditional Use Areas (TUAs). As such, treatment recommendations have not accounted for these TUAs. It is paramount that further information be collected from the knowledge keepers in the community, or other members, as to the Traditional Uses of the treatment areas being proposed. Should it be found that there may be overlap between the TUAs and the treatment areas, further

consultation should occur between ENR and Kakisa to ensure negative impacts from treatments are minimized or avoided.

Fire Suppression Capabilities

While preventative measures can greatly reduce losses realized from an interface wildfire, the ability for a local fire department to suppress an interface fire is just as critical to reducing losses. At the time of the field visit, it was uncertain as to the capability of the Kakisa community to undertake such suppression activities. While it appears there is a fire department, and it was confirmed there is fire apparatus and equipment, personal conversations with community members indicate that there may not be enough community members trained or available on an on-going basis. It may also be that not enough of the female population is trained in the use of the equipment and that this is an issue given it is often the men that are trained but also absent from the town due to work or hunting commitments.

These potential issues and shortcomings of the local fire department should be explored further as to its capabilities. Without this locally based first line of defence, it will be up to distance resources (ENR crews from outside the community, other community fire departments) to suppress an interface fire. Given travel distances and time, and the high rate of spread that can be realized in the local fuel types, waiting for outside resources to arrive to suppress an interface fire may contribute to increased structural losses than might otherwise be realized if there was an on site active and trained local fire department.

Conclusion

The above recommendations once accepted and implemented, should provide wildland fire risk reduction to the community. The fuel management area will reduce potential fire behavior associated with the interface stands and the community interface fuel break will provide a final line of defence and offence to an approaching wildfire. The Landscape Fuel Break will provide a location from which suppression tactics can be anchored in the event of an approaching wildfire. Lastly, further critical analysis should be conducted on the local fire department to ascertain its capabilities and recommendations should be made for improving its abilities.

References

Agee, J.K., and Huff, M.H. 1987. Fuel succession in a western hemlock/Douglas-fir forest. Can. J. For. Res. 17: 697–704. doi:10.1139/x87-112.

Graf, Ron, Mark Bradley, Lee Kearey and Troy Ellsworth. 2000. Successional Responses of a Black Spruce Ecosystem to Wildfire in the Northwest Territories (Final Report). File Report No. 127, GNWT, Dept of Resources, Wildlife and Economic Development.

Harmon, M.E., Franklin, J.F., Swanson, F.J., Sollins, P., Gregory, S.V., Latti, J.D., Anderson, N.H., Cline, S.P., Aumen, N.G., Sedell, J.R., Lienkaemper, G.W., Cromack, K., Jr., and Cummins, K.W. 1986. Ecology of coarse woody debris in temperate Fig. 3. Downed woody debris (DWD) mass (dry matter) versus stand age in plots dominated by black spruce. 2196 Can. J. For. Res. Vol. 38, 2008 # 2008 NRC Canada ecosystems. In Advances in ecological research. Vol. 15. Edited by A. MacFadyen and E.D. Ford. Academic Press, New York. pp. 133–302.