

Public Forest Land

Operational Plan

#333914 and #564310

Valley, PEI

(31.6 ha + 10.2 ha = 41.8 ha total)

Prepared by:

the Macphail Woods Ecological Forestry Project



PROPERTY DESCRIPTION

These two properties share a very complicated border, resulting from past gravel exploration and extraction. Together, they form a long, narrow block of woodland that runs from the Selkirk Road eastward along the Klondyke Road. As with other public lands that border each other, it makes sense to manage the two properties under one operational plan. Like most of Prince Edward Island's forest, this is a patchwork of stand types with a mixture of origins. There are unploughed areas and forests growing on old fields. The gravel extraction makes it challenging for restoration, as much of the topsoil was moved and the resulting digs are so damaged that they are actually back in the lichen stage, building soil by catching dust and depositing organic matter. While the lichens are beautiful and very interesting, the area demonstrates once more that ecological damage takes a long time to heal. Approximately 3 ha of the property are in a stage dominated by lichens, with very little other growth. The soil is obviously lacking in organic matter and nitrogen.

Much of the property, especially towards the western end, was cut over in the 1970's when Islanders were allowed to cut firewood on public forest land in response to the oil crisis. The regeneration has been mixed, with some areas developing high quality yellow birch and sugar maple while others are dominated by poor quality, early succesional species such as pin cherry and trembling aspen. Unploughed woodland towards the eastern end of the property contains large hemlock and white pine that is regenerating very well, while an area towards the northeast boundary is full of mixed hardwoods. Some sections of these properties have reverted into low-value balsam fir and several areas are dominated by this species, coming in either after a clearcut or when some of the overstory started to die from natural causes..

There is an excellent riparian area running off the Klondyke Road and across the woodland. The banks are predominantly blanketed conifers, which appears to be a result of the work of beavers over a long period of time. Two old dams are still visible and gnawed hardwood stumps remain up to 50m above the stream. are still quite visible in sections. The most likely scenario is that the beavers built the dam, removed the hardwoods and the existing conifer understory took advantage of the increased sunlight. This has obviously been going on for a long time and will likely continue if hardwoods once again begin to dominate the stream banks. A dry streambank that runs in the spring joins this riparian zone and two other dry streambanks along the roadway also carry water in the spring. .

While parts of this woodland are healthy and show the potential of the area, these properties clearly demonstrate the lack of regard that many people hold for Island woodlands. There is garbage all along the roadway, including several tires in a waterway. A fairly-new cabin was discovered straddling the stream, equipped with a woodstove. Trees had been cut and ground hemlock in the area had been illegally harvested. Large amounts of silt enter the waterways from the clay road, a result of poorly-maintained silt traps and was probably compounded when the road was kept open over several recent winters. Riparian zones are among the most productive habitats on Prince Edward Island for both plants and animals and much better stewardship should be displayed in these areas.

This site is part of a large, glacial deposit that runs along the Klondyke Road. Trees that blow over show roots entwined with a variety of rounded rocks, uncommon in most of Prince Edward Island. Without doing extensive soil work, it can be assumed that the soil has lots of minerals and is very well-drained. Access is poor throughout the stand, given the many gravel pits, slopes and streambeds. There is evidence of many woods roads throughout the property but these will have to be cleared and in many instances, re-located to improve efficiency.

The Klondyke Road is one of the province's designated Scenic Heritage Roads. Though the buffer zone recommendations have been largely ignored by landowners in the area, the woods along the road will be maintained and improved in support of the designation. The roadway also offers a great opportunity to add large numbers of native plants that are especially-attractive for wildlife. The edge has more sunlight over a longer period and allows greater fruiting and flowering of plants such as American mountain ash, serviceberry, highbush cranberry, beaked hazelnut, hawthorn and the elderberries.

Special notes:

The eastern half of the woodland comprises a key part of the territory of a pair of barred owls, which are regularly seen in the area. There are some excellent wildlife trees in this area and care should be taken to ensure that the stand structure is maintained. Several large wildlife trees indicate the presence of pileated woodpeckers, a bird once thought to be extirpated from the province. A northern goshawk was sited in the main riparian zone, which should be surveyed more extensively for both flora and fauna. Hobblebush, one of our rarest native shrubs, has also been found growing in this area.

Once these plantings reach 4-5m, more patches can be created until the entire component of older white spruce is removed. The young plantings of red oak and sugar maple may need pruning to create the highest quality hardwood logs and veneer trees.

Any large poplars should be girdled to create wildlife trees that are lacking throughout this area.

There is an old household dump site at the front of the property and this should be cleaned up.

The edges of the woods road throughout the length of the property are good places to add shrubs such as American mountain ash, highbush cranberry, beaked hazelnut and serviceberry to provide more food for wildlife throughout the year. Add trees such as red oak, white ash, white pine and hemlock to any larger openings and also witch hazel, hobblebush and other rare shrubs.

Stand #2 (.52 ha): A small stand north of Stand #1 that occurs on unploughed land and has large amounts of poor quality, heavily-cankered beech. It sits on the edge of one of the gravel pits and some excavations probably took place in this area as well. There are some natural openings in the area. This is one of the few areas in the woodland where beech drops were found. These are parasitic plants that do not produce chlorophyll. Instead, they absorb nutrients from the roots of the nearby beech trees.

Origin: unploughed

Approximate age: 60

Main trees in canopy: beech (40%), white spruce (20%), white birch (20%) and trembling aspen (10%)

Height of canopy: 15.5m

Diameter: 20.3cm

Volume: this will be added before any harvest

Quality: trees are mostly of poor quality

Other tree species: red maple, sugar maple, striped maple, balsam fir, yellow birch

Plants: European mountain ash, beaked hazelnut, wild raisin, bayberry, raspberry, blueberry, goldenrod, hawkweed, veronica, starflower, wild lily of the valley, wood sedge, bracken fern, wood fern, Indian pipe, beech drops

Regeneration: some dense patches of young white spruce and balsam fir, with beech, red maple and striped maple

Coarse woody debris: there is a medium amount of rotted wood present throughout

Wildlife trees: there is a medium amount of wildlife trees in the stand

Notes on wildlife: signs of red squirrel feeding, black-capped chickadees, robins, blue jays

Treatment: Fuelwood cuts that remove the worst of the beech will help improve the quality and diversity of the stand. This should be done at the same time as the patch cuts are being done in Stand #1 to make it more economically viable. Care should be taken to leave some of the beech areas untouched to protect the beech drops.

The stand already has a good mix of hardwoods present. Natural openings should be planted in a mix of hemlock, white pine and red spruce, along with witch hazel and hobblebush.

Stand #3 (.81 ha): The first stand along the Klondyke Road east of Stand #1, containing young mixed hardwoods. There are several pockets of high quality yellow birch and one of sugar maple. The white birch and red maple throughout the stand are of good form as are the larger trembling and large-toothed aspen. This area could have been divided up into 5-6 separate stands, but the treatments will be the same and the stand will be worked as a unit. A precommercial thinning was carried out on the stand. The stand is unploughed, but could have had some topsoil removal or bulldozing as it is close to the gravel pits. The soil is well-drained and relatively flat.

Origin: clearcut

Approximate age: 30

Main trees in canopy: red maple (40%), white birch (20%), trembling and large-toothed aspen (20%), yellow birch (10%) and sugar maple (5%)

Height of canopy: 12.2m

Diameter: 10.2cm

Volume: this will be added before any harvest

Quality: excellent young stems

Other tree species: beech, balsam fir, white birch, pin cherry

Plants: bayberry, wild raisin, red-berried elder, willow, raspberry, dwarf red raspberry, blackberry, blueberry, pyrola, bunchberry, wild lily of the valley, wood sedge, veronica, bracken fern, wood fern, lady fern, Indian pipe, beechdrops

Regeneration: poor - some white spruce, balsam fir and red maple

Coarse woody debris: little

Wildlife trees: few, except for one excellent aspen in the northeast corner of the stand

Notes on wildlife: two vireo nests and a robin nest from 2006 were observed, along with black-capped chickadees and blue jays.

Treatment: The large aspen in the northeast section should be girdled. It is starting to die and the wood is of little value, so it is better to encourage the slow breakup before it falls down. This will help both the surrounding young trees and cavity-dependant wildlife.

Pruning for structure and health will greatly improve the future value of the stand. Throughout the area, look for healthy crop trees approximately 6-8m apart. These should be pruned of lower branches and of double leaders. Favour good quality sugar maple and yellow birch, though the aspen, white birch and red maple will also have good future value.

The stand contains few conifers of value and red spruce, white pine and hemlock should be added where there is sufficient light.

Stand #4 (.67 ha): A long narrow stand of mixed woods that runs from the mounds at the edge of the gravel pits and down to the Klondyke Road between Stands #3 and #5. It is a mixed stand not only of species but of ages and heights as well. Many of the trees are multi-stemmed, especially the beech and red maple, as they are growing from stumps after a partial cut. The beech at the northern end of the stand are of especially poor quality and heavily cankered.

Origin: partial cut

Approximate age: 60, though some areas have been cut and are 30+

Main trees in canopy: white spruce (20%), balsam fir (20%), white birch (20%), red maple (20%) and beech and the aspens (10% each)

Height of canopy: 15m average, though some of the spruce are over 17m **Diameter:** 12.5cm

Volume: this will be added before any harvest

Quality: poor to medium

Other tree species: gray birch, pin cherry

Plants: willow, bayberry, raspberry, blueberry, pyrola, Canada goldenrod, wood sedge, bunchberry, wild strawberries, mouse-eared hawkweed, bracken fern, wood fern, Indian pipe

Regeneration: very little, except for some balsam fir

Coarse woody debris: small amounts scattered throughout the front but more towards the north end of the property.

Wildlife trees: lots of larger trees that are well-used throughout most of the stand.

Notes on wildlife:

Treatment: Selectively harvest some of the larger white spruce throughout the stand, choosing those that are at the end of their lifecycle. These areas can be replanted with red oak, yellow birch, sugar maple, white pine and hemlock.

An enrichment planting of yellow birch, sugar maple, white pine and hemlock will help improve the diversity and future value of the stand.

A fuelwood cut should be done to remove the worst of the cankered beech at the northern end of the stand. This area should then be planted in yellow birch, sugar maple, red spruce, white pine and hemlock, as well as American mountain ash, beaked hazelnut and witch hazel.

Girdle several of the largest trembling aspens to improve their value to cavity-nesting wildlife.

Thinning some of the multi-stemmed hardwoods will improve quality and provide fuelwood during the next intervention.

Stand #5 (2.73 ha): Another area of older mixed wood that runs through some of the mounds at the northern end of the stand out to the Klondyke Road. While the value of the trees in the stand is relatively low, there are some large white spruce and aspens that are over 42cm in diameter at breast height. There are good roads throughout the stand, especially at the northern end of the property. The mounds offer challenges for restoration.

Origin: partial cut

Approximate age: 60

Main trees in canopy: white birch (50%), white spruce (20%), trembling aspen (20%) and red maple (10%)

Height of canopy: 15.4m

Diameter: 15cm

Volume: this will be added before any harvest

Quality: poor

Other tree species: large-toothed aspen, gray birch, beech, pin cherry

Plants: willow, downy alder, bayberry, raspberry, bayberry, veronica, rough goldenrod, tall white aster, pyrola, mouse-eared hawkweed, bracken fern, wood fern, Indian pipe

Regeneration: poor, mostly balsam fir and some white spruce

Coarse woody debris: not enough at the Klondyke Road but lots of excellent CWD as you travel north in the stand.

Wildlife trees: some large trees scattered throughout the stand.

Notes on wildlife: robin nest from 2006 at back of stand along roadway, signs of woodpeckers feeding

Treatment: Selectively harvest some of the larger white spruce throughout the stand, choosing those that are at the end of their lifecycle. These areas can be replanted with red oak, yellow birch, sugar maple, white pine and hemlock.

Girdle several of the largest trembling aspens to improve their value to cavity-nesting wildlife.

Thinning some of the mult-stemmed hardwoods will improve quality and provide fuelwood during the next intervention.

An enrichment planting of yellow birch, sugar maple, white pine and hemlock will help improve the diversity and future value of the stand.

Stand #6 (3.15 ha): A young mixed wood stand running along the Klondyke Road resulting from a fuelwood cut in the 1970's. The southeastern corner of the stand has more yellow birch, which are starting to produce large amounts of seed. The northeastern corner has more large-toothed aspen and these are high-quality trees. Access is good, as there are several woods roads that could be used again with some cleaning.

Origin: clearcut

Approximate age: 30

Main trees in canopy: red maple (30%), white birch (30%), yellow birch (10%), balsam fir (10%) and trembling and large-toothed aspen (10% total)

Height of canopy: 11.9m

Diameter: 11.7cm

Volume: this will be added before any harvest

Quality: excellent quality

Other tree species: beech, white spruce, sugar maple, gray birch

Plants: bayberry, red-berried elder, wild raisin, blueberry, raspberry, Canada goldenrod, wood sedge, bedstraw, wild lily of the valley, pyrola, starflower, wild strawberry, mouse-eared hawkweed, prince's pine, bracken fern, lady fern, wood fern, shiny club moss, ground pine, Indian pipe

Regeneration: little, some balsam fir and red maple

Coarse woody debris: almost none

Wildlife trees: a few larger wildlife trees are on the edges of the stand

Notes on wildlife: there are signs of pileated woodpeckers feeding on the larger trees in the area

Treatment: Release all yellow birch and sugar maple so that they are free to grow. These trees should also be pruned to a single stem and to remove lower branches. Other crop trees throughout the stand should also be pruned to improve quality. Select the healthiest, highest-quality trees.

Underplant hemlock, red spruce and white pine throughout the stand.

Some of the balsam fir thickets should be patch cut and replanted with red oak, hemlock, red spruce and white pine. Shrubs such as beaked hazelnut, American mountain ash and serviceberry should also be added.

Stand #7 (4.4 ha): An old field site running from the Klondyke Road up to the gravel pits. It is starting to reach the end of its normal life cycle and some of the spruce are starting to die from natural causes. One older white birch measured 54cm in diameter at breast height.

Origin: old field

Approximate age: 60

Main trees in canopy: white spruce (60%), red maple (20%), white birch and balsam fir (10% each)

Height of canopy: 17.4m

Diameter: 25.2cm

Volume: this will be added before any harvest

Quality: some very large, good quality spruce

Other tree species: trembling aspen, beech, large-toothed aspen

Plants: bayberry, wild raisin, raspberry, blueberry, rough goldenrod, mouse-eared hawkweed, pyrola, wild lily of the valley, starflower, shiny club moss, running club moss, ground pine, wood sedge, wood fern, bracken fern, Indian pipe

Regeneration: little, mostly balsam fir with some red maple

Coarse woody debris: little

Wildlife trees: some large ones scattered throughout

Notes on wildlife: signs of woodpeckers feeding on a red maple snag. Two red squirrels sighted.

Treatment: Create 4-5 patch cuts per hectare of approximately 18m in diameter throughout this area. Replant with red oak, sugar maple, yellow birch, white ash, white pine, hemlock, beaked hazelnut, serviceberry and American mountain ash.

Stand #8 (1.03 ha): A very disturbed site that has had a lot of gravel removed and soil pushed up into piles. No remediation to fix the damage has taken place and it has reverted to an extremely early successional stage dominated by lichens. For the most part, these gravel pits are unproductive - their capacity to grow trees, feed wildlife, store carbon or generate wealth has been greatly reduced. Stands #8 and #11 are actually a series of small openings dominated by lichens, small patches of short (though probably quite old) trees, and larger trees around the edges growing along the mounds of soil.

Origin: bulldozing

Approximate age: 50

Open areas (about 40% of the stand): a wide range of lichens and mosses dominates these areas, which are connected through the stand. There are also bayberry, blueberry and potentilla in the area. Growth is exceedingly slow, due to the obvious lack of organic matter and nitrogen. There is no volume in these areas at all.

Shrubby areas (about 30% of the stand): gray birch and white spruce are the most common trees, growing up to 4.6m tall and 8.1cm in diameter. White birch, speckled alder and bayberry are also growing and all woody plants are heavily covered with lichens. A few young balsam fir are regenerating on the site. There is no volume of commercial trees at all in these areas.

Trees surrounding these areas (about 30% of the stand): white spruce dominates the surrounding strips of woodland, accounting for 80% of the trees. Other trees present include gray birch, white birch, red maple, trembling aspen and balsam fir. Average height is 12.6m and average dbh is 10.4cm. The wood is of poor quality and there is little regeneration other than some small balsam fir. There is little coarse woody debris and few wildlife trees. Diversity is low in these strips, with bayberry, blueberry and running club moss growing through a mossy forest floor.

Volume: this will be added before any harvest

Notes on wildlife: owl pellets were found in one of the pits

Treatment: These areas are quite fragile and should be treated carefully. Work on soil restoration will be necessary before any plantings. Compost and woodland soil should be added to the immediate planting sites. Species should include red oak, white birch, white spruce, white pine, wild rose, red-berried elder, hawthorn, American mountain ash and serviceberry. Plant the holes as time and resources permit.

Create 2-3 patches per hectare, enlarging natural holes wherever possible, and plant with red oak, yellow birch, white pine and hemlock. Shrubs such as American mountain ash, red-berried elder and serviceberry should be added.

Stand #9 (.56 ha): A very low quality stand, dominated by pin cherry and trembling aspen, resulting from a recent clearcut. Unfortunately, the few larger trees left on site are of poor form and some of the white birch are already starting to blow down. The harvesting has left the site much more difficult to restore. The area is well-drained and has a mix of early successional species of both trees and shrubs.

Origin: clearcut

Approximate age: 6

Main trees in canopy: pin cherry and trembling aspen

Height of canopy: 4.2m

Diameter: 2cm

Volume: almost nothing of value

Quality: poor

Other tree species: white spruce, gray birch, white birch and balsam fir

Plants: red-berried elder, bayberry, willow, beaked hazelnut, blueberry, raspberry, blackberry, fireweed, pyrola, rough goldenrod, narrow-leaved goldenrod, tall white aster

Regeneration: some younger balsam fir

Coarse woody debris: lots left on the ground, including some large diameter white spruce.

These will take years to rot.

Wildlife trees: low

Notes on wildlife:

Treatment: This stand would benefit greatly from the creation of narrow strips with a spacing saw and planting these with red oak, yellow birch and white pine, though it is such a mess that working conditions will be difficult.

Stand #10 (1.39 ha): An old field white spruce site that borders a gravel pit. It previously had been mapped as a single block with Stand #9 before that area was clearcut. There is some value in the trees but access and working conditions will be difficult as there are many large mounds of what appears to be soil from the gravel pits. Some areas are already starting to break up. A good road running about 20m south of the property border could be cleared to provide access to some of the stand. There is an old dump along this road. Diversity throughout the stand is very low.

Origin: old field

Approximate age: 50-60

Main trees in canopy: white spruce

Height of canopy: 14.6m

Diameter: 17.5 cm

Volume: this will be added before any harvest

Quality: medium

Other tree species: white birch, gray birch, red maple, trembling aspen

Plants: bayberry, willow, downy alder, blueberry, mouse-eared hawkweed, veronica, narrow-leaved goldenrod, pyrola, wood fern, bracken fern, ladyfern

Regeneration: poor, mostly balsam fir with a little white spruce

Coarse woody debris: little

Wildlife trees: few

Notes on wildlife:

Treatment: Cutting only the white spruce, create 4-5 patches per hectare spaced through the stand and replant with red oak, yellow birch, white pine and hemlock. This might be a good choice for experimenting with direct seeding of red oak acorns and, after scarifying the soil, yellow birch seed. Shrubs such as American mountain ash, highbush cranberry and red-berried elder should also be added.

Stand #11 (2.01 ha): Another very disturbed site that has had a lot of gravel removed and soil pushed up into piles. No remediation to fix the damage has taken place and it has reverted to an extremely early successional stage dominated by lichens. For the most part, these gravel pits are unproductive - their capacity to grow trees, feed wildlife, store carbon or generate wealth has been greatly reduced. Stands #8 and #11 are actually a series of small openings dominated by lichens, small patches of short (though probably quite old) trees, and larger trees around the edges growing along the mounds of soil.

Origin: bulldozing

Approximate age: 50

Open areas (about 40% of the stand): a wide range of lichens and mosses dominates these areas, which are connected through the stand. There are also bayberry, blueberry and potentilla in the area. Growth is exceedingly slow, due to the obvious lack of organic matter and nitrogen. There is no volume in these areas at all.

Shrubby areas (about 30% of the stand): gray birch and white spruce are the most common trees, growing up to 4.6m tall and 8.1cm in diameter. White birch, speckled alder and bayberry are also growing and all woody plants are heavily covered with lichens. A few young balsam fir are regenerating on the site. There is no volume of commercial trees at all in these areas.

Trees surrounding these areas (about 30% of the stand): white spruce dominates the surrounding strips of woodland, accounting for 80% of the trees. Other trees present include gray birch, white birch, red maple, trembling aspen and balsam fir. Average height is 12.6m and average dbh is 10.4cm. The wood is of poor quality and there is little regeneration other than some small balsam fir. There is little coarse woody debris and few wildlife trees. Diversity is low in these strips, with bayberry, blueberry and running club moss growing through a mossy forest floor.

Volume: this will be added before any harvest

Notes on wildlife:

Treatment: These areas are quite fragile and should be treated carefully. Work on soil restoration will be necessary before any plantings. Compost and woodland soil should be added to the immediate planting sites. Species should include red oak, white birch, white spruce, white pine, wild rose, red-berried elder, hawthorn, American mountain ash and serviceberry. Plant the holes as time and resources permit.

Create 2-3 patches per hectare, enlarging natural holes wherever possible, and plant with red oak, yellow birch, white pine and hemlock. Shrubs such as American mountain ash, red-berried elder and serviceberry should be added.

Stand #12 (1.39 ha): A very low quality stand, dominated by balsam fir, resulting from a clearcut. Diversity is low and there is little value in the stand at present. These areas of almost pure balsam fir tend towards insect and disease problems and early intervention will greatly improve the future makeup of the stand. In some areas where trees are dying there is a large amount of young balsam fir regenerating and care should be taken to prevent more of this from

happening. Access good to this area, with older woods roads running through that need some cleaning.

Origin: clearcut

Approximate age: 35

Main trees in canopy: balsam fir (80%) and white spruce (10%)

Height of canopy: 12.4m **Diameter:** 12.3cm

Volume: this will be added before any harvest

Quality: low

Other tree species: trembling aspen, beech, white birch, red maple, striped maple and sugar maple

Plants: bayberry, willow, speckled alder, blueberry, veronica, wild lily of the valley, starflower, wood fern, bracken fern, Indian pipe

Regeneration: little, but there are some dense patches of young balsam fir

Coarse woody debris: little

Wildlife trees: there are a couple of excellent large wildlife trees

Notes on wildlife: a flock of white-winged crossbills flew in the canopy. Black-capped chickadees and a red squirrel were also sighted. There is an old robin nest along the roadway.

Treatment: Strip cuts should be made in this area with the idea of eventually changing it from a fir-dominated stand to a mixed wood stand. Make the strips 14m wide and cut every third strip. Plant with red oak, yellow birch, sugar maple, white pine and hemlock. Add shrubs such as witch hazel, red-berried elder, American mountain ash and highbush cranberry. Future cuts should be carried out in 10-15 years and red spruce can be added to these cuts once there will be less pressure from the spruce budworm.

Stand #13(3.5 ha): A large stand running along the Klondyke Road and almost to the northern boundary of the property. There are more tolerant hardwoods in the northern section and more balsam fir and red maple in the areas closer to the road. It is a result of a fuelwood cut done in the 1970's. There is a lot of eastern dwarf mistletoe on the balsam fir.

Origin: unploughed land, clearcut

Approximate age: 30+

Main trees in canopy: red maple (50%), balsam fir (30%) and white birch (20%)

Height of canopy: 11.2m **Diameter:** 10.8cm

Volume: this will be added before any harvest

Quality: medium

Other tree species: white spruce, beech, gray birch, yellow birch, sugar maple, pin cherry, trembling aspen, striped maple

Plants: European mountain ash, ground hemlock, wild raisin, beaked hazelnut, blueberry, raspberry, starflower, bunchberry, wild lily of the valley, veronica, mouse-eared hawkweed, wood sedge, asters, narrow-leaf sedge, prince's pine, shiny club moss, bracken fern, lady fern, wood fern, Indian pipe

Regeneration: very little. There are some patches of young balsam fir and small amounts of beech, red maple and striped maple

Coarse woody debris: little

Wildlife trees: scattered throughout

Notes on wildlife: black-capped chickadees, golden-crowned kinglets and blue jays

Treatment: Sugar maple and yellow birch should be released and pruned where necessary to create single stems and remove lower branches. Other crop trees should be pruned and released throughout the stand, favouring red maple and white birch.

Enrichment planting throughout that stand will improve the diversity and future value of the stand. Red spruce, white pine, hemlock, yellow birch, red oak, white ash and sugar maple could be added, along with American mountain ash, highbush cranberry and witch hazel.

Stand #14 (2.48 ha): A small stand of mixed wood running along the northern boundary of the property. This stand includes some of the tallest trees on the site. Natural disturbances such as bark beetle and wind storms have started to cause some of these trees to blow down. This is another important area for wildlife.

Origin: partial cut

Approximate age: 100+

Main trees in canopy: white spruce (50%), red maple (30%) and white birch (20%)

Height of canopy: 21.8m

Diameter: 31.7cm

Volume: this will be added before any harvest

Quality: good, with some excellent white and red spruce

Other tree species: sugar maple, beech, balsam fir, striped maple and red spruce

Plants: ground hemlock, wild raisin, raspberry, common lady's slipper, bluebead lily, wild lily of the valley, bunchberry, starflower, ground pine, shiny club moss, wood fern, bracken fern, lady fern, Indian pipe

Regeneration: little, mostly balsam fir, with some striped maple, red maple, white spruce, beech and sugar maple

Coarse woody debris: lots, one of the best areas on the property

Wildlife trees: medium, some of the large trees are starting to die and this will improve the area for cavity-nesting birds

Notes on wildlife: signs of pileated woodpeckers feeding in the area, along with other woodpecker feeding and nesting signs. Golden-crowned kinglets, black-capped chickadees, hairy woodpecker, and barred owl sighted. Skunk rooting in area.

Treatment: Selectively harvest some of the larger white spruce as it is starting to die. Individual tree selection should create patches large enough to plant a variety of species including white pine, hemlock, sugar maple, yellow birch, witch hazel, beaked hazelnut and hobblebush.

Care should be taken to discourage heavy balsam fir regeneration, even if it means hand-pulling or cutting it out with a brush saw.

Stand #15 (2.66 ha): An older mixed-wood stand to the west of the riparian zone. This rolling area is unploughed and though access will be a challenge, contains product that could be harvested as part of an overall enhancement program. Removal of poor quality wood to create high-quality products can be followed up with enrichment plantings. One yellow birch measured 46.6cm in diameter at breast height. A small area of young hardwoods has regenerated after a fuelwood cut and has been precommercially thinned. This stand should provide excellent value in the future, as it contains high quality yellow birch.

Origin: partial cut

Approximate age: 120+

Main trees in canopy: red maple (60%), sugar maple (20%), yellow birch (10%) and balsam fir (10%)

Height of canopy: 21.6m

Diameter: 24cm

Volume: this will be added before any harvest

Quality: medium

Other tree species: white spruce, hemlock, beech, white birch, striped maple

Plants: red-berried elder, wild raisin, beaked hazelnut, mountain maple, veronica, starflower, wild lily of the valley, bunchberry, bluebead lily, common lady's slipper, ground pine, shiny club moss, running club moss, bracken fern, wood fern, lady fern, Indian pipe

Regeneration: too much balsam fir, especially along the northern boundary. There are smaller amounts of beech, red maple, striped maple and white pine

Coarse woody debris: lots of debris of all sizes

Wildlife trees: large amounts

Notes on wildlife: blue jays, black-capped chickadees, barred owl, crows and red squirrel sighted. Old downy woodpecker nest in area and snowshoe hare browse visible.

Treatment: Selectively harvest red maple and yellow birch for product. If there is not enough regeneration of yellow birch, sugar maple, white pine, red spruce and/or hemlock in the area, these can be added.

The area that has been thinned should have the crop trees pruned to a single stem, removing the lower branches. Red spruce and hemlock should also be added to the site wherever the openings are large enough.

Stand #16 (3.55 ha): This stand includes both sides of a stream running off the Klondyke Road. The riparian zone has extensively used by beavers in the past, though there is no sign of activity at present. It is a very important area for wildlife and contains a large number of older hemlock and white pine up to 72cm in diameter at breast height. Much of the ground hemlock in the area has been illegally harvested.

Origin: partial cut

Approximate age: 200+

Main trees in canopy: balsam fir (30%), hemlock (20%), white spruce (20%) and white pine (10%) and red maple (10%)

Height of canopy: 21.6m

Diameter: 48cm

Volume: this will be added before any harvest

Quality: high quality

Other tree species: yellow birch, beech, striped maple

Plants: ground hemlock, serviceberry, beaked hazelnut, willow, American mountain ash, wild raisin, cranberry, veronica, bluebead lily, small white violet, mouse-eared hawkweed, vetch, curly dock, marsh bedstraw, turtlehead, wild strawberry, liverwort, duckweed, cattail, bullrush, bunchberry, cress, jewelweed, coltsfoot, Canada mint, narrow-leaf goldenrod, buttercup, bunchberry, wood sorrel, goldthread, mitrewort, twinflower, starflower, heal-all, wild lily of the valley, wood fern, bracken fern, lady fern, running club moss, shiny club moss, ground pine, Indian pipe

Regeneration: mostly balsam fir, but with good numbers of hemlock, white pine, red maple, striped maple and beech

Coarse woody debris: good

Wildlife trees: excellent, some of the best on the property

Notes on wildlife: a barred owl is regularly sighted in the area and an adult bald eagle and a northern goshawk use trees along the edge as perches. Golden crowned kinglets, black-capped and boreal chickadees, blue jays, hairy and downy woodpeckers are also present.

Treatment: This area should be left to continue to produce high-quality wildlife habitat that is becoming less and less common in the province. It will be well worth the effort to ensure that it develops into a white pine-hemlock-red spruce area with associated hardwoods rather than having increasing amounts of balsam fir. In areas with heavy fir regeneration, pulling the young plants to free up the other conifers would be worth the effort.

Rare shrubs such as witch hazel and hobblebush and a variety of wildflowers could be added to the site as resources permit, to improve the floristic diversity.

Stand #17 (.91 ha): An older, mixed wood stand along the northern border of the property along a seasonal stream. Some of the balsam fir and white spruce have reached the end of their life cycle and are starting to blow over. It is quite open and the trees have good height, but there are areas thick with balsam fir regeneration. The older hemlock and white pine, and the accompanying regeneration, hold great promise for the future of this stand. At present, it is an excellent stand for wildlife.

Origin: partial cut

Approximate age: 120+

Main trees in canopy: red maple (50%), balsam fir (20%), hemlock (20%)

Height of canopy: 23.5m

Diameter: 21.5cm

Volume: this will be added before any harvest

Quality: medium

Other tree species: sugar maple, white spruce, white birch, yellow birch, trembling aspen, and striped maple

Plants: mountain maple, beaked hazelnut, wild raisin, ground hemlock, American fly honeysuckle, single European buckthorn seedling, raspberry, blueberry, veronica, common lady's

slipper, pyrola, wild strawberry, wood sedge, mouse-eared hawkweed, agrimony, heal-all, tall white aster, goldthread, starflower, wild lily of the valley, bunchberry, running club moss, shiny club moss, ground pine, bracken fern, lady fern, wood fern, Indian pipe

Regeneration: lots, especially along the stream. A mix of sugar maple, balsam fir, red maple, striped maple and beech

Coarse woody debris: large amounts and much of it is well-rotted

Wildlife trees: large amount high-quality wildlife trees throughout the stand

Notes on wildlife: black-capped chickadees, barred owl calling, lots of signs of woodpeckers feeding, snowshoe hare browse.

Treatment: Selectively harvest some of the poorer quality red maple and hemlock to improve the overall stand and provide material for high-value products. These gaps can be planted with yellow birch and red spruce to improve future value and diversity.

Plant the area along the seasonal streambed and any other appropriate openings throughout the stand with a mix of red spruce, hemlock, white pine, yellow birch, witch hazel, hobblebush and American mountain ash.

Stand # 18 (2.24 ha): A mixed wood stand from to the east of the riparian zone, sloping gently at first from the Klondyke Road and then becoming steeper. This stand shows a history of gravel excavation in scattered dugouts. The stand is starting to break up, but it contains an interesting mix of plants (including the rare hobblebush) with good height on the trees. There are quite a few large older hemlock and some white pine, both of which are seeding throughout the stand. The large amount of balsam fir regeneration will be a challenge that needs to be addressed if the stand is to progress to a more valuable mix of trees..

Origin: partial cut

Approximate age: 100+

Main trees in canopy: white spruce (40%), red maple (30%), balsam fir (20%)

Height of canopy: 22.8m

Diameter: 21.3cm

Volume: this will be added before any harvest

Quality: medium

Other tree species: hemlock, red spruce, beech, white pine, yellow birch, sugar maple and striped maple

Plants: ground hemlock, American mountain ash, hobblebush, raspberry, bluebead lily, pyrola, teaberry, wood sorrel, wild lily of the valley, prince's pine, common lady's slipper, goldthread, bunchberry, twinflower, agrimony, starflower, ground pine, running club moss, shiny club moss, ground cedar, wood fern, lady fern, bracken fern, Indian pipe

Regeneration: lots of balsam fir, but good amounts of hemlock, white pine, red spruce, striped maple and yellow birch. There are also smaller amounts of sugar maple, beech and white spruce.

Coarse woody debris: large amounts, much of it well-rotted

Wildlife trees: high

Notes on wildlife: black-capped chickadees and blue jays sighted in stand and a barred owl was heard calling. There signs of snowshoe hare browse on the young hardwoods.

Treatment: Selectively harvest white spruce as it reaches the end of its life cycle. These gaps can be replanted with sugar maple, ironwood, red spruce, witch hazel, hobblebush and other rare plants.

Hand pull some of the balsam fir to release the hemlock, white pine, red spruce and yellow birch. Seedlings that have been browsed - especially the young yellow birch - would greatly benefit from proper pruning.

Stand #19 (2.55 ha): A stand of young mixed hardwoods along the Klondyke Road that resulted from a fuelwood cut in the late 1970's. Some larger hemlock were left in the area, adding to the diversity and structure of the stand.

Origin: partial cut

Approximate age: 30

Main trees in canopy: red maple (50%), white birch (20%), balsam fir (20%) and pin cherry (10%)

Height of canopy: 11m

Diameter: 10cm

Volume: this will be added before any harvest

Quality: stems and composition are of medium quality

Other tree species: hemlock, white spruce, yellow birch, sugar maple

Plants: ground hemlock, American fly honeysuckle, raspberry, twinflower, bluebead lily, aster, bunchberry, common lady's slipper, wood sedge, wild lily of the valley, starflower, bracken fern, wood fern, ground pine, shiny club moss, Indian pipe

Regeneration: low, mostly balsam fir

Coarse woody debris: none

Wildlife trees: few of any size

Notes on wildlife:

Treatment: This is an area that should be left to grow older. No harvest is planned at this time, but pruning should be carried out to improve quality and health of future crop trees. Ensure that all yellow birch and sugar maple are free to grow.

Stand #20 (.19 ha): A small area of young mixed hardwoods at the southeast corner of the property along the Klondyke Road. This stand has excellent potential to grow high-quality trees in a relatively short period of time. Though mostly a young stand, there were some larger hemlocks left when the fuelwood cut was done and this makes the structure of the stand much more interesting than some of the other areas with similar cuts. One of the largest hemlock is 35cm in diameter at breast height. Some of the balsam fir and trembling aspen are already starting to break up.

Origin: fuelwood cut

Approximate age: 35

Main trees in canopy: red maple (30%), sugar maple (20%), trembling aspen (20%), white birch, beech and yellow birch (10% each)

Height of canopy: 14.2m

Diameter: 10cm

Volume: this will be added before any harvest

Quality: the yellow birch and sugar maple are of excellent quality.

Other tree species: hemlock, balsam fir

Plants: wild raisin, wild lily of the valley, starflower, bunchberry, bluebead lily, common lady's slipper, wood fern, ground pine, shining club moss, Indian pipe

Regeneration: mostly balsam fir but with some red maple, white spruce and smaller amounts of white pine, hemlock and sugar maple.

Coarse woody debris: low-medium, depending on the area

Wildlife trees: few specimens of large-diameter

Notes on wildlife: old robin nest along roadway, black-capped chickadees

Treatment: Girdle some of the largest trembling aspen to improve their value to wildlife and to protect the smaller hardwoods from damage.

Release all yellow birch and sugar maple carefully, allowing free growth without causing excessive epicormic branching.

Protect all the white pine, hemlock, sugar maple and yellow birch regeneration. These will be the future forest and it will be worthwhile to ensure that the balsam fir regeneration does not outcompete these species. In some areas it will be worthwhile to hand pull the competing fir growing immediately around the more desirable species.

Underplanting should be done with white pine, red spruce, hemlock, witch hazel, hobblebush and beaked hazelnut. This may also be a good area to try adding ground hemlock.

Some beech could be removed in a fuelwood cut if a crew is already working in a nearby stand.

Stand #21 (3.16 ha): A good quality stand of mixed hardwoods in the northeast corner of the property. The land is rolling but there are some roadways that could be renewed to provide access to this area. This area is part of the territory of the barred owls.

Origin: partial cut

Approximate age: 80

Main trees in canopy: red maple (50%), white birch, trembling aspen, yellow birch, hemlock and beech (10% each)

Height of canopy: 17.3m

Diameter: 20cm

Volume: this will be added before any harvest

Quality: good

Other tree species: balsam fir, striped maple, sugar maple, white spruce, pin cherry

Plants: wild raisin, ground hemlock, red-berried elder, American fly honeysuckle, goldthread, pyrola, wild lily of the valley, starflower, bunchberry, bluebead lily, common lady's slipper,

wood sedge, twinflower, tall white aster, rough goldenrod, wood fern, bracken fern, prince's pine, shiny club moss, running club moss, ground pine, Indian pipe

Regeneration: lots of balsam fir patches, with lesser amounts of red maple, but there are some hemlock, white pine, yellow birch and sugar maple in places

Coarse woody debris: medium

Wildlife trees: medium

Notes on wildlife: barred owl came in on several occasions. Other birds sighted include black-capped chickadees, boreal chickadees, golden-crowned kinglets, hermit thrush, downy woodpecker and blue jays. There is lots of evidence of woodpeckers feeding and nesting in the area.

Treatment: Girdle some of the largest trembling aspen to improve their value to wildlife and to protect the smaller hardwoods from damage.

Selectively harvest some of the red maple, hemlock and trembling aspen for specialty products.

Release all yellow birch trees, taking care not to promote excessive epicormic branching. Prune to improve health and quality.

Ensure that hemlock and white pine seedlings are free to grow, removing balsam fir where necessary.

Plant any natural openings with red spruce, witch hazel and hobblebush.

- Priorities:**
1. As early as possible, carry out enrichment plantings, especially in the riparian areas, to get a jump on future restoration work.
 2. Plant the open areas of the gravel pits in Stands #8 and #11 with a mix of appropriate species, using a variety of soil amendments.
 3. Plant any openings along the edges of the roadway with 1-200 appropriate native plants that are especially attractive to wildlife, including fruit-bearing shrubs and red oak.
 4. Start string-of-pearl patch cuts in Stands #1 and #2 to create openings for plantings. Early intervention will allow the plantings to thrive in the side shade of the remaining trees, which will be harvested in small groups as the new plantings grow.
 5. Carry out fuelwood cuts in Stands #2 and #4 to remove some of the worst quality and heavily-cankered beech.

Additional comments: Once the woody plantings are done, add wildflowers and ferns that will help make the property more diverse and more attractive to wildlife.