Yukon
Energy, Mines and Resources

Forest Development Plan for the Quill Creek Bench Harvest Planning Area in the Haines Junction Area

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A TIMBER HARVESTING PLAN 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 analysis classifies broad areas for forest development and provides strategies for reducing or eliminating negative impacts on other resource values. (SFMP for the CATT)

This Forest Development Plan (FDP) should 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.

The Quill Creek Bench HPA currently has 140,000 m^3 of timber in 25 cut-blocks laid out (flagged) in Operating Units (OU) #2, 3, 4, and 6. A further 53,000 m^3 of timber is located in eight proposed cutblocks in OU's #1 and #7. The block boundaries in #1 and #7 will be finalized, as the need arises through demand for wood products and with direction from Technical Working Groups (TWG) working on the SFMP.

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 m^3 will be available in small volume permits through this opportunity.

This FDP has been prepared for review through the Environmental Assessment process in the Yukon Territory. Comments and concerns resulting from this review shall be addressed in the Environmental Assessment screening report. Forest Management Branch (FMB) shall incorporate required mitigation from the screening report into the Final Site and Harvest Plans, which will be prepared prior to the issuance of timber permits.

1.0 INTRODUCTION

1.1 Background

The planning area is located 10 to 20 km south of the town of Haines Junction along the Haines Road and 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 moving to final public consultation on several 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 understorey 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.

** Appendix A Map indicates "green hatched" area as Wildlife Corridor in the Legend. Green hatched area is designated as landscape zone with other resource values that must be considered in planning. See Section 2.1for landscape classifications.*

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 development plan 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 kill 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 SFMP landscape 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 a number of economic opportunity areas ("green") with areas of other values ("green hatched"). This HPA is being developed within one these green areas (refer to map in Appendix A).

The HPA Overview Map and all Operating Unit (OU) maps, show the proposed development in relation to the "green" landscape classification.

The Resource Assessment Classification Areas are defined as follows:

- GREEN: Recommended as areas for harvest development planning.
- GREEN HATCHED: Recommended as areas for harvest development, but requires consideration for other resources. (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%

Regional guidelines from RATWG have not been finalized through community consultation. FMB understands that “Best Practices” based on the THPOG guidelines, local consultation and the Environmental Assessment will provide mitigation for this HPA.

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 650 m no harvest zone along Quill Creek (200 m on the north side of the creek and 450 m on the south side). The block identified as 6L on the RR map (Appendix B), has been deleted from planning.

Several natural wildlife corridors exist throughout the Planning Area. In addition to the prescribed Quill Creek Corridor, animals may travel from Kluane 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 area is located in a wetland complex east of the proposed development in OU #3 and south of OU #4.

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

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.

New access and hunting opportunities created by roads and open sight lines are cited 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 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 (i.e. migratory birds) in the area is May 1-July 31. Operations in the HPA, targeting green roundwood will not be permitted during the bird nesting 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 less than 10% of the total landscape area in the HPA (Table 11). The percentage of beetle attack indicates in excess of 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 and these nests have been protected from harvesting. Should operators find a nest during operations, the local Natural Resource Officer should be notified for direction. Specific mitigation for known nests is included in the block reports (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 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. Currently a fisheries assessment is being conducted within the HPA.

The THPOG guidelines have been applied to all identified riparian areas and wetlands. The identified silviculture system is natural shelterwood, with all non-merchantable conifer and all deciduous stems being reserved from harvest. For this reason, the harvest prescription does not change within the riparian management zone. The riparian reserve zones are as prescribed in the THPOG.

Several non-classified drainages (NCD) will require crossing during operations. Best practices for eliminating or minimizing damage in these areas will be applied on the individual permits, where crossings are required.

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 sensitivity classification (green hatched) area.

During reconnaissance in OU #7, blocks were identified in close proximity to the Kathleen River system. The blocks have not been finalized and a detailed discussion on block location is found in Section 3: Harvesting.

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) 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.

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 an old ski trail area. The skiing area used previous hunting and mining trails, natural openings and swamps to provide an extensive trail network over the north end of the HPA. FMB encourages users to bring forward ideas for recreational development in this area as part of the FDP review.

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 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 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 fire fighting, is not currently

considered a suitable objective, so all new development currently requires de-activation.

The SFMP 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 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 understorey trees, reducing 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 bark beetle, focusing on timber management and forest health, fire hazard abatement and silviculture treatments. This FDP has been developed in cooperation with TWG to meet the intent of the strategy.

2.2.1 Spruce Bark Beetle

The bark beetle infestation continues to degrade standing volumes of merchantable spruce. 2004 and 2005 cruise information in all OUs 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 spruce or spruce leading stands. These stands have been targeted for harvest as they contain the highest concentration of 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 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). Leave strips between identified harvest blocks consist of similar vegetations 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 moss 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 the 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, 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 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 bark beetle infestation is naturally removing the overstorey layer in the spruce stands around Haines Junction. This is similar to a natural shelterwood silviculture system. The death of the overstorey trees leads to the natural release of the understorey. The silviculture system proposed within the harvest area is emulating this natural disturbance process (SFMP Direction).

The uniformity of the identified stands in structure, composition and bark beetle incidence makes the decision to use silvicultural systems and treatments that are uniform for most blocks. A natural shelterwood system is prescribed where the overstorey is removed in a single pass to release established regeneration and pole layer stems. The established understorey will release (increase growth and vigor in unshaded conditions) and form the future forest. Some understorey white spruce stems may be impacted during harvesting operations, but the numbers of established regeneration within blocks should achieve Yukon stocking standards.

The removal of all overstorey stems increases the economic potential for the harvesting of predominantly dead wood.

The proposed shelterwood system will require timber harvesters to establish and flag primary skid trails prior to the commencement of operations. Skidding or forwarding operations must remain on established skid trails to minimize unnecessary damage to residual understorey stems.

The following definition and table are provided for 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.

SYSTEM	METHOD	DEFINITION
Evenaged	Clear-cut	The cutting of the entire stand of trees producing a fully exposed micro-climate 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 retained as a seed source for natural regeneration in a fully exposed micro-climate. 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 moderated micro-environment. 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 create or maintain an all-aged stand structure and provide the measures needed for tree growth and seedling establishment.
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, to meet criteria not related to requirements for regeneration of the new stand. Criteria may include biodiversity, structure, wildlife, aesthetic, cultural or other rationale. (Not a true silviculture system)

2.2.4 Cultural Heritage Resources and Archeological Sites

Two areas of potential archeological importance were noted by reconnaissance crews in OU #6 and OU #7. Both locations are adjacent to existing trails. 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. The location is not within any proposed harvest blocks.

Identified cultural sites or other FN interests will be buffered, respecting the values of the CAFN (SFMP Strategic Direction).

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 performed as required (THPOG).

3.0 HARVESTING SECTION

The harvesting section outlines the general direction of operations for scheduling and reforestation options based on site specific details. Data for each block, summarized by OU, is presented in tabular form. A short block report is provided in descriptive form, explaining the block location rationale and other site specific block information that is provided for review.

3.1 Harvest Scheduling and Season

There is no defined schedule for harvesting in the planning area. The future implementation of the FDP 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. Hence, OUs #3, #4 and #2 will serve immediate demand with OU #6 and #7 being available as needed. OU #1 will become operational when final recommendations for priority treatment areas in the landscape zone area are prepared by FATWG. A separate Environmental Assessment will be required for OU #1.

It is possible to harvest during dry summer conditions 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. For silvicultural reasons, it is preferable to harvest in the summer as it would increase soil disturbance and promote soil mixing providing better seed bed conditions suited to natural seeding and regeneration of the site. Summer disturbance will also promote aspen suckering.

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

To prevent incidental damage or destruction of forest bird nests during the breeding season, no greenwood harvesting will be allowed between May 1 and July 31.

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 understorey 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 meters. 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 will 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 overstorey along prepared skid trails will conserve a high percentage of these trees.

Natural seeding from residual stems is expected to complete regeneration on roads and landings. This will be checked during scheduled post harvest surveys and fill planting will be prescribed where necessary. 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 and Harvest Block Description

This section provides for a detailed review of harvest blocks within OUs. Tables provide area, volume, height, diameter and spruce beetle incidence. The information presented in each column of the tables is calculated or derived by:

- Net Area: Gross block area with NP (non-productive) or aspen patches deleted.
- Gross vol/ha: The total volume potential in cubic meters per hectare, calculated in the cruise compilation.
- Net vol/ha: The recoverable roundwood (sawlog) volume per hectare (trees >16 cm dbh), calculated in the cruise compilation. This volume is somewhat related to the number of standing dead trees in the stand.
- Mean dia: Average Dbh of merchantable trees in the stand.
- Mean Ht: Average height of merchantable trees in the stand.
- Net RW: Net roundwood vol/ha multiplied by the net area of the block.
- Net FW: An estimate of the Fuelwood component of the stand, based on the difference between gross and net volumes/ha multiplied by the block net area.
- Gross vol: A summation of the net RW and Net FW volumes.
- 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, the operating units 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. The availability of government direction for longer term permits 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). Final road layout will be required by the applicant prior to permit issuance. Once roads are laid-out, the applicant will also be required to designate a skidding pattern by flagging primary skid trails to roads or landings. In all cases, site disturbance for in-block roads and landings will be minimized and should be less than 5% of the gross block area.

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 use area. The area is also considered in the Haines Junction Interface Fire Management Zone. As such, discussions continue within the ILP TWG, on the harvesting prescriptions that will be used to meet fire abatement plans while minimizing negative impacts on other values.

Ground reconnaissance in this unit has not been completed. Block size and volume estimates have been taken from the RR. Based on the results of ground reconnaissance in other OU, the volumes are considered conservative. Data for average height, diameter or percent beetle attack is not available. Road locations shown on the map are only proposed access, taken from aerial photography.

Table 4: Operating Unit 1 – Block area and volume summaries.

BLOCK	NET AREA	GROSS VOL/HA	NET VOL/HA	MEAN DIA	MEAN HT	NET RW	NET FW	GROSS VOL	BEETLE % ATT'K	BEETLE % DEAD
1A	80.8	150.0						12,120		
1D	15.1	125.0						1,887		
1E	58.3	130.0						7,579		
1I	41.7	150.0						6,255		
MEAN	49.0	138.8								
TOTAL	195.9							27,841		

The northern boundary of all blocks, proposed in OU #1, are located near the upper elevations of the Dezadeash River Valley, hence should be considered upland forest type.

Proposed harvest blocks G and H from the original RR were located in the lower elevations of the Dezadeash Valley and are isolated small stands of 4.5 and 5.1 ha, respectively. Due to the potential wildlife conflicts and access constraints related to these blocks, they have been deleted from this FDP.

OPERATING UNIT #2

Refer to Map - Appendix D.

OU 2 is located along the Haines Road, 4 - 7 km from Haines Junction. Proposed access into the OU uses an existing quad trail that is currently used by local hunters and serves as the access point for cross country skiers.

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

BLOCK	NET AREA	GROSS VOL/HA	NET VOL/HA	MEAN DIA	MEAN HT	NET RW	NET FW	GROSS VOL	BEETLE % ATT'K	BEETLE % DEAD
2A	10.0	164.8	70.2	17.4	11.4	702.0	946.0	1,648.0	100%	94%
2C	28.5	201.4	105.1	19.8	14.0	2,995.4	2,744.6	5,739.9	90%	41%
2E	13.5	192.7	90.4	20.3	13.3	1,220.4	1,381.1	2,601.5	96%	54%
2F	50.8	210.6	134.9	25.4	15.1	6,852.9	3,845.6	10,698.5	96%	63%
2H	27.5	156.6	90.9	21.6	12.3	2,499.8	1,806.8	4,306.5	97%	80%
2I	10.5	187.2	158.4	25.9	15.6	1,663.2	302.4	1,965.6	97%	38%
MEAN	23.5	185.6	108.3	21.7	13.6				96%	62%
TOTAL	140.8					15,934	11,026	26,960		

Block 2A

Ecology: V17 vegetation type on even to rolling terrain with moderately well drained sandy soils and 5 cm OM on a mesic site.

Boundary: Boundary follows spruce timber type. Formerly Blocks A and B of RR. A small finger of scrub nearly divides the block in half.

Access: Via a spur road off the Auriol Branch Road.

Harvesting Season: Dry summer or winter

Harvest System: Natural Shelterwood (over-storey removal) – retention of all deciduous, and all non-merchantable (< 16 cm dbh) conifer stems.

Special Concerns: There is a small seasonal swamp (Class 1 wetland) adjacent to the western boundary. A riparian reserve zone is not required by the THPOG for a Class 1 wetland; however a 60 m riparian management zone has been established. The block will not be visible from Haines Road due to 100 m buffer.

Understorey: Between 2,000 and 8,000 sph in all categories (understorey categories defined in Section 3.2 – Reforestation).

Block 2C
Ecology: V17 vegetation type on even terrain and north aspect, moderately well drained sandy soils with 10 cm OM on a fresh site.
Boundary: Boundary follows spruce timber type. Formerly Blocks C and D of RR.
Access: Auriol Branch Road goes through SE corner of block.
Harvesting Season: Dry summer or winter
Harvest System: Natural Shelterwood (over-storey removal) – retention of all deciduous, and all non-merchantable (< 16 cm dbh) conifer stems.
Special Concerns: eastern boundary set back from topographic break leading to a Class 3 stream. A 40 m riparian reserve zone and a 60 m riparian management zone have been established from the stream.
Understorey: Between 2,000 and 12,000 sph in all 3 categories.

Block 2E
Ecology: V17 vegetation type on even terrain and N-NW aspect, with moderately drained fine soils and 6 -10 cm OM on a fresh site.
Boundary: Boundary follows spruce timber type. Formerly Block E of RR.
Access: Auriol Branch Road goes through center of the block.
Harvesting Season: Dry summer or winter
Harvest System: Natural Shelterwood (over-storey removal) – retention of all deciduous, and all non-merchantable (< 16 cm dbh) conifer stems.
Special Concerns: SE block boundary has a 60 m riparian reserve to the Class 3 wetland and a 140 m riparian management zone has been established.
Understorey: Patchy with 1,000 to 5,000 sph primarily in advance regeneration category.

Block 2F
Ecology: V17 vegetation type on even terrain and N-NW aspect, with moderately drained fine soils and 10 cm OM on a moist site.
Boundary: Boundary follows spruce timber type. Formerly Block F and G of RR.
Access: A spur road from the Auriol Branch Road follows the existing trail into the block and divides into several more spurs to access the rest of the block.
Harvesting Season: Dry summer or winter
Harvest System: Natural Shelterwood (over-storey removal) – retention of all deciduous, and all non-merchantable (< 16 cm dbh) conifer stems.
Special Concerns: Block boundary has a 60 m riparian reserve zone adjacent to the Class 3 wetland. A140 m riparian management zone has also been established.
Understorey: Variable with 1,500 to 7,000 sph primarily in advanced regeneration and regeneration category.

Block 2H
Ecology: V17 vegetation type on even terrain and N-NE aspect, with well drained fine soils and 10 cm OM on a dry site.
Boundary: Boundary follows spruce timber type. Formerly Block H of the RR.
Access: A spur road southeast off the Auriol Branch Road is required. Winter access to avoid site disturbance. The road intersects the northern boundary of 2H and continues to Block 2I.
Harvesting Season: Winter due to wet spots on access
Harvest System: Natural Shelterwood (over-storey removal) – retention of all deciduous, and all non-merchantable (< 16 cm dbh) conifer stems.
Special Concerns: A raptor nest (goshawk) was located within the block boundary. Inspection by a biologist confirmed the nest type. It is located in the lower crown of a dead aspen. The nest was falling apart, an indication that it had not been used in several years. The aspen tree has loose bark, a sign it has been dead for several years and will likely not stand for many more. Because of the tree condition and lack of canopy cover for the nest, the nest is not likely to be used again by goshawks. The nesting area is located in a small patch of aspen and young spruce. This patch is reserved from harvest.
Understorey: Variable with 1,400 to 5,000 sph primarily in advanced regeneration and regeneration category.

Block 2I
Ecology: V11 vegetation type on even, level terrain. Moderately well drained fine soils with 10 cm OM on a fresh site.
Boundary: Boundary follows spruce timber type. Formerly Block I and J of RR.
Access: Via the spur road from the Auriol Branch Road though Block 2H.
Harvesting Season: Winter due to wet spots on access.
Harvest System: Natural Shelterwood (over-storey removal) – retention of all deciduous, and all non-merchantable (< 16 cm dbh) conifer stems.
Special Concerns: None.
Understorey: Patchy from 2,000 to 5,000 sph primarily in advance regeneration and regeneration category.

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 along road corridors has been incorporated into the proposed block development 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.

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

BLOCK	NET AREA	GROSS VOL/HA	NET VOL/HA	MEAN DIA	MEAN HT	NET RW	NET FW	GROSS VOL	BEETLE % ATT'K	BEETLE % DEAD
3A	3.4	180.9	119.1	19.9	13.3	404.9	210.1	615.1	94%	59%
3B	27.5	186.2	109.7	17.9	12.3	3,016.8	2,103.8	5,120.5	95%	54%
3D	7.1	215.6	154.5	23.7	13.7	1,097.0	433.8	1,530.8	85%	63%
3E	9.0	153.5	104.8	21.6	13.0	943.2	438.3	1,381.5	83%	42%
3F	4.5	251.4	211.5	25.7	15.6	951.8	179.6	1,131.3	97%	70%
3G	8.4	199.6	155.3	22.6	15.2	1,304.5	372.1	1,676.6	100%	53%
3H	8.8	205.2	169.9	25.9	15.6	1,495.1	310.6	1,805.8	95%	37%
MEAN	9.8	198.9	146.4	22.5	14.1				93%	54%
TOTAL	68.7					9,213	4,048	13,262		

This OU was reviewed during an Environmental Assessment earlier in 2005. The development of this OU remains the same as was proposed; with the exception that Block 3F has been reduced in size by 1.5 hectares to ensure the 200 m wildlife corridor remains intact.

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 the road corridors has been incorporated into the proposed block development, and will provide an easily accessible firewood source for the local 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.

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

BLOCK	NET AREA	GROSS VOL/HA	NET VOL/HA	MEAN DIA	MEAN HT	NET RW	NET FW	GROSS VOL	BEETLE % ATT'K	BEETLE % DEAD
4A	18.4	293.5	202.7	21.6	13.9	3,729.7	1,670.7	5,400.4	100%	52%
4B	92.9	204.3	138.4	22.1	14.7	12,857.4	6,122.1	18,979.5	100%	70%
4C	43.7	163.1	111.9	23.3	13.9	4,890.0	2,237.4	7,127.5	100%	54%
4D	33.1	266.2	181.4	22.4	14.6	6,004.3	2,806.9	8,811.2	100%	46%
4N	17.1	295.5	175.0	23.1	14.8	2,992.5	2,060.6	5,053.1	100%	55%
4P	62.7	201.6	153.6	27.2	15.7	9,630.7	3,009.6	12,640.3	100%	68%
MEAN	44.7	237.4	160.5	23.3	14.6				100%	58%
TOTAL	267.9					40,105	17,907	58,012		

Block 4A

Ecology: V17 vegetation type on even, level terrain. Moderately well drained fine soils with 8 cm OM on a fresh site.
Boundary: Boundary follows spruce timber type. Formerly Block A of RR.
Access: Via a spur road off the Quill Creek East Branch.
Harvesting Season: Dry summer or winter
Harvest System: Natural Shelterwood (over-storey removal) – retention of all deciduous, and all non-merchantable (< 16 cm dbh) conifer stems.
Special Concerns: Southern portion of Block within the "green hatched" SFMP classification; therefore, variable retention harvesting system will be required for harvesting in this zone. The southern block boundary is 300+ m from the Class 3 wetland.
Understorey: Uniform from 2,000 to 4,000 sph in all 3 categories.

Block 4B
Ecology: V11 vegetation type on rolling terrain. Moderately well drained fine soils with 8 - 15 cm OM on a fresh site.
Boundary: Boundary follows spruce timber type. Formerly Block B of RR. Internal patches of aspen and brush, which will be avoided during harvest.
Access: Via spur roads off the Quill Creek East and Quill Creek Branch roads.
Harvesting Season: Dry summer or winter
Harvest System: Natural Shelterwood (over-storey removal) – retention of all deciduous, and all non-merchantable (< 16 cm dbh) conifer stems.
Special Concerns: A raptor nest (goshawk) was found in the SE corner of the proposed block. The nest is located in the lower part of the crown of a live aspen. Inspection confirmed the identity and indications are that this nest is in good shape and has the capacity to be re-used, although there were no signs the nest had been used recently. The block boundary was adjusted to provide a 200 m forested buffer around the nest.
A Class 2 wetland to the north has a 60 m riparian reserve and a 40 m riparian management zone have been established. There is localized heart-rot and broom rust throughout the stand. Regeneration also shows signs of broom rust.
Understorey: Patchy from 1,000 to 4,000 sph in all 3 categories.

Block 4C
Ecology: V11 vegetation type on even, level terrain. Moderately well drained sandy soils with 8 cm OM on a mesic site.
Boundary: Boundary joins several spruce stands divided by aspen and brush patches. Formerly Blocks C, D, E, H, and I of RR.
Access: Quill Creek Branch is the eastern block boundary. One spur required to access western portion of block.
Harvesting Season: Dry summer or winter
Harvest System: Natural Shelterwood (over-storey removal) – retention of all deciduous, and all non-merchantable (< 16 cm dbh) conifer stems.
Special Concerns: Class 1 wetland to the south of the block has a 60 m riparian management zone. A riparian reserve zone is not required.
Understorey: Uniform from 800 to 2,000 sph in primarily in advanced regeneration and regeneration categories.

Block 4D
Ecology: V11 vegetation type on rolling terrain. Well drained loamy soils with 12 cm OM on a mesic site.
Boundary: Boundary joins several spruce stands divided by aspen and brush patches. Formerly Blocks F, J, and K of RR.
Access: Quill Creek Branch Road runs through the center of block with a spur required to access SW corner.
Harvesting Season: Dry summer or winter
Harvest System: Natural Shelterwood (over-storey removal) – retention of all deciduous, and all non-merchantable (< 16 cm dbh) conifer stems.
Special Concerns: Northern tip of block in "green hatched" SFMP classification; therefore a variable retention harvesting system will be required.
Understorey: Patchy from 1,000 to 5,000 sph in all 3 categories.

Block 4N
Ecology: V17 vegetation type soils on even, level terrain. Moderately drained fine soils with 12 cm OM on a fresh site.
Boundary: Boundary follows the spruce timber type. Formerly Blocks N and O of RR.
Access: Quill Creek Branch runs through the center of block to termination.
Harvesting Season: Dry summer or winter
Harvest System: Variable Retention due to classification.
Special Concerns: Entire block in "green hatched" SFMP classification. A Class 1 Lake with adjacent Class 3 wetland to the south of the block has a 60 m riparian reserve and a 40 m riparian management zone.
Understorey: Patchy from 2,500 to 8,000 sph primarily in advanced regeneration and regeneration categories.

Block 4P
Ecology: V17 vegetation type on even, level terrain. Well drained medium textured soils with 11 cm OM on a fresh site.
Boundary: Boundary follows spruce timber. Small patches of aspen spread throughout. Formerly Block P of RR.
Access: Quill Creek East Road uses existing trail to access center of block with spur roads required to access east and west sides of block.
Harvesting Season: Dry summer or winter
Harvest System: Natural Shelterwood (over-storey removal) – retention of all deciduous, and all non-merchantable (< 16 cm dbh) conifer stems.
Special Concerns: None.
Understorey: Patchy from 600 to 4,000 sph primarily in advanced regeneration and regeneration categories.

Fuelwood
Point source fuelwood permits for personal and community use are not advised for this operating unit. Access roads do not provide access to additional standing dead timber.

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 an existing gravel pit just south of Quill Creek which follows an existing quad trail. 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.

South of the OU, a spur road is required to access block 6O.

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

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

BLOCK	NET AREA	GROSS VOL/HA	NET VOL/HA	MEAN DIA	MEAN HT	NET RW	NET FW	GROSS VOL	BEETLE % ATT'K	BEETLE % DEAD
6A	22.7	151.9	117.6	24.6	13.7	2,669.5	778.6	3,448.1	96%	80%
6B	7.9	193.2	148.5	27.5	16.1	1,173.2	353.1	1,526.3	100%	80%
6C	8.3	290.3	184.9	22	15	1,534.7	874.8	2,409.5	97%	60%
6F	9.7	173.9	150.2	28.2	16.9	1,456.9	229.9	1,686.8	100%	75%
6G	28.0	164.2	148.8	27.8	14.5	4,166.4	431.2	4,597.6	100%	66%
6J	29.0	317.8	271.1	25.3	16.8	7,861.9	1,354.3	9,216.2	100%	76%
6M	8.6	204.8	177.0	26.7	16.5	1,522.2	239.1	1,761.3	100%	80%
6N	37.4	250.1	201.9	27.6	16.8	7,551.1	1,802.7	9,353.7	100%	76%
6O	46.8	172.7	132.1	26.2	15.0	6,182.3	1,900.1	8,082.4	98%	69%
MEAN	22.0	213.2	170.2	26.2	15.7				99%	74%
TOTAL	198.4					34,118	7,964	42,082		

Blocks 6A, 6B and 6C
Ecology: V11 vegetation type on even, rolling terrain. Moderately drained fine textured soils with 7-12 cm OM on a fresh site.
Boundary: Boundaries follow higher volume spruce timber type, located on drier ground. aspen throughout blocks. Formerly Blocks A, B and south section of C of RR.
Access: From proposed Central Branch Road off Haines Highway. Alternately access may come from Crescent Branch, south into Block C.
Harvesting Season: Winter
Harvest System: Natural Shelterwood (over-storey removal) – retention of all deciduous, and all non-merchantable (< 16 cm dbh) conifer stems.
Special Concerns: Blocks are surrounded with pockets of wet ground and NCD. Winter harvesting is recommended.
Understorey: Variable from 600 to 7,000 sph primarily in advanced regeneration and regeneration categories. Disturbance is likely to promote aspen regeneration from root suckers.

Block 6F
Ecology: V17 vegetation type on even, rolling terrain. Well drained sandy textured soils with 8 cm OM on a fresh site.
Boundary: Boundaries follow higher volume spruce timber type. Aspen throughout block. Formerly Blocks E and F of RR.
Access: From Crescent Branch to Crescent Branch North through block. Right spur road travels to SE portion of block 6G.
Harvesting Season: Dry summer or winter
Harvest System: Natural Shelterwood (over-storey removal) – retention of all deciduous, and all non-merchantable (< 16 cm dbh) conifer stems.
Special Concerns: None.
Understorey: Variable from 1,000 to 2,500 sph in all 3 categories. Disturbance is likely to promote aspen regeneration from root suckers.

Block 6G
Ecology: V17 vegetation type on even, rolling terrain. Well drained sandy textured soils with 8 cm OM on a fresh site.
Boundary: Boundaries follow higher volume spruce timber type. Aspen throughout block. . Formerly blocks G, H and I of RR.
Access: Crescent Branch North travels through block. Spur road from Block 6F accesses SE corner and small spur required to access SW corner.
Harvesting Season: Dry summer or winter
Harvest System: Natural Shelterwood (over-storey removal) – retention of all deciduous, and all non-merchantable (< 16 cm dbh) conifer stems.
Special Concerns: None.
Understorey: Patchy from 200 to 2,000 sph mostly in the regeneration category. Disturbance is likely to promote aspen regeneration from root suckers. Due to patchy understorey, the block is a potential candidate for site preparation treatments (scarification to promote natural regeneration and aspen suckering), and/or fill planting.

Block 6J
Ecology: V11 vegetation type on even, rolling terrain. Moderately drained fine textured soils with 10 - 13 cm OM on a fresh site.
Boundary: Boundaries follow higher volume spruce timber type. Aspen throughout blocks, with two internal aspen patches. Formerly Blocks J and K of RR.
Access: Crescent Branch North travels through block. Two spurs required to access SW and NW corners of the block.
Harvesting Season: Dry summer or winter
Harvest System: Natural Shelterwood (over-storey removal) – retention of all deciduous, and all non-merchantable (< 16 cm dbh) conifer stems.
Special Concerns: None.
Understorey: Variable from 2,000 to 12,000 sph in all 3 categories, large numbers of regeneration. Disturbance is likely to promote aspen regeneration from root suckers.

Block 6M
Ecology: V11 vegetation type on even, rolling terrain. Well drained sandy textured soils with 6 - 10 cm OM on a fresh site.
Boundary: Boundaries follow higher volume spruce timber type. Aspen throughout block. Formerly Block M of RR.
Access: Crescent Branch North bisects block to termination.
Harvesting Season: Dry summer or winter
Harvest System: Natural Shelterwood (over-storey removal) – retention of all deciduous, and all non-merchantable (< 16 cm dbh) conifer stems.
Special Concerns: Northern tip of block extends into SFMP "green hatched" classification; therefore, a variable retention harvesting system will be required for this area. Block boundary 450 m south of Quill Creek.
Understorey: Variable from 2,000 to 12,000 sph in all 3 categories, large numbers of regeneration. Disturbance is likely to promote aspen regeneration from root suckers.

Block 6N
Ecology: V11 vegetation type on even, rolling terrain. Moderately drained fine textured soils with 8 - 10 cm OM on a mesic to dry site.
Boundary: Boundaries follow higher volume spruce timber type. Aspen throughout block. Formerly Block N of RR.
Access: Crescent Branch enters block and turns south to bisect south half before continuing through to OU #7. Spur road required to access north half of block. Crescent Branch crosses a NCD on west side of block. A crossing structure is required for summer access. Otherwise, access restricted to winter.
Harvesting Season: Winter due to required wetland crossing.
Harvest System: Natural Shelterwood (over-storey removal) – retention of all deciduous, and all non-merchantable (< 16 cm dbh) conifer stems.
Special Concerns: A Class 3 wetland is located running parallel to the west boundary of this block, outside of a 60 m riparian reserve zone. A 140 m riparian management zone has been established.
Understorey: Patchy from 500 to 5,000 sph in all 3 categories. Due to patchy understorey the block is a potential candidate for site prep treatments (scarification to promote natural regeneration and aspen suckering), and/or fill planting.

Block 6O
Refer to Appendix H, OU #6S

Ecology: V17 vegetation type on rolling terrain. Moderate to poorly drained fine textured soils and 8 - 10 cm OM on a moist site.
Boundary: Boundaries follows higher volume spruce timber type. Aspen throughout block. Formerly Block O of RR.
Access: New access from the Haines Road is required.
Harvesting Season: Dry summer or winter
Harvest System: Natural Shelterwood (over-storey removal) – retention of all deciduous, and all non-merchantable (< 16 cm dbh) conifer stems.
Special Concerns: Eastern side of block falls within the SFMP "green hatched" classification; therefore a variable retention harvesting strategy system will be required in this area. No impact on other resources anticipated. 60 meter visual buffer along Haines Road.
Understorey: Variable from 2,000 to 8,000 sph in all 3 categories, large numbers of regeneration. Disturbance is likely to promote aspen regeneration from root suckers.

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. Crossing of the wetland west of block 6N limits access into this operating unit to winter only.

Final block layout in OU #7 has not been completed; i.e. boundaries have not been flagged and are shown on the map as dashed orange. Boundary location has been 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.

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

BLOCK	NET AREA	GROSS VOL/HA	NET VOL/HA	MEAN DIA	MEAN HT	NET RW	NET FW	GROSS VOL	BEETLE % ATT'K	BEETLE % DEAD
7A	10.0	247.1	180.3	23.1	15.5	1,803.0	668.0	2,471.0	100%	80%
7B	28.5	122.3	103.1	28.4	15.6	2,938.4	547.2	3,485.6	100%	84%
7H	13.5	357.2	297.3	26.5	18.0	4,013.6	808.7	4,822.2	99%	63%
7J	50.8	281.0	225.3	27.2	17.8	11,445.2	2,829.6	14,274.8	100%	64%
MEAN	25.7	251.9	201.5	26.3	16.7				100%	73%
TOTAL	102.8					20,200	4,853	25,054		

Block 7A

Ecology: V11 vegetation type on even, rolling terrain. Moderately drained medium textured soils with 8 - 10 cm OM on a moist site.
Boundary: Boundaries follow spruce timber type. Formerly Block A of RR.
Access: Crescent Branch bisects block. Two short spur roads are required to access the northern and southern portions of the block.
Harvesting Season: Winter only
Harvest System: Natural Shelterwood (over-storey removal) – retention of all deciduous, and all non-merchantable (< 16 cm dbh) conifer stems.
Special Concerns: None.
Understorey: Patchy from 500 to 6,000 sph in all 3 categories. Some dense thickets of regeneration and advanced regeneration.

Block 7B
Ecology: V11 vegetation type on even, rolling terrain. Moderately drained fine textured soils with 8 - 10 cm OM on a moist site.
Boundary: Boundaries follow higher volume spruce-aspen mixed timber type. Four internal patches of aspen within the block. Formerly Blocks B, C, and E of RR.
Access: Crescent Branch bisects block. Three spurs are required to access all the block.
Harvesting Season: Winter only
Harvest System: Natural Shelterwood (over-storey removal) – retention of all deciduous, and all non-merchantable (< 16 cm dbh) conifer stems.
Special Concerns: Eastern portion of block is within the SFMP "green hatched" classification; therefore, a variable retention harvesting system will be required.
Understorey: Patchy from 2,000 to 12,000 sph in all 3 categories.

Block 7H
Ecology: V11 and V17 vegetation type soils on rolling terrain. Moderately drained fine textured soils with 8 - 15 cm OM on a moist site.
Boundary: Boundaries follow higher volume spruce timber type. Six internal patches of aspen within the block. Formerly Blocks G, H, and I of RR.
Access: The access to this block uses Crescent Branch Road. Three spur roads are required to access block. Spur north continues into Block 7J. Two spurs south on either side of aspen patch in central portion of block.
Harvesting Season: Winter only
Harvest System: Variable Retention due to classification.
Special Concerns: Entire block is within the SFMP "green hatched" classification. Proposed eastern block boundary adjacent to the Kathleen River and a 80 m riparian reserve zone and a 120 m riparian management zone will be required. Windthrow is a concern in this area. Forest health issues are of concern as *Chrysomyxa* (broom rust) and *Armillaria* (heart rot) are evidenced along the eastern portion of the block. A few property owners have been identified and they will be consulted during the environmental assessment.
Understorey: Patchy from <200 to 6,000 sph in all 3 categories. Advanced regeneration has mistletoe infection and there is dense regeneration.

Block 7J
General: Good quality stands, good piece size with moderate mortality.
Ecology: V11 vegetation type on rolling terrain. Moderately drained medium textured soils with 8 cm OM on a mesic site.
Boundary: Boundaries follow spruce timber type. Formerly Block J of RR.
Access: Spur north from Crescent Branch Road to Block 7H.
Harvesting Season: Winter only.
Harvest System: Variable Retention due to classification.
Special Concerns: Block is within the SFMP "green hatched" classification.
Understorey: Variable from 2,000 to 5,000 sph in all 3 categories.

Fuelwood
Point source fuelwood permits for personal and community use are not advised for this operating unit.

QUILL CREEK HPA OPERATING UNIT SUMMARY

Table 10 provides the area, volume and beetle attack summaries for all harvest blocks proposed in the Quill Creek Bench HPA.

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

OU	NET AREA	GROSS VOL/HA	NET VOL/HA	MEAN DIA	MEAN HT	NET RW	NET FW	GROSS VOL	BEETLE % ATT'K	BEETLE % DEAD
1	195.9	138.8						27,842		
2	140.8	185.6	108.3	21.7	13.6	15,933.6	11,026.3	26,960	96%	62%
3	68.7	198.9	146.4	22.5	14.1	9,213.2	4,048.3	13,262	93%	54%
4	267.9	237.4	160.5	23.3	14.6	40,104.6	17,907.3	58,012	100%	58%
6	198.4	213.2	170.2	26.2	15.7	34,118.1	7,963.8	42,082	99%	74%
7	102.8	251.9	201.5	26.3	16.7	20,200.1	4,853.4	25,054	100%	73%
MEAN		204.3	157.4	24.0	14.9				97%	64%
TOTAL	974.5					119,567	45,799	193,210		

Table 11 shows a summary of the “footprint” on the landscape of proposed operations within the HPA, as compared to the SFMP landscape 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 landscape attributed to the HPA.

Table 11: Landscape Disturbance by SFMP Assessment Class

OU	HARV AREA (ha)	AREA BY CLASS GREEN (ha)	AREA BY CLASS HATCH (ha)	CLASS % GREEN %	CLASS % HATCH %	LANDSCAPE DISTURBANCE GREEN 4805 HA %	LANDSCAPE DISTURBANCE GR HATCH 5766 HA %	LANDSCAPE DISTURBANCE FOREST 10571 HA %
1	195.9	0.0	195.9	0.00%	100.00%	0.00%	3.40%	1.85%
2	140.8	140.8	0.0	100.00%	0.00%	2.93%	0.00%	1.33%
3	68.7	30.9	37.8	44.98%	55.02%	0.64%	0.66%	0.65%
4	267.9	238.8	29.1	89.14%	10.86%	4.97%	0.50%	2.53%
6	198.4	190.4	8.0	95.97%	4.03%	3.96%	0.14%	1.88%
7	102.8	24.5	78.3	23.83%	76.17%	0.51%	1.36%	0.97%
TOTAL	974.5	625.4	349.1			13.02%	6.05%	9.22%

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.

Access points on the Haines Road will require an access application and approval from Highways and Public Works to perform the work.

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 planning groups.

Table 12: Existing, Located and Proposed access requirements.

OU	ROADS/TRAILS (km)					TOTAL	OPERATING
	Existing*	Located**		Proposed***		New Located & Proposed	UNIT TOTAL
		on existing	new	inter-block	on-block		
1	2.6			1.8	5.7	7.5	10.1
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		3.1	0.0	3.2	6.3	7.8
TOTALS	**33.0**	**9.9**	**12.0**	**2.3**	**28.0**	**42.3**	**75.3**
AREA(ha)	16.5	5.0	6.0	1.2	14.0	21.2	37.7

*Existing - amount of road and trails currently in operating units.

**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 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 regeneration surveys performed by Forest Management Branch over the next 15 years.

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 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)

Down the Road , Yukon Fish and Wildlife Management Board (2003)

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