Tsiigehtchic Fuel Break Recommendations

Introduction

On July 14th, a field review was completed for Tssigehtchic 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. Additionally, potential locations for landscape fuel breaks were also reviewed in the field. Two maps have been provided. Map #1 shows the location of the proposed FMA and Map #2 illustrates a potential perimeter landscape fuel break.

Interface Stand Description

Much of the vegetation complex within and immediately adjacent to the community is deciduous shrubbery with low density inclusions of white and black spruce. The coniferous tree densities within these stands range from low (<300 sph) to moderately dense (500-1000+ sph) with very little coarse woody debris (CWD) on site. The following photos illustrate the high deciduous component of the stands within the community boundary.

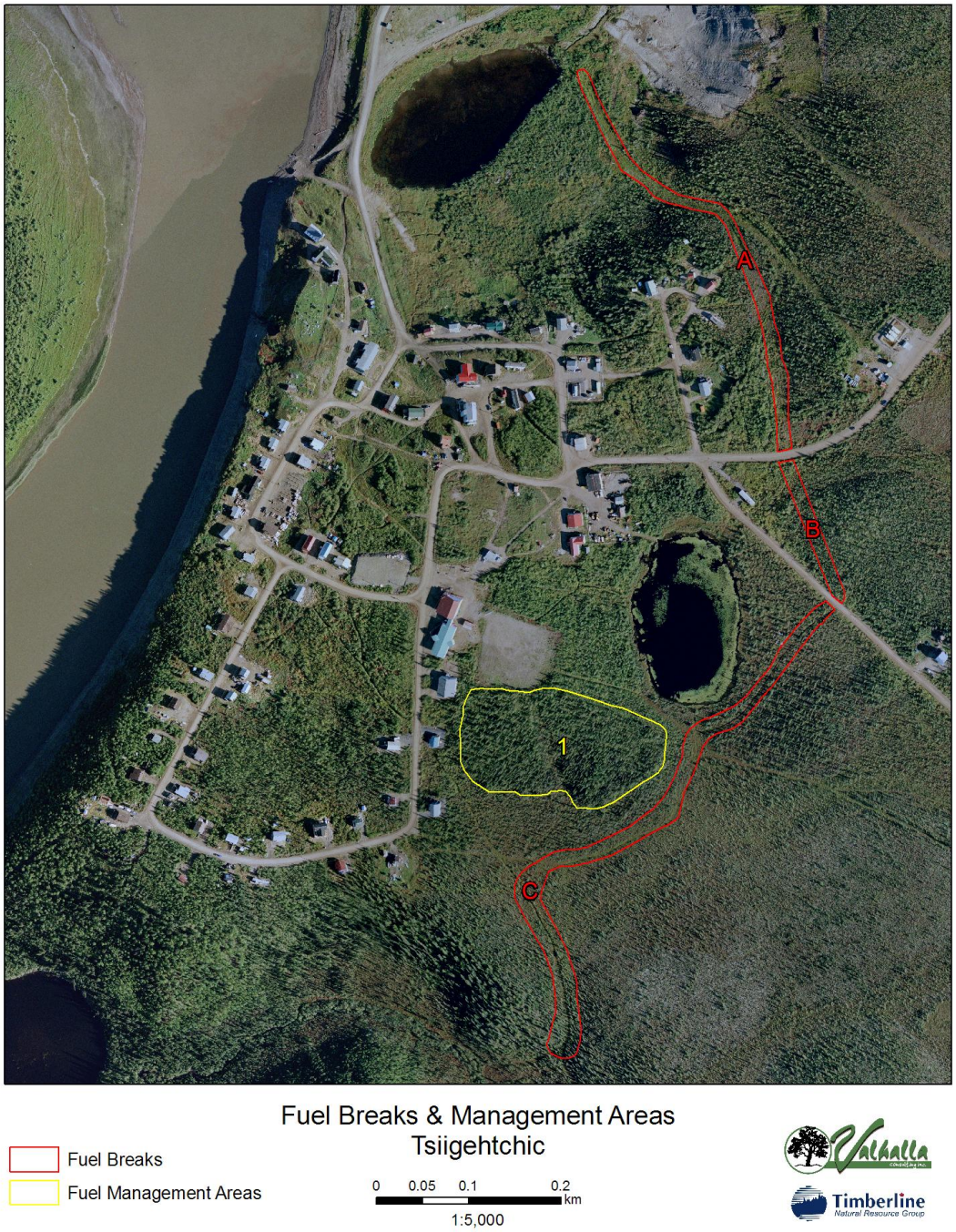
Figure 1. The mixed, low hazard stands contained within the community.

Most of the intermix stands in the community pose a low fuel hazard due to the low continuity of coniferous cover and high deciduous component within the stand. While there is still a potential for a fire to occur within these stands, either from an internal ignition or from spotting into the stand from an adjacent wildfire, the spread through these complexes should be relatively slower when compared to a pure coniferous stand. Additionally, the fire would likely remain on the ground with some torching associated with the individual coniferous stems.

The easy access to these stands from nearby roads and the presence of the local fire department apparatus contributes to these internal stands being lower priority than the other stands along the interface perimeter of the community.

Fuel Management Area

The most prominent fuel hazard to the community is the moderately dense stand of spruce located within the proposed FMA #1 as delineated in Map #1.



Map #1: Location of Fuel Management Areas and Interface Fuel Breaks.

The stands within the FMA consist of approximately 1000 sph of black and white spruce, with ladder fuels to the ground, and a surface vegetation complex of deciduous shrubs, herbs and sphagnum. The stand possesses a dense enough component of coniferous species that it could support an intermittent crown fire with aggressive surface fire behavior and could present a radiant heat issue or spotting risk to the community. The following photos show the stand type for this FMA.

Figure 2. The moderately dense coniferous stand contained with FMA #1.

This stand varies from 500-1000 sph and should be thinned to a density of 300-500 sph or a crown spacing that provides for a distance of 5-10m between coniferous crowns. Some variability in age class structure should be maintained (i.e. age class structure shouldn't be increased to a single, older age class) to ensure the presence of coniferous species through time.

If the presence of coniferous species within this stand is not considered important, implementing a prescribe burn may be more ecologically appropriate than mechanical treatment. Prescribe burning will have the added benefit of allowing for natural snag attrition, Coarse Woody Debris (CWD) recruitment and more natural vegetative response to treatment.

Coarse Woody Debris

There is limited literature as to the historical loading of CWD in these ecosystems, but ocular observations of existing stands indicate that it is currently very low. *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.

The low abundance of snags or CWD in close proximity of the community suggests that the last fire must not have left many snags on site or the historical density of the stands was low prior to the fire and, hence, snags were few as is indicated by the current low CWD observations. Given the duration for which there has been a First Nation presence at this location, it is also entirely possible that the community recovered most of the snags and dead woody debris for firewood after the last burn and the

lack of these attributes on the present landscape is a function of anthropogenic influence and not one of historical stand condition.

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 of 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 (>15cm dbh) and should prefer those pieces in the higher decay classes. CWD 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. If prescribe burning is used to treat this stand, then the placement of CWD will be less important with regards to fuel hazards as long as the majority of the CWD has been charred by the burn. If this is not the case, then mitigation of uncharred CWD may be necessary to reach recommended surface fuel loadings.

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

Interface Community Fuel Break

Immediately adjacent to the community there is a pre-existing fuel break indicated as Fire Break 'A' on Map #1. The following pictures show the current condition of this fuel break.

Figure 3. Pictures showing the condition of the current condition of Fuel Break 'A'.

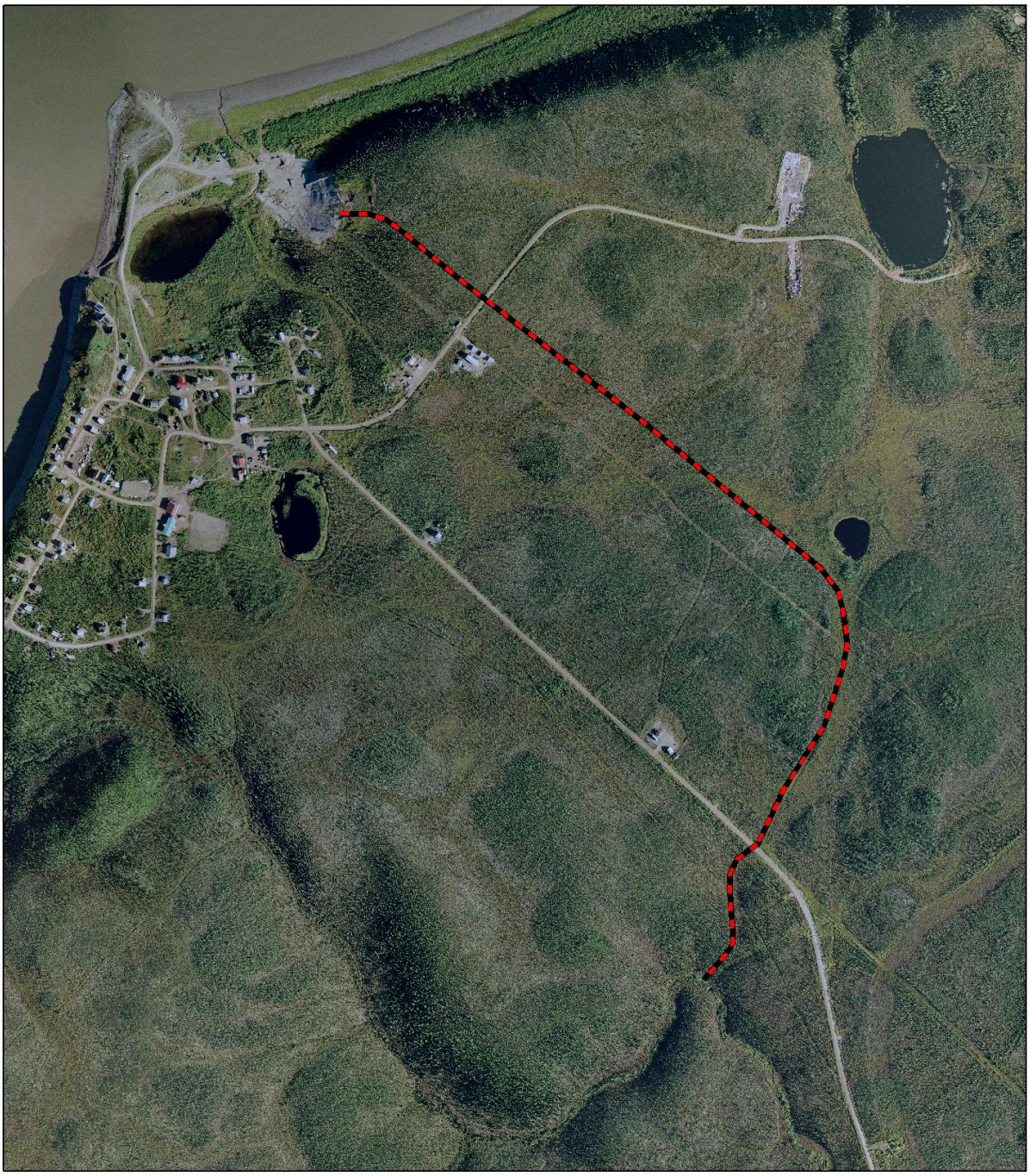
This fuel break is roughly 20m wide and extends from the gravel road near the fuel station down to the water feature near the river and the gravel pit. Generally, the break is in good condition but it should be reviewed annually to determine brushing requirements. This fuel break should be kept maintained as a

vegetation complex with low lying shrubs and at a low shrub density in order to be effective as a fuel break and an anchor point for suppression tactics. It should also be used as a model for the Desired Future Ecosystem Condition for proposed Fuel Breaks 'B' and 'C' as indicated on Map #1.

Two new fuel breaks, 'B' and 'C' on Map #1, are being proposed for the interface area. These two breaks will connect the existing fuel break 'A' to the road leading to the water treatment plant, along the small lake behind the ball diamond and southwest to the creek to the west of the community. Once completed, this set of fuel breaks will encircle the community, should reduce the fire behavior of an approaching surface fire and also provide an anchor point for suppression purposes. It will not be a suitable location from which to burn off due to the presence of several homes outside of the fuel break. These fuel breaks could also be used as a community recreation trail for walking, hiking, berry gathering or snowmobile use. The breaks should be developed by removing all vegetation down to the herb layer and disposing of it through pile and burning or removal for pile burning elsewhere, such as the helicopter landing area near the water treatment plant, the dump or other suitable location.

Perimeter Fuel Break

The fuel management area and interface community fuel break should, once developed, assist with reducing the potential fire behavior of a wildfire immediately adjacent to the community. However, given the speed with which wildfires can move in these fuel types, and the potential spotting distance, it would be wise to develop a fuel break some distance from the community from which fire suppression professionals could anchor their suppression activities for a wildfire that is not yet in the community but approaching it. A second Perimeter Fuel Break is proposed as shown in Map #2.



Map #2: Location of a Perimeter Fuel Break.

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This proposed perimeter fuel break will encompass both the core of the community and the several outlying structures, as well as being a further distance from the community from which to attempt to slow an approaching fire. In addition to this proposed fuel break, the existing road leading to the dump and the water treatment area could also serve as fuel breaks from which to burn off in the event of an approaching wildfire.

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 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 Tsiigehtchic community had not provided any information on the location of their known Traditional Use Areas (TUAs). As such, these 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, and negative consequences may be realized, further consultation should occur between ENR and Tsiigehtchic to ensure that 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 Tsiigehtchic 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 not enough community members are trained, available on an on-going basis, or that the department lacks the official organization to undertake suppression of a wildfire. Similarly, 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. Additionally, it was put forth that ENR no longer provides an on site suppression crew.

These potential issues and shortcomings of the local fire department should be explored further as to its capabilities, its equipment on site and its overall functionality. 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 with the adjacent dense spruce stand and the community interface fuel break will provide a final line of defence and offence to an approaching wildfire. The Perimeter Fuel Break, in conjunction with the existing road system and cut lines, will provide an all encompassing fuel break 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. 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.