



Forest Development Project for the Quill Creek Bench Harvest Planning Area (HPA) in the Haines Junction Area

**A TIMBER HARVESTING PROJECT THAT MERGES THE PREVIOUS
RESOURCE REPORT FOR PLANNING AREA 2 WITH CURRENT
STRATEGIC LANDSCAPE PLANNING OF THE CHAMPAGNE AND
AISHIHIK TRADITIONAL TERRITORY**

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EXECUTIVE SUMMARY

In 2001, DIAND Forest Resources completed a Resource Report (RR) for Forest Fire Hazard Reduction and Timber Salvage in Planning Area 2, south of Haines Junction. The intent of the RR was to continue the wildfire hazard and risk reduction initiative for the community of Haines Junction, as well as to provide economic opportunity for local industrial demand through the salvage of dead and dying stands of spruce.

The signing of the Strategic Forest Management Plan (SFMP) in the Champagne and Aishihik Traditional Territory (CATT) in the fall of 2004 initiated the second phase of the planning process referred to as Integrated Landscape Planning (ILP). The ILP integrates other resource plans in the CATT, classifies areas of forest development and provides an analysis of timber resource available for economic development (SFMP for the CATT).

This Forest Development Project (FDP) may meet current industry demand for timber for the Haines Junction area for a period in excess of 5 years. This does not include the potential economic expansion of the timber or related wood residue industries that may move into the Haines Junction area when regional forest management planning is completed. Increased demand for fiber may reduce the number of years of wood due to accelerated harvest rates.

30 cut-blocks and approximately 117,000 m³ of timber have been identified for development in Operating Units (OU) #2, 3, 4, and 6 of the Quill Creek Bench project area. A further 46,000 m³ of timber is located in OU's #1 and #7, however, these two areas have been deferred from this project and any future development in these areas will be subject to assessment under YESAA.

In addition, fuelwood harvesting of dead and down material will only be allowed along access roads during the time that roads are being maintained by larger operations. This will provide the community with small volume and personal fuelwood opportunities until such time as larger operations complete harvesting plans and access roads are decommissioned. It is estimated that an additional 20,000 m³ will be available in small volume permits through this opportunity.

This FDP was initially screened under the Yukon Environmental Assessment Act, prior to the issuance of several timber permits in the HPA. Comments and concerns addressed through the Environmental Assessment (EA) are found in the environmental assessment screening report. The Forest Management Branch (FMB) has incorporated mitigation from the screening report into the Final Site and Harvest Plans.

1.0 INTRODUCTION

1.1 Background

The planning area is located 5 to 20 km south of Haines Junction along the Haines Road east of the Kluane National Park Boundary. The 2001 RR referred to the area as Planning Area #2. The area is also located in the NW corner of Landscape Unit #3 of the SFMP. To avoid the confusion of differently numbered planning areas, this plan will be referred to by its geographic location and is henceforth known as the Quill Creek Bench Harvest Planning Area (HPA). Refer to Appendix A and B maps.

As a result of the previous planning, the Quill Creek Bench HPA was designated as an Interim Wood Supply Area for the Haines Junction area, while regional forest planning was ongoing. The SFMP process is currently at the ILP stage, which is scheduled for completion March 31, 2006 on the identified landscape units. This plan incorporates SFMP values and ILP direction, from several TWG, and provides the general community of Haines Junction, local First Nations, government agencies and other stakeholders with a preview of what forest development planning may look like in the CATT.

The Quill Creek Bench HPA is comprised of a mosaic of predominantly mature to over-mature white spruce and mixed wood forests. Due, in part, to the older, spruce dominated structure of the forest, the spruce bark beetle has found suitable host material for maintaining an infestation of epidemic proportions in the forests around Haines Junction (SFMP). The forests have been heavily attacked by spruce bark beetle (CFS-Forest Insect and Disease Surveys), which has resulted in large numbers of dead and dying mature spruce in these forests and a significant rise in fire hazard for the area (Ember, 2000).

The SFMP for the CATT identifies the spruce bark beetle as a key issue for the region. Strategic direction for harvest planning is identified as:

- Forest harvesting for timber and fuelwood products should concentrate in areas of beetle infestation in order to salvage timber before it becomes unusable.
- Forest understory should be protected, recognizing that advanced regeneration and young trees represent the next forest and the continuation of natural processes.
- Techniques for reducing the spread of the beetle infestation should be investigated and incorporated into timber harvest planning.
- Tenures for timber harvesting rights must focus on spruce bark beetle-kill wood and related salvage.

As an Interim Wood Supply, this FDP meets three of the directions listed. Techniques for reducing the spread of the beetle will be addressed through future regional planning in the CATT.

The Kathleen Lake area, in the southern portion of the Quill Creek Bench HPA, was one of the first spruce bark beetle infestation areas. A large proportion of the trees in this area have been dead for a decade. Previous salvage work in the vicinity indicates that roundwood (sawlog) quality timber values diminish rapidly 3 to 5 years after initial death from beetle activity, due to stain, checking and the onset of other decay mechanisms (rot and fungus).

Harvesting as proposed in this FDP will provide some economic activity in the vicinity of Haines Junction. At the same time, TWG involved in current Resource Assessment and Regional Planning may gain useful information concerning the utilization of beetle-killed timber, silviculture systems and other potential strategies for dealing with the beetle problem in the rest of the region.

1.2 Ecoregion and Drainages

The HPA is within the Ruby Range Ecoregion closely influenced by the adjacent Yukon Southern Lakes Ecoregion of the Boreal Cordillera Ecozone.

This ecoregion covers the Kluane, Ruby and Nisling Ranges, Shakwak Valley (Trench), and Kluane Plateau. The climate is characterized by short, cool summers and long, cold winters. Winter temperature inversions are common, giving milder temperatures at higher elevation. Maritime air from the Gulf of Alaska periodically invades the ecoregion during the winter to produce mild spells with near-thawing temperatures. The mean annual temperature for the area is approximately -3°C with a summer mean of 10°C and a winter mean of -17°C. Mean annual precipitation ranges 250–300 mm (Environment Canada).

All waterways in the HPA drain into the Kathleen River system or the Dezadeash system, and then flow into the Alsek River drainage.

2.0 PLANNING AREA IDENTIFICATION

The Quill Creek Bench HPA occupies the NW corner of Landscape Planning Area #3 of the SFMP for the CATT (refer to the overview map - Appendix A). The planning area is bounded by the Haines Road and Kluane Park on the west, Kathleen River to the east and the Dezadeash River to the North.

The following tables show the land classification and forest age classes for the HPA.

Table 1: Land Classification within HPA.

LAND CLASS	QUILL CREEK BENCH HARVEST PLANNING AREA 12,031ha	
	Hectares	Percent of Area
FORESTED	10,571	87.9
NP / WETLAND	676	5.6
NSR (Not Satisfactorily Restocked)	34	0.3
RIVERS	180	1.5
LAKES	275	2.3
URBAN/DEVELOPED	295	2.4

Table 2: Age Class Distribution of Forests in the HPA (EMR Forest Inventory)

AGE CLASS	QUILL CREEK BENCH HARVEST PLANNING AREA 10,571 ha FORESTED	
	Hectares	Percent of Area
<40	338	3.2
41-60	322	3.1
61-80	1791	16.9
81-100	3406	32.2
101-120	1543	14.6
121-150	2096	19.8
> 150	1075	10.2

The age class distribution of the forests in the HPA indicates a predominantly mature to over-mature forest. As pointed out in the SFMP document, this provides favorable forest conditions for maintaining severe outbreaks and increasing mortality related to the spruce bark beetle infestation.

During reconnaissance and cruising of the stands in the HPA, >90% of trees over the 16 cm diameter class have been attacked by the spruce bark beetle and 38-80% of tallied trees (depending on block location) are standing dead. Detailed analysis for each of the proposed harvest blocks can be found in Section 3.

2.1 Landscape Issues

This FDP includes the newly prescribed Integrated Landscape Planning (ILP) classification for all proposed development. In addition, the site specific constraints from the original RR have been maintained or in some cases enhanced.

During consultation for the RR, the Department of Environment recommended a wildlife corridor along Quill Creek and the protection of two wetlands identified as moose habitat. The Dezadeash River valley was already considered important moose winter range. In addition, recreational and visual concerns for the Kathleen River system were identified as a local concern. Refer to map in Appendix B.

These areas were “netted out” (removed) from the proposed harvesting in the RR with:

- A 200 meter “no development” corridor on either side of Quill Creek,
- Required buffers around wetlands as prescribed in the Timber Harvest Planning and Operating Guidebook, 1999 (THPOG)
- Seasonal restrictions on operations around and through the wetlands,
- A height of land reserve along the Kathleen River to maintain visual quality.
- Visual screening of operations along the Haines Road.

These measures, when implemented, also address fish and water values in the HPA by minimizing disturbance in riparian zones.

The Resource Assessment Technical Working Group (RATWG), working on the ILP, has classified priority economic opportunity areas (“green”) with areas which contain high wildlife values (“green hatched”). The Resource Assessment Classification Areas are defined as follows (Appendix K for map):

- GREEN: Recommended as areas for priority harvest development planning.
- GREEN HATCHED: Recommended as areas for harvest development, but requires consideration for other resources (such as wildlife, wetlands, movement corridors and other habitat).

Table 3 provides the classification area breakdown of the Quill Creek Bench HPA.

Table 3: Classification areas according to the ILP Assessment

ASSESSMENT CLASSIFICATION	HARVEST PLANNING AREA – 10,571 ha forested	
	AREA (ha)	PERCENT OF FORESTED AREA
GREEN	4805	45.4%
GREEN HATCHED	5766	55.6%

As indicated, harvesting may occur in the “green hatched” areas, but planning requires consideration for the other resource values identified during the resource assessment. The wildlife value classification may have a variety of impacts on operations depending on the site specific conditions identified. In this HPA, forest planners have incorporated the following options for harvesting in the Wildlife Value Area:

- Reduce the harvest footprint on the landscape – in this HPA, harvesting impacts 6% of the land base in the wildlife zone, compared to 13% of the land base in the priority harvest zone. See Table 11.
- Elimination of OUs – the RR included OU #5, located near the confluence of the Kathleen and Dezadeash Rivers. Due to the proximity to the moose wintering area, visual quality, fish and water as well as some operability concerns, the OU was removed from this FDP.
- Increased block retention – In this HPA, in-block dispersed retention of $\geq 25\%$ has been suggested for all harvest areas located in the Wildlife Value Areas.

2.1.1 Connectivity

A wildlife corridor was originally prescribed as a requirement for animal movement (moose and bear) between upland habitat in Kluane National Park and lower elevation winter habitat along the Kathleen and Dezadeash River Valleys.

The Quill Creek Bench HPA provides for an enhanced 500 m no harvest zone along Quill Creek (200 m on the north side of the creek and 300 m on the south side). The block identified as 6L on the RR map (Appendix B), has been deleted from harvesting.

Several natural wildlife corridors exist throughout the HPA. In addition to the prescribed Quill Creek Corridor, animals may travel from Kluane National Park without encountering harvest blocks or road development, with the exception of the Haines Road:

- North of OU #2 into the Dezadeash Valley
- Between OU #2 and OU #3, into either of the swamp complexes previously identified as seasonal moose habitat
- North of Kathleen Lake through OU#6 to Rainbow Lake.

2.1.2 Moose

Two wetlands have been identified as moose habitat, but are not identified as critical seasonal ranges. One wetland area is located in the northern section of the HPA separating OU #1 and OU #4 and the eastern side of OU #2. The other moose habitat area is located in a wetland complex east of proposed harvesting in OU #3 and south of OU #4.

The ILP for the CATT currently includes both areas within a more extensive wildlife values classification. Standards for buffering identified wetlands, as outlined in the THPOG, were applied in these locations. Seasonal restrictions on operations may be applied to harvesting permits.

New access and hunting opportunities created by roads and open sight lines are considered as a potential problem in moose management. The prescribed natural shelterwood silviculture system (explained in Section 2.2.3 - Silviculture) will help reduce sight lines. The Quill Creek Bench area is already posted as a limited entry hunt and has been identified as a subsistence hunting area. Prompt de-activation of new roads will limit access to the operational harvesting window.

Moose are considered a disturbance and edge oriented species, relying on areas of new regeneration or riparian areas for browsing. Openings created by the proposed harvesting

may improve overall forage in the area and have a positive impact on moose populations which have been declining in the region recently (RATWG Meeting Minutes). Many of the old access trails from previous mining activities are being used extensively by moose in the area. These existing trails, which are in an advanced stage of regeneration (1.5+ m in height), shall be avoided by new harvesting when possible or disturbance minimized.

2.1.3 Forest Birds

The HPA is located within a major bird migration route and some 118 bird species have been observed nesting in the region (Alsek RRC, 2004).

The breeding window for most forest birds, including migratory birds, is May 1-July 31. Operations in the HPA, targeting green roundwood will not be permitted during the bird breeding window, to avoid the incidental destruction of migratory bird nests. Fuelwood harvesting of dead and down trees may be allowed on a sight specific basis.

Woodpeckers and cavity nesters dependant on dead or dying trees have habitat in this planning area. Proposed operations in this FDP will impact <10% of the total landscape area in the HPA (Table 11). The percentage of beetle attack indicates >40% of all trees in this area are currently standing dead, with more recruits annually as the beetle infestation works through the stands.

Several raptor species were noted in the area and two nests were found during reconnaissance. These nests have been protected from harvesting. Should operators find a nest during operations, the local Natural Resource Officer (NRO) should be notified for direction. Specific mitigation for known nests is included in the site and harvest plans (Section 3 – Harvesting).

2.1.4 Fish and Water

Major fish bearing waterways in the HPA are the Kathleen and Dezadeash rivers. The Kathleen is especially prized as a recreational fishery for rainbow trout, lake trout, dolly varden, kokanee and arctic grayling.

Quill Creek has fish in the lower reaches near the Kathleen River. The topographic break and steep stream flow limits fish from accessing the upper reaches of Quill Creek through the majority of the HPA.

A fish survey was completed for two drainages in the northern section of the HPA (associated with proposed stream crossings) in 2005. The unnamed creek flowing through OU #2 and the unnamed creek flowing from the wetland between OU#1 and OU#2 were assessed (2005).

At the crossing points, neither drainage is considered a stream, as it was found the seepage areas were primarily vegetated channels, lacking defined channel scouring. It appears that there is seasonal water flow during spring freshet, but no fish habitat values were found.

However, a dolly varden was trapped about 100 m downstream of the confluence of these two creeks. At this point, fish habitat was considered fair. The channel of the stream leading to OU#2, continued to a point adjacent to the SW corner of Block 2C without impediments. Hence the stream defaulted to fish bearing status, even though the stream was dry at the time of assessment.

Access construction along the Auriol Branch will have to include drainage controls and seasonal deactivation at these two crossing points to minimize downstream impacts on water quality and fish habitat.

The THPOG guidelines have been applied to all identified riparian areas and wetlands with slight variations on a site specific basis. The identified silviculture system is natural shelterwood, with all non-merchantable conifer and all deciduous stems being reserved from harvest. Where blocks are located within the ILP Wildlife Values Area, or where blocks require riparian management zones, variable retention of overstory stems will compliment the shelterwood harvesting system. As per the 2005 EA, all RMZ's shall have at least 25% retention.

Several other non-classified drainages (NCD) may require crossing during operations. Best practices for eliminating or minimizing damage in these areas will be applied on a site specific and seasonal basis.

2.1.5 Recreation and Visual Impact

The Kathleen River system provides a variety of recreational opportunities. The RR identified a height of land reserve along the river system for the protection of visual values as well as providing a corridor for animal movement and protection of water and fish values.

The ILP includes this area within a much wider wildlife values classification (green hatched) area.

During reconnaissance in OU #7, blocks were identified in close proximity to the Kathleen River system. These blocks (7H and 7J) have been deferred from this FDP.

The wildlife corridor along Quill Creek serves also as a visual buffer for recreational users of this waterway.

There are no viewpoints along the Haines Road that will be impacted by harvesting. Any new access from the Haines Road will require a curved approach through the highway buffer to restrict viewing down the right-of way from the highway. A 100 m visual buffer is maintained between the Haines Road and all harvest blocks.

The RR consultation included concern that harvesting blocks may impact visual quality from the Auriol Trail located in Kluane National Park. The viewing distance of proposed harvesting in the HPA from viewpoints along this trail is greater than 15 km and from an oblique angle. At this viewing distance, the major developmental impact on viewscape will be the intermittent view of branch road right-of-ways. The proposed silviculture system of natural shelterwood (overstory removal with retention of understory and deciduous) will provide residual stems within blocks to reduce the visual impact of disturbance. In addition, block boundaries are laid out to follow timber type boundaries which are curvilinear in shape, blending into the natural vegetative mosaic of the viewscape. A plan to monitor

visual impacts will be implemented as detailed in Section 5.

Proposed buffers along the Kathleen River and Quill Creek as well as the proposed harvesting system with irregular block boundaries are designed to minimize visual impact concerns from known viewpoints.

Development within OU #2, #3 and #4 will impact a recreational cross country ski trail area. The skiing area uses previous hunting and mining trails, natural openings and wetlands to provide an extensive trail network over the north end of the HPA. All existing trails in the HPA that will be impacted by harvest blocks will be restored to pre-disturbance condition to allow continued use. FMB staff have agreed to meet with ski trail users to incorporate new ideas for recreational development in this area.

2.1.6 Fire

The RR and previous Ember Report (2000) identified the Quill Creek area as a potential risk to the town of Haines Junction from wildfire. Ember (2000) indicates that under a worst case scenario, the predominantly coniferous fuels being pushed by prevailing southerly winds could put the village in jeopardy. Harvesting of the beetle killed stands may decrease the localized impacts of fire, although the proposed low disturbance ratio on the landscape, <10%, does little to change the overall vegetation complex, hence the fire risk will remain high. The maintenance of access routes into the HPA for use in firefighting is not considered a suitable objective of this FDP so all new development requires de-activation.

The IRP Fire Abatement Technical Working Group (FATWG) is currently preparing comprehensive fire risk abatement plans for the community of Haines Junction. Stand conversion and larger scale disturbance may be recommended in portions of the HPA to meet these objectives. The recommendations of this group may require changes to the proposed silviculture prescriptions. When approved, amendments to the harvest planning, silviculture and monitoring programs will be reviewed and implemented.

2.1.7 Forest Health

Many stands contain localized incidence of spruce broom rust (*Chrysomyxa*) along with evidence of heart rot (*Armillaria*) and brown cubical butt rot (*Polyporus*). It is not unusual to see these diseases in old forests, but without site preparation and treatment, these can be transmitted to understory trees, reducing the growth potential and impacting the productivity of the new forest.

2.2 Stand Level Issues

The SFMP outlines a salvage and rehabilitation strategy for the renewal of stands impacted by the spruce bark beetle, focusing on timber management and forest health, fire hazard abatement and silviculture treatments. This FDP has been developed in cooperation with the TWG to meet the intent of the strategy.

2.2.1 Spruce Bark Beetle

The spruce bark beetle infestation continues to degrade standing volumes of merchantable spruce. 2004 and 2005 cruise information in all OU's indicates all proposed blocks are infested and the attacked stem count ranges between 83 to 100% of merchantable stems (all timber >16cm dbh). Standing dead trees within proposed harvest areas range from 38% to 80% of merchantable stem count. (Section 3 – Harvesting).

2.2.2 Ecosystem and Stand Composition

Proposed harvest blocks within the Quill Creek HPA are pure white spruce or spruce leading stands. These stands have been targeted for harvest as they contain the highest concentration of spruce bark beetle attack, the highest recoverable per hectare volume and the highest significance related to the fire hazard reduction. Stands were identified using 1:20,000 aerial photographs, ground truthed (field checked) and ecosystem information was collected during ground reconnaissance and timber cruising. The timber typing inventory for this area was provided from data collected by Natural Resources Canada at a 1:50,000 scale. Generally the Quill Creek Bench is a mosaic of mixed white spruce and aspen stands of varying distribution and composition. There is evidence of previous harvesting and disturbance.

The geology of the area is fairly uniform, consisting of medium textured alluvial soils on a gently rolling to flat topography. Small depressions with finer soils and organics, that have no direct overland flow to creek discharges, have created a mosaic of varying sized wetlands and seasonally wet depressions that naturally dry out during the summer.

The vegetation type for all blocks identified is V-11 or V-17, indicating a white spruce canopy (Ecosystem Classification for the SE Yukon, 1996). Leave strips between identified harvest blocks consist of similar vegetation types with a higher percentage of aspen, younger stands or in some cases V-29 or V-30 types of closed or open canopy mixed wood stands. Refer to Section 7 for vegetation type description.

Understory vegetation consists of white spruce regeneration (<1.3m height), with a distinct variety of shrubs, flowers, grasses and mosses related to the region. Depending on localized site moisture and canopy closure, shrubs include: willows, labrador tea, alder and soapberry. Ground cover includes kinnikinnick, bunchberry and twin-flower. Canopy openings provide sunlight for grass and flowers such as rose, lupin, buttercup and aster. Moss cover increases under a denser spruce canopy.

The soil organic layer (litter, fines and humus) within the blocks varies, according to soil moisture, from a depth of 3 cm on the drier sites to 15 cm on the moist to fresh sites. Generally, there is very little humus. The litter and fines make up the highest percent of the depth of organics regardless of site, due to reduced microbial action in the cold soils and slow decay mechanisms that are typical of the boreal forest.

The Quill Creek Bench HPA falls into the Simple Upland Natural Disturbance Zone (NDZ3) of the Yukon boreal forest. The THPOG indicates insect related stand replacing events in the NDZ3 as occurring every 40 years after the stand reaches maturity. Average disturbance is 300 ha within a range of 1 to 1000 ha.

The current spruce bark beetle infestation (covering in excess of 450,000 ha) exceeds the considered the natural range of variability of stand replacing events.

2.2.3 Silviculture System

The spruce bark beetle infestation is naturally removing the overstory layer in the spruce stands around Haines Junction. This is a natural shelterwood silviculture system. The death of the overstory trees leads to the natural release of the understory. The silviculture system proposed within the harvest area is emulating this natural disturbance process (as per SFMP, 2004).

The stands identified for harvest are reasonably uniform in structure, composition and bark beetle incidence. This makes the best silvicultural system and harvesting treatments appear uniform for most blocks. A natural shelterwood system is prescribed, where the overstory is removed in a single pass to release established regeneration and pole layer stems. The established understory will release (increase growth and vigor in unshaded conditions) and form the future forest. Some understory white spruce stems may be destroyed during harvesting operations. Nonetheless, field assessments show large numbers of fairly uniform understory in most blocks. It is anticipated that existing regeneration within blocks should achieve Yukon stocking standards after harvest.

The removal of all overstory stems in the identified harvest blocks, increases the economic potential for the harvesting of predominantly dead wood.

The natural shelterwood system will require timber harvesters to establish primary skid trails during operations. Skidding or forwarding operations must remain on established skid trails to minimize unnecessary damage to residual understory stems. The 2005 EA screening report called for dispersed retention of at least 10% for all blocks greater than 10 hectares.

In addition to understory and deciduous retention, overstory retention is proposed, where the harvest block is located adjacent to water and requires a Riparian Management Zone (RMZ), or where the block is located within the ILP Wildlife Values Area. The EA Screening report and public consultation suggests that $\geq 25\%$ retention level within the Wildlife Value Area should meet wildlife and biodiversity objectives. The intent of the RMZ is to maintain the integrity of the adjacent Riparian Reserve Zone against natural disturbance after harvest, so a similar retention level for the RMZ is proposed for harvest areas.

The following definitions and table provide information on silviculture systems.

Silviculture Systems: A silviculture system is one or more planned series of treatments prescribed for a stand that are designed to encourage the regeneration of a new stand of trees following harvest and maintain the stand through rotation. The system is based on the number of age classes being managed (even-aged or uneven-aged) and is further divided into methods based on site conditions, the tree species being managed and other management criteria.

The following table shows the basic systems and differentiates between the methods used in silviculture. The list is not comprehensive with respect to all variations possible within each method but is intended to provide basic differentiation between terminology.

Table 4: Silviculture Systems

SYSTEM	METHOD	DEFINITION
Evenaged	Clear-cut	The cutting of the entire stand of trees producing a <u>fully exposed micro-climate</u> for the development of a new even-aged stand. Clearcuts may contain reserves to meet other resource values and can be configured as blocks (>4 ha), patches (<4 ha) or strips. Planting is usually required to ensure restocking and managed tree species require full sunlight for best growth.
	Seed Tree	The cutting of all trees for the exception of a small number (usually <15%) of widely dispersed trees <u>retained as a seed source for natural regeneration in a fully exposed micro-climate</u> . Seed trees are not normally planned for removal.
	Shelterwood	The cutting of most trees, leaving those needed to produce sufficient shade to produce a new age class in a <u>moderated micro-environment</u> . Requires two or more entries to completely remove the original stand. Leave trees can be left in a uniform configuration (uniform shelterwood), or in groups (group shelterwood).
Unevenaged	Selection	The periodic cutting of groups or individual trees in a stand to <u>create or maintain an uneven-aged stand structure and provide the measures needed for tree growth and seedling establishment</u> .
Harvesting	Variable Retention	The cutting of most trees in the stand, retaining a specified number of trees in a uniform configuration (uniform retention) or in groups (group retention), that have specific characteristics, <u>to meet criteria not related to requirements for regeneration of the new stand</u> . Criteria may include biodiversity, structure, wildlife, aesthetic, cultural or other rationale.

2.2.4 Cultural Heritage Resources and Archeological Sites

Thomas Heritage Consulting prepared a report entitled “Heritage Potential Mapping Study for the CATT Forestry Planning” in 2005.

The overview assessment provided guidance on potential locations for heritage sites in the Quill Creek Planning Area, as well as suggestions for minimizing impacts to heritage resources. The report was tabled to CAFN Heritage who had the opportunity to review the report in conjunction with the Quill Creek FDP.

Thomas identifies various forestry activities and classes them into "Levels of Impact" according to their potential for disturbing the vegetation or ground.

Level 0 – minor clearing of surface vegetation – this includes surveying, use of existing roads, tree planting, and winter stream crossings, where banks are not modified.

Level 1 – significant clearing of surface vegetation but limited ground disturbance – this includes timber harvesting, skidding and winter road or landing construction.

Level 2 – activities that include significant surface subsurface ground disturbance – this includes summer road and landing construction, stream crossings requiring bank modification and post harvest mechanical site preparation.

Thomas suggests that for the mapped heritage potential zones:

- * For all areas targeted for harvesting, a survey for above ground resources should be carried out as part of routine block layout.

During field reconnaissance in OU#6 and #7, two potential sites were noted by crews. They were GPS'd and the information was forwarded to CAFN. One area consisted of an old blue enamel cooking pot. Investigation of the area did not note any structural remnants, indications of fire pits or extended habitation. The second area was a fire pit containing some rusty tin cans, a broken sleigh and tarp tent frame.

- * Forestry activities that result in Level 1 and 2 impacts do not require an archeological impact assessment prior to harvest.
- * Forestry activities that result in Level 2 impacts within 100 m of a body of water or terrain feature overlooking the body of water should be preceded with an archeological impact assessment. For the area 100 – 300 m from the body of water or terrain feature, a post-harvest assessment is considered adequate mitigation.
- * Mechanical site preparation (scarification) activities in the mapped potential heritage areas should have an archeological impact assessment after harvest but before the treatment.

Thomas' suggested mitigations have been incorporated into the Site Plans. When located, any identified cultural sites or other FN interests will be buffered, respecting the values of the CAFN (SFMP Strategic Direction).

In addition, any sites that are uncovered during road development or harvesting operations will require cessation of all operations until both the CAFN and Yukon Government Heritage are notified and site inspections are performed as required (DIAND, 1999).

3.0 HARVESTING SECTION

The harvesting section outlines the general direction of operations, summarized by OU. A harvest data summary for each block is presented in tabular form. A short summary report is provided in descriptive form detailing specific access management, landscape or site information particular to that OU. Individual site plans for each block are located in the appendices.

3.1 Harvest Scheduling and Season

There is no defined schedule for harvesting in the HPA. The future implementation of the THP is dependant upon local demand for timber products and permit applications.

The order for disposition for OUs considered current timber quantity and quality along with existing access and applicant requirements. OUs #3, #4, #2 and one block in #6 will serve immediate demand with the remainder of OU #6 being available as needed.

OU #1 has not been ground checked. The overview map is based upon timber typing and aerial photography from the original RR. This OU will be assessed when final recommendations for treatments, related to Fire Abatement, are prepared by FATWG. A separate EA will be required for OU #1.

OU#7 has been ground checked but requires final layout of boundaries and roads. Comments received during the EA, primarily related to concerns surrounding the size and location of block 7H; hence, blocks in OU 7 were deferred from this FDP.

It is possible to harvest during dry summer conditions on most blocks, as site conditions do not restrict harvesting to winter only; however, there are a few key locations along access corridors that may limit some operations to winter only. The EA lists blocks 2H, 2I , 4A, 4B, 4C, 4D, 4N, 4P, 6A, 6B, 6C, and 6N as winter harvest only blocks. For silvicultural reasons, it is preferable to harvest in the summer as it would increase soil disturbance and promote soil mixing, which would provide better seed bed conditions suited to natural seeding and regeneration of the site. Summer disturbance will also promote aspen suckering.

Because of the commitment not to harvest green wood during the forest bird breeding season, dry summer harvest is considered to be between August 1 and winter freeze up. Winter logging is restricted to freeze up with a snow pack to spring break-up. This allows firewood cutters to access permits during snow free conditions and get their wood in time for the upcoming winter, while operators with traditional logging equipment can operate during the winter season and ensure access routes are trafficable for larger equipment.

Harvesting without a snow-pack includes the risk of increased damage to established regeneration that exists on site. However, use of skid trails and the use of proper equipment during harvesting operations should maintain adequate stocking.

Harvesting during snow free conditions requires enhanced on-block road and landing construction standards to ensure operability. This also increases the risk of soil disturbance, erosion and compaction. The rehabilitation of summer roads, landings and skid trails will require scarification of compacted areas and roll back of overburden stripped during construction.

3.2 Reforestation

Natural regeneration exists in abundance within most blocks. It has been broken down into three categories: pole, advanced regeneration and regeneration. The categories of understory are defined as:

- The pole layer is made up of trees between 7 cm and 16 cm dbh. These trees are under the harvestable size for most sawmills, but range in height up to 10 or 11 m. Diameter at breast height (dbh) is a measure of the trees diameter in cm at a point 1.3 m above the ground.
- Advanced regeneration is the layer made up of trees over 1.3 m in height, but with a diameter of less than 7cm. These stems can be up to 5 m in height.
- Regeneration includes all the trees less than 1.3 m in height.

The protection of natural regeneration by careful harvesting of the overstory along prepared skid trails will conserve a high percentage of these trees.

Natural seeding from residual stems is expected to regenerate roads and landings. This will be checked during scheduled post harvest surveys and if necessary, fill planting will be prescribed. The old mining trails in OU #4 show good recovery and stocking on areas that have not been used regularly for recreational purposes.

Where planting is prescribed, trees grown from a local seed source will be used. The trees planted will generally be spruce. The Research and Monitoring TWG of the SFMP may propose operational regeneration trials of pine or other species for purposes of fire abatement, diversity, or to improve ecosystem resilience.

3.3 Operating Unit Description and Harvest Block Summary

This section provides for a general summary of harvest volumes within the OU, and an estimate of the percent of bark beetle attack. The information presented in each column of the tables is calculated or derived by:

- Merch. Area: Gross block area with NP (non-productive) or aspen patches deleted.
- Avg. vol/ha: The volume potential in cubic meters per hectare, calculated in the cruise compilation, with deletions for retention.
- Mean dia: Average Dbh of merchantable trees in the stand.
- Mean Ht: Average height of merchantable trees in the stand.
- Total Vol: Multiplication of Avg. Vol/ha times Area of block.
- Beetle % ATTK: Percentage of trees showing indications of beetle attack.
- Beetle % DEAD: Percentage of trees tallied that are dead (no foliage) as a result of spruce bark beetle attack.

For comparison purposes, the OUs remain delineated as in the RR. The notable exception is OU #5, which has been removed from this FDP for potential conflicts with other resource values.

Individual harvest block boundaries are not necessarily the same as in the RR. The RR provided direction from aerial photography, on the general location of stands to be targeted during reconnaissance and layout. The current boundaries have been ground checked and

refined. In some cases, areas have been amalgamated for administrative and logistical reasons, hence the alphabetical numbering of blocks is not properly sequenced, but reflects the identification of the original stands in the RR.

Current government direction for longer term permitting provides increased incentives for investment and some operational security for loggers.

All in-block roads in this FDP are proposed only. Final layout is dependant upon the applicant's equipment to be used for logging and the harvesting system proposed (landings or roadside). Applications for permits in the designated harvest blocks in this FDP will be required to complete a Project Description Form for each block under permit. The form requires applicants to provide details related to harvesting equipment, scaling sites and operational timing. In addition, the applicant must submit a logging plan map, indicating the location of in-block roads, landings and other development particular to their proposed operation. FMB or the local NRO may be available to help in this regard. The Project Description Form is required to ensure that the applicant meets intent of the approved Site Plan. Designated in-block Riparian Management Zones or Wildlife Values Zone require the pre-flagging of primary skid trails to roads or landings. In all cases, site disturbance for in-block roads and landings will be minimized and should be <5% of the gross block area.

Point source permits for community and personal use firewood allocations are not included in the formal block layout and volume summaries in this FDP. The intent of Interim Wood Supply planning is to provide for economic development of commercial enterprises within the local community. As access is developed into the HPA, many km of road will open previously inaccessible areas to the general public. During the short period of time when commercial enterprises will be working their permit areas, personal use firewood permits may be made available through the CS&I District Office along the access corridors.

In the OU summaries, there is an indication of areas that will be available for point source permitting.

Detailed Site Plans and maps for all approved blocks in OU's #2, #3, #4 and #6 are available and will be provided to proponents who are awarded timber permits.

OPERATING UNIT #1

OU #1 is located in the extreme NW corner of the HPA. Refer to Appendix C map. The entire unit is located within the “green hatched” wildlife value area. The area is also considered in the Haines Junction Interface Fire Management Zone. As such, discussions continue within the Fire Abatement TWG, on the harvesting prescriptions that will be used to meet fire abatement plans while minimizing negative impacts on other values.

Road locations shown on the map are only proposed access, taken from aerial photography. However, the proposed Auriol Branch crossing of the drainage that separates OU#2 and OU#1, was assessed by Environmental Dynamics for fish concerns. At the crossing point, no fish habitat was identified. The lower reaches, 1 km downstream, of the crossing point does contain fish bearing waters, so the crossing will require a drainage structure and maintenance to ensure water quality is not negatively impacted.

OPERATING UNIT #2

Refer to Map - Appendix D.

OU 2 is located along the Haines Road, 4 - 7 km from Haines Junction. Access into the OU will be developed on the Haines Road, 200 m south and opposite the existing Auriol Trail parking lot. The access will join the existing quad trail at a point inside the required highway visual buffer.

Table 5: Operating Unit 2 – Block area and volume summaries.

BLOCK	MERCH AREA	AVG VOL/HA	MEAN DIA	MEAN HT	TOTAL VOL	SPRUCE BEETLE % ATT'K	% DEAD
2A	10.0	101.6	17.4	11.4	1,016	100%	94%
2C	28.5	147.1	19.8	14.0	4,192	90%	41%
2E	13.5	118.5	20.3	13.3	1,600	96%	54%
2F	50.8	157.5	25.4	15.1	8,000	96%	63%
2H	26.5	145.3	21.6	12.3	3,850	97%	80%
2I	10.5	171.4	25.9	15.6	1,800	97%	38%
MEAN	23.3	140.2	21.7	13.6		96%	62%
TOTAL	139.8				20,458		

Fuelwood

Point source fuelwood permits for personal and community use should be made available along all roads developed for harvesting in this OU. The recovery of dead and down material for 100 m on each side of the road corridors will help to reduce flammable fuels and will provide an accessible firewood source for the community.

OPERATING UNIT #3

Refer to map in Appendix E.

Access is provided by an existing 4 X 4 trail, called the Quill Creek Branch. Some road upgrading is required to produce the alignment necessary for highway vehicles. This is also the primary access into OU#4.

Table 6: Operating Unit 3 – Block area and volume summaries.

BLOCK	MERCH AREA	AVG VOL/HA	MEAN DIA	MEAN HT	TOTAL VOL	SPRUCE BEETLE % ATT'K	% DEAD
3A	3.4	132.3	19.9	13.3	450	94%	59%
3B	27.5	140.0	17.9	12.3	3,850	95%	54%
3D	7.1	180.0	23.7	13.7	1,278	85%	63%
3E	9.0	140.0	21.6	13.0	1,260	83%	42%
3F	6.0	230.0	25.7	15.6	1,380	97%	70%
3G	8.4	180.0	22.6	15.2	1,512	100%	53%
3H	8.8	175.0	25.9	15.6	1,540	95%	37%
MEAN	10.0	168.2	22.5	14.1		93%	54%
TOTAL	70.2				11,270		

As a result of the ILP Wildlife Value Areas encompassing Blocks D, E, F, G and H with increased variable retention, these blocks will be more suitable for small volume roundwood or commercial firewood operations, where only the dead and down will be allowed to be removed.

Fuelwood

Point source fuelwood permits for personal and community use should be made available along the Quill Creek Branch in areas not laid out for larger volumes. The recovery of dead and down material along road corridors will provide an accessible fuelwood source for the community.

OPERATING UNIT #4

Refer to map in Appendix F.

Access is proposed through an extension of the Quill Creek Branch Road, which follows an existing trail through a wetland area. Once past the wetland, the Quill Creek Branch continues along the south side of Block 4B and provides access to blocks 4C, 4D and 4N. The East Branch Road provides access to blocks 4A and 4B, continuing on along previous trails to Block 4P. The access follows existing trails when possible, but has been realigned in places due to topography.

This unit is winter operations only, due to the required access through a wetland. The seasonal restriction will also provide less disruption to guides and hunters, who use the area through the summer and into the fall.

Table 7: Operating Unit 4 – Block area and volume summaries.

BLOCK	MERCH AREA	AVG VOL/HA	MEAN DIA	MEAN HT	TOTAL VOL	SPRUCE % ATT'K	BEETLE % DEAD
4A	18.4	255.5	21.6	13.9	4,700	100%	52%
4B	88.6	169.3	22.1	14.7	15,000	100%	70%
4C	43.7	135.0	23.3	13.9	5,900	100%	54%
4D	33.1	181.3	22.4	14.6	6,000	100%	46%
4N	17.1	228.1	23.1	14.8	3,900	100%	55%
4P	62.7	175.4	27.2	15.7	11,000	100%	68%
MEAN	43.9	190.8	23.3	14.6		100%	58%
TOTAL	263.6				46,500		

Fuelwood

Point source fuelwood permits for personal and community use will not be permitted in this operating unit.

OPERATING UNIT #6

Refer to Maps in Appendix G and H. The operating unit is shown on two maps, in order to maintain a uniform 1:15,000 scale for all overview maps in this FDP.

Access is proposed at three locations from the Haines Road for this OU. Primary access (Crescent Branch Road) is through new access 200 m south of the existing gravel pit and will connect with the existing quad trail inside the required highway buffer. The trail will require upgrading for highway vehicles. This main access point will provide access into the majority of OU #6 blocks and continues through Block 6N into OU #7.

New access (Central Branch Road) is proposed 1.5 km south of the Crescent Branch, into the cluster of blocks 6A, 6B, and 6C. Another option from the Haines Road to these blocks is a road off the Crescent Branch Road (at about 1 km). This option will provide additional community fuelwood opportunities, as the road will traverse through dead spruce stands with a high degree of mortality.

In the southern part of the OU, new access and a spur road is required to access block 6O. Blocks 6A, 6B, 6C and 6N are winter harvest only.

Block 6L from the RR, has been deleted from this FDP, to ensure integrity of wildlife corridor.

Table 8: Operating Unit 6 – Block area and volume summaries.

BLOCK	MERCH AREA	AVG VOL/HA	MEAN DIA	MEAN HT	TOTAL VOL	SPRUCE BEETLE % ATT'K	%DEAD
6A	22.7	133.9	24.6	13.7	3,040	96%	80%
6B	7.9	169.6	27.5	16.1	1,340	100%	80%
6C	8.3	236.1	22.0	15.0	1,960	97%	60%
6F	9.7	160.8	28.2	16.9	1,560	100%	75%
6G	25.5	149.0	27.8	14.5	3,800	100%	66%
6J	25.7	287.9	25.3	16.8	7,400	100%	76%
6M	8.6	186.0	26.7	16.5	1,600	100%	80%
6N	36.2	223.8	27.6	16.8	8,100	100%	76%
6O	45.7	120.4	26.2	15	5,500	100%	76%
MEAN	21.1	185.3	26.2	15.7		100%	76%
TOTAL	190.3				34,300		

Fuelwood

Point source fuelwood permits for personal and community use could be made available along Crescent Branch Road. Pending decision on access to blocks A, B and C, additional small volume permits could be available along the access corridors. The recovery of dead and down material along road corridors will provide an accessible fuelwood source for the community.

OPERATING UNIT #7

Refer to map in Appendix I.

Access to OU #7 is along the proposed Crescent Branch Road. The crossing of the wetland west of block 6N limits access into this OU to winter only.

Final block layout in OU #7 has not been completed. Boundaries have not been flagged and are shown on the map as dashed orange. Boundary location were determined through GPS way-point locations on reconnaissance lines, so the boundary may be altered at a later date.

Final layout will be conducted subject to mitigation provided in the EA screening report. Comments received during the EA indicate a concern with the eastern boundary of blocks 7H and 7J and it's proximity to the Kathleen River, as well as potential access into private property. Blocks 7H and 7J were deferred from this FDP because of stakeholder concerns until further work has been completed by RATWG.

All roads into the unit will be de-activated immediately following harvest to limit access into this area.

Table 9: Operating Unit 7 – Block area and volume summaries.

BLOCK	MERCH AREA	AVG VOL/HA	MEAN DIA	MEAN HT	TOTAL VOL	SPRUCE BEETLE % ATT'K	% DEAD
7A	10.0	180.3	23.1	15.5	1,803	100%	80%
7B	28.5	103.1	28.4	15.6	2,938	100%	84%
MEAN	19.2	141.7	25.8	15.6		100%	82%
TOTAL	38.5				4,741		

Fuelwood

Point source fuelwood permits for personal and community use will not be permitted in this operating unit.

QUILL CREEK HPA OPERATING UNIT SUMMARY

Table 10 provides the area, volume and beetle attack summaries for operating units in the Quill Creek Bench HPA.

Table 10: Operating Units - Block area and volume summaries.

OU	MERCH AREA	AVG VOL/HA	MEAN DIA	MEAN HT	TOTAL VOL	SPRUCE BEETLE % ATT'K	% DEAD
2	139.8	140.2	21.7	13.6	20,458	96%	62%
3	70.2	168.2	22.5	14.1	11,270	93%	54%
4	263.6	190.8	23.3	14.6	46,500	100%	58%
6	190.3	185.3	26.2	15.7	34,300	100%	76%
7	38.5	141.7	25.8	15.6	4,741	100%	82%
MEAN		165.2	23.9	14.7		98%	66%
TOTAL	702.4				117,269		

Table 11 shows a summary of the “footprint” on the landscape of proposed operations within the HPA, as compared to the ILP values classification. Operations target twice as much land area by percent in the green than the hatched classification, and overall impact less than 10% of the forested landscape within the HPA.

Table 11: Landscape Disturbance by ILP Assessment Class

OU	HARV AREA (ha)	AREA BY CLASS		CLASS %		LANDSCAPE DISTURBANCE		
		GREEN (ha)	HATCH (ha)	GREEN %	HATCH %	GREEN 4805 HA %	HATCH 5766 HA %	FOREST 10571 HA %
2	139.8	139.8	0	100%	0%	2.91%	0.00%	1.32%
3	70.2	32.4	37.8	46%	54%	0.67%	0.66%	0.66%
4	263.6	234.5	29.1	89%	11%	4.88%	0.50%	2.49%
6	190.3	182.3	8	96%	4%	3.79%	0.14%	1.80%
7	38.5	24.5	14.0	64%	36%	0.51%	0.24%	0.36%
TOTAL	702.4	613.5	88.9	79%	21%	12.76%	1.54%	6.63%

4.0 ACCESS MANAGEMENT

As directed by the SFMP, existing access from points along the Haines Road have been used whenever possible and existing trails are incorporated into access planning where feasible. Table 12 provides a breakdown of access required for each operating unit in the HPA. Information is taken from GIS data used in the FDP preparation.

FMB has applied for and received access permits for five locations along the Haines Road. The Auriol Branch Road is approved for a point 200 m further south than proposed, as there was visibility concerns at the proposed location. The Crescent Branch will also require relocation 200m south of the proposed location due to safety concerns related to the use of the gravel pit area. Neither relocation proposes serious changes to the scope of the FDP.

FMB will incorporate all terms and conditions for access construction and use into the timber permits acquired by one or more harvesting proponents.

Branch roads may remain usable for several years until harvesting is completed on all blocks accessed. Once all harvesting permit conditions have been completed, branch roads will be de-activated.

Access spurs for in block development are all classed as temporary with full rehabilitation required upon completion of harvesting operations.

Opportunities also exist where the developed road and skid trail systems may be integrated into a recreational land use plan after completion of harvesting operations. The opportunity has not been formally pursued but remains an option. Existing quad trails in the HPA shall be restored to pre-harvest condition.

Discussions on access policy and the rationale for restricting public access on resource roads continue within FMB and the SFMP technical working groups.

Table 12: Existing, Located and Proposed Access Requirements.

OU	ROADS/TRAILS (km)					TOTAL New Located & Proposed (km)	OU (km) TOTAL
	Existing*	Located**		Proposed***			
		on existing	new	inter-block	on-block		
2	3.3	1.2	2.2	0.5	4.5	7.2	10.5
3	7.2	3.6	0.0	0.0	2.1	2.1	9.3
4	15.3	2.2	3.6	0.0	6.1	9.7	25.0
6	3.1	2.9	3.1	0.0	6.4	9.5	12.6
7	1.5		1.5	0.0	1.5	3.0	4.5
TOTALS(km)	30.4	9.9	10.4	0.5	20.6	31.5	61.9
AREA(ha)	15.2	5.0	5.2	0.2	10.3	15.8	31.0

*Existing - amount of road and trails currently in OUs.

**Located - access that has been ground checked and flagged with ribbon. Of the located roads 9.9 km use existing access and 12.0 km is new.

***Proposed – access that has not been flagged in the field but will be required to complete operations. The majority of this development is within harvest blocks so will be seasonal and requires full rehabilitation.

5.0 MONITORING PLAN

Monitoring of harvest operations in the Quill Creek Bench HPA will be performed by local Forest Officers through enforcement of timber permit terms and conditions.

Post harvest monitoring and long term assessments of the harvest areas will be performed during scheduled post-harvest surveys performed by Forest Management Branch over the next 15 years.

The EA screening report identified several areas of concern within the HPA and formal monitoring of conditions shall be addressed through the following actions.

5.1 RETENTION

The EA requires the following levels of in-block retention:

- Within the Riparian Management Zones and Wildlife Value Areas of harvest blocks. $\geq 25\%$ variable retention, comprised of understory, deciduous and 15-25 mature ($>16\text{cm dbh}$) stems per hectare, is prescribed.
- Within blocks over 10 ha. 10% retention is required, comprised of coniferous, deciduous, snags and understory.

Retention levels will be assessed after harvesting according to Forest Practices Field Procedures for assessment of retention levels.

5.2 VISUAL QUALITY

Wilderness values and visual quality from viewpoints in Kluane National Park were identified as a local concern for harvesting in the Quill Creek Bench HPA.

Monitoring of visual quality will be performed, with the help of Parks Canada staff, by establishing a series of fixed view points from areas within the Park where the Quill Creek Bench HPA is clearly visible.

FMB staff will establish fixed photographic plots at these viewpoints and record disturbance by taking pictures from these viewpoints on a semi-annual basis (winter and summer).

Over the expected 5 – 10 year period that operations may continue within the HPA, this photographic record will provide visual quality impacts on the landscape. At any time during the harvesting schedule of the HPA, where visual quality is negatively impacted by openings from these viewpoints, the site plans for un-harvested blocks may be reviewed and amended to mitigate visual impacts.

5.3 EXISTING TRAILS

A trail network exists in OUs 2 and 4 that is used by local ski and skidoo enthusiasts. Concern has been raised regarding the impacts of harvesting on these recreational trails.

Wherever trails have been identified within harvest blocks, site plans require the

clearing of harvesting brush and debris to pre-harvest condition, so that future use of the trails is not compromised. This is a condition of the Timber Permit and will be enforced by the Forest Officer during his final inspection of the harvest area.

Prior to harvest initiation, meetings with the local ski club have been requested to accommodate scheduling or other concerns into harvest plans. Plans may include potential improvements to the trail network by increasing the amount and locations of trails by using the corridors required and developed during harvest.

5.4 OTHER MATTERS

Other issues that arise during harvesting and post harvest assessments will be included in planning area reviews to test assumptions on harvest systems, environmental conditions and impacts. Information gained through these studies will be considered and potentially applied to future forest management planning, through an adaptive management strategy (SFMP Strategic Direction).

6.0 REFERENCES

- Strategic Forest Management Plan for the Champagne and Aishihik Traditional Territory - Community Directions for a Sustainable Forest. (2004)
- Final Resource Report – Hazard Reduction and Timber Salvage FMP in the Vicinity of Haines Junction, Planning Area 2, (2001)
- Environment Canada Website – Terrestrial Eco-zones -
http://www.ec.gc.ca/soer-ree/English/Framework/Nardesc/borcor_e.cfm
- Timber Harvest Planning and Operating Guidebook, DIAND(1999)
- Yukon Communities Fire Risk – Final Ember Report (2000)
- Ecosystem Classification for the Southeast Yukon, DIAND(1996)
- Alsek RRC 2004
- RATWG Meeting Minutes (August 2005)
- Environmental Assessment Screening Report – Forest Development Plan for the Quill Creek Bench Harvest Planning Area in the Haines Junction Area (2005)
- YG CATT Heritage and Archeological Assessment Report. Thomas Heritage Consulting (2005)
- CFS – Forest Insect and Disease Survey Report (2004), YG/CFS Publication
- CATT SFMP and the Quill Creek Bench FDP Fish and Fish Habitat Assessment Report. (2005) Environmental Dynamics Ltd.

7.0 Acronyms: The following is a list of technical and abbreviated terms used in the text of the Forest Development Plan.

CAFN – Champagne and Aishihik First Nation

CATT – Champagne and Aishihik Traditional Territory

Cm - centimeter

Dbh – diameter breast height – the measure of a tree's diameter in centimeters at a point 1.3 meters above the ground.

DIAND – Department of Indian Affairs and Northern Development

FATWG – Fire Abatement Technical Working Group

FMB – Forest Management Branch, Yukon Government, Energy Mines and Resources Department.

Ha – hectare

ILP – Integrated Landscape Plan

NCD - Non-classified Drainage

OM – Organic Matter over the mineral soil, usually broken into 3 components.
Litter, Fines and Humus. Litter is fresh needles, leaves, cones and other organic debris.
Fines are aged and partially decomposed litter and Humus is the fully decomposed organic layer sitting directly above the mineral soil.

OU – Operating Unit – a distinct area of operations within a Harvest Planning Area.

RATWG – Resource Assessment Technical Working Group

RR – Resource Report

SFMP – Strategic Forest Management Plan

Sph – Stems per hectare or average number of trees per hectare used for evaluating on site stocking.

THPOG – Timber Harvest Planning and Operating Guidebook

TWG – Technical Working Group

V type – vegetation type for ecosystem classification.

V-11 is closed canopy (>50% crown closure) forest composed of > 75% white spruce.

V-17 is an open canopy (<50%) forest composed of > 75% white spruce.

V-29 is closed canopy spruce-aspen forest of mixed composition.

V-30 is open canopy spruce-aspen forest.

YG – Yukon Government

APPENDIX A

APPENDIX B

APPENDIX C

APPENDIX D

APPENDIX E

APPENDIX F

APPENDIX G

APPENDIX H

APPENDIX I

APPENDIX J

APPENDIX K