

# Public Forest Land

## Operational Plan

#333922

Valley, PEI

(30.7 ha - 76.8 acres)

Prepared by:

**the Macphail Woods Ecological Forestry Project**



### PROPERTY DESCRIPTION

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This woodland, like most of Prince Edward Island's forest, is a patchwork of stand types with a mixture of origins. It was once a working farm, with a large area of previously-cleared land towards at the Selkirk Road that has grown up predominantly in white spruce. Some unploughed woodland at the western end of the property contains large yellow birch, sugar maple and hemlock. Several smaller clear cuts of approximately .34 ha each were done in the older hardwoods, date unknown. In 2000, a 4.75 ha clearcut was done and in 2001 blocks of Red spruce and Japanese larch were planted. There are also two black spruce plantations in poor shape, due to excessive competition from alders. This has led to many trees having twisted stems and/or forked tops and survival has been low.

There are two riparian areas and an alder swale that deserve special attention. Riparian zones are among the most productive habitats on Prince Edward Island for both plants and animals. The alder-dominated areas occupy sensitive, wetter soils and care should be taken to avoid any rutting that would compact the soil and disrupt the drainage pattern. Otherwise, the land is relatively flat and well-drained, with sandy soil. Access is good throughout the stands, except for the western end across the stream. The property is obviously capable of growing large-diameter, long-lived trees and but the old farmland will pose special problems for restoration. It lacks seed sources for many of the more desirable species of native trees and shrubs. The roadway running the length of the property offers a great opportunity to add large numbers of native plants that are especially-attractive for wildlife. The edges will have more sunlight over a longer period and allow greater fruiting and flowering of plants such as American mountain ash, serviceberry, highbush cranberry, beaked hazelnut, hawthorn and the elderberries.

**Special notes:**

The western end of the property composes a key part of the territory of a pair of barred owls, which are regularly seen in the area. There are excellent wildlife trees in this area and care should be taken to ensure that the stand structure is maintained. The area also has several witch hazels growing, one of the province's rarest native shrubs. The woodlands of the property to the immediate South are home to a nesting pair of Northern goshawks.

There are also thousands of young yellow birch and lesser numbers of red maple and sugar maple along the road that could be transplanted into the patch cuts.

Several large piles of wood have been left to rot at the edge of the road.

## STAND TREATMENTS

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**Stand #1 (.56 ha):** The block directly as you enter the property off the Selkirk Road (Highway #23). This looks like a hole in the surrounding wooded area and is old farmland. Part of the area is a black spruce plantation that is in need of thinning and where many of the trees have multiple leaders. Some of the area has grown up in speckled alder, while other parts are still in the grass stage. There is little regeneration on the site.

**Origin:** old field

**Approximate age:** 20-25

**Main trees in canopy:** black spruce

**Height of canopy:** black spruce, 10m          Diameter: 15cm

**Volume:** this will be added before any harvest

**Quality:** the stem quality is poor and the present value of the stand is low.

**Other tree species:** wild apple, balsam fir, white spruce, pin cherry

**Plants:** speckled alder, beaked hazelnut, European mountain ash, raspberry, goldenrod, hawkweed, veronica, pyrola, heal-all, wild strawberry, blueberry, grasses

**Regeneration:** very little

**Coarse woody debris:** very little

**Wildlife trees:** there is a lack of wildlife trees of any size in the stand.

**Notes on wildlife:** an old fox or coyote den is along the south side of the woods road.

**Treatment:** The eastern end that is in grasses should be planted with three each of red oak, white ash and red maple. This is the introduction to the property and should give visitors a good impression. The grass will need to be controlled around the trees, so this is the one area that should be mulched and tree guards placed on the hardwoods.

The black spruce plantation is not what we would like to see as a final outcome of our work, but as a nurse crop it can provide shade for other species. Once the plantings are well-established, the larger black spruce can be removed as needed. Thin the black spruce, removing any trees with poor growth or form. Much of this plantation was completely overtopped by alders and has had a difficult life.

Make 3-4 small patch cuts, approximately 10m in diameter, in the alders and plant with white ash, red spruce, white pine and yellow birch.

**Stand #2 (3.3 ha):** A slightly rolling stand of old field white spruce on either side of the woods road. Some parts of the stand are starting to blow down and without some assistance in the near future it will probably be dominated by balsam fir, red maple and white birch. There is one very large European mountain ash in the northern section that is a main seed source for all the young of this species.

Origin: old field

Approximate age: 60

Main trees in canopy: white spruce (over 90%)

Height of canopy: 18m          Diameter: 25cm

Volume: \* there should be something about quality as well

Other tree species: red maple, white birch, balsam fir, wild apple, pin cherry

Plants: speckled alder, European mountain ash, beaked hazelnut, wild raisin, red-berried elder, raspberry, blueberry, goldenrod, hawkweed, veronica, starflower, wild lily of the valley

Regeneration: very little

Coarse woody debris: very little well-rotted wood present though there are fallen trees

Wildlife trees: There is a lack of wildlife trees of any size in the stand.

Notes on wildlife:

**Treatment:** Begin patch cuts in the white spruce while the remaining stems will still provide shade and increase humidity levels. Create 15-20 patches of approximately 18-20m diameter. Young white birch, especially those with large crowns, should be retained, as should all other species. Plant these patches with a mix of native species - mainly white pine, yellow birch and red oak, with lesser numbers of sugar maple, white ash, red spruce, hemlock, highbush cranberry and witch hazel.

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.

This is an excellent area to try out some different regeneration techniques. Further along the woods road there are yellow birch, sugar maple, red maple and striped maple that could be directly transplanted into the patches. Good records should be kept of time involved and the rates of success. The patches could also be used as trials for direct seeding of red oak acorns and, with minimal scarification, yellow birch seed.

The edges of the road are good places to add in shrubs such as American mountain ash, highbush cranberry, beaked hazelnut and serviceberry to provide more food for wildlife throughout the year.

**Stand #3 (3.05 ha):** A level old field site that is dominated by white spruce and trembling aspen. Other hardwoods are already mixed in the canopy, mainly white birch and red maple, with lesser amounts of yellow birch. There are already patches dominated by thickets of juvenile balsam fir. Care should be taken not to increase these patches, as the fir is generally low-value and very susceptible to insects. There is some blowdown in the stand, both in the spruce and the poplars. The southern boundary borders on an open field so this edge especially should be protected and not opened up.

Origin: old field

Approximate age: 60

Main trees in canopy: white spruce and trembling aspen

Height of canopy: 19m      Diameter: trembling aspen - 22.5cm; white spruce - 20cm

Volume: \* there should be something about quality as well

Other tree species: red maple, white birch, balsam fir, yellow birch

Plants: European mountain ash, beaked hazelnut, bayberry, raspberry, hawkweed, veronica, sarsaparilla, starflower, blueberry

Regeneration: lots of balsam fir, also some sugar, red and striped maples and yellow birch

Coarse woody debris: very little well-rotted wood present though there are fallen trees

Wildlife trees: there are some wildlife trees of size in the stand just developing.

Notes on wildlife:

**Treatment:** Release and prune all yellow birch. Some of these will make excellent future lumber trees but most will be valuable just as seed sources and for the shade they provide.

Begin patch cuts in the white spruce while the remaining stems will still provide shade and increase humidity levels. Create five patches per hectare of approximately 18-20m diameter where the spruce is most prevalent. Retain all red maple, white birch and large-toothed aspen. Plant these patches with a mix of red oak, sugar maple, white pine, red spruce, hemlock. Rely on natural regeneration where suitable, adding just the longer-lived conifers.

The existing thickets of young balsam fir should be thinned (if they are providing shade and protection to the regeneration) or removed (if there is nothing else of value growing there).

Some of the larger trembling aspen that are suppressing the yellow birch could be girdled instead of being removed, to create additional wildlife trees for larger cavity-nesting birds.

**Stand #4 (.51 ha):** A small stand to the south of the woods road, resulting from a clearcut. There are large numbers of stems of mixed species and quality and an interesting variety of plants.

Garbage was left on site from the cut.

Origin: from clearcut

Approximate age: 18

Main trees in canopy: red maple at 50% and white birch at 30%

Height of canopy: 7m          Diameter: 7cm

Volume: 0 merchantable. \* there should be something about quality as well

Other tree species: beech, pin cherry, balsam fir, sugar maple, yellow birch, gray birch

Plants: alternate-leaf dogwood, beaked hazelnut, red-berried elder, mountain maple, wild lily of the valley, starflower, Indian pipe, lion's paw

Regeneration: large amount of red maple seedlings with some sugar maple

Coarse woody debris: little on floor

Wildlife trees: no wildlife trees of size

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

**Treatment:** Release all yellow birch, sugar maple and beech.

**Stand #5 (2.88 ha):** The next block to the North of the woods road, mostly made up of poor quality, low value regeneration from an old field. There are quite a few yellow birch that should become the focus of the stand, providing seed sources for future forests.

Origin: old field

Approximate age: 55

Main trees in canopy: trembling aspen 50%; white birch 30%; white spruce 20%

Height of canopy: 18m                      Diameter: 25cm

Volume: \* there should be something about quality as well

Other tree species: large-toothed aspen, yellow birch, red maple, striped maple, beech, balsam fir, apple

Plants: beaked hazelnut, willow, bayberry, serviceberry, European mountain ash, blueberry, sheep laurel, common lady's slipper, ground-pine

Regeneration: lots of red maple with some balsam fir and white spruce

Coarse woody debris: some beginning to rot

Wildlife trees: some large aspen beginning to be useful

Notes on wildlife: black-capped chickadees

**Treatment:** All yellow birch should be free to grow, removing some of the trembling aspen and white spruce that are growing too close, especially to the south. Some pruning to improve quality of the yellow birch should be carried out, though the primary importance of these trees will be for seed.

Create five small patches, approximately 16-18m, per hectare and spaced throughout the stand. Remove groups of higher value spruce that have smaller crowns. Leave all white birch and red maple. These patches should be planted with a mixture of red oak, white pine, sugar maple and hemlock.

Girdle some of the larger aspens that are already starting to rot. This will hasten their decay and cause less damage to the surrounding regeneration.

**Stand #6 (1.27 ha):** A damp site that probably has standing water in the spring. At one time there was a black spruce plantation attempted in the area, with little success.

Origin: old field

Approximate age: 25

Main trees in canopy: speckled alder makes up 80% of the stand, with the rest in black spruce and pin cherry

Height of canopy: 7m                      Diameter: 7cm

Volume: \* there should be something about quality as well

Other tree species: red maple, white spruce, balsam fir

Plants: red-berried elder, beaked hazelnut, European mountain ash, potentilla, buttercup, pyrola, hawkweed, aster, wild strawberry, blackberry, raspberry, bunchberry, heal-all, wood fern

Regeneration: lots of good young red maple 2m in height

Coarse woody debris: little on ground

Wildlife trees: none of any size

Notes on wildlife:

**Treatment:** Prune up red maple to improve quality.

Every 20 m create a small 10-m strip running North-South. Leave any maples good quality black spruce in the strip. Plant with white ash, American elm, cedar and larch. No product will be removed from this work.

Thin some of the remaining black spruce, favouring those with good quality stems. No product will be removed from this work.

**Stand #7 (.16 ha):** A very small strip of mixed hardwoods that nonetheless could wind up being an important seed source for the surrounding areas.

Origin: partial cut

Approximate age: 80-100

Main trees in canopy: red maple, beech and sugar maple

Height of canopy: 18m                      Diameter: 28cm

Volume: \* there should be something about quality as well

Other tree species: balsam fir, striped maple, white birch

Plants: beaked hazelnut, ground hemlock, starflower, wild lily of the valley, blue bead lily

Regeneration: lots of red maple with some sugar maple, balsam fir and striped maple

Coarse woody debris: medium amount on the ground

Wildlife trees: some large trees starting to have good cavity potential

Notes on wildlife:

**Treatment:** No treatment at this time.

**Stand #8 (2.55 ha):** This is the best stand of white spruce on the property and it should be removed over the next twenty years while it still has both commercial value and the ability to provide shade and protection to the new plantings. Some of the white spruce are already starting to fall down and there are also areas where bark beetle damage is evident. There is a low area running into the stand.

Origin: old field

Approximate age: 65

Main trees in canopy: white spruce occupies 80% of the stand and an even higher percentage of the volume. The rest is mainly in white birch and trembling aspen.

Height of canopy: 21m                      Diameter: 27.5cm

Volume: \* there should be something about quality as well

Other tree species: large-toothed aspen, beech, balsam fir, white pine

Plants: wild raisin, European mountain ash, willow, alternate-leaf dogwood, red-berried elder, pin cherry, speckled alder, beaked hazelnut, blueberry, raspberry, wild lily of the valley, sarsaparilla, starflower, hawkweed, wood fern

Regeneration: some areas have large amounts of red maple seedlings, with smaller amounts of striped maple, sugar maple, balsam fir, white spruce and beech.

Coarse woody debris: large amounts on the ground

Wildlife trees: large numbers of suitable wildlife trees, some with broken tops

Notes on wildlife:

**Treatment:** Use small patch cuts to create a “string of pearls” effect. Five 20m-diameter patches per hectare will leave adequate standing protection and create excellent planting sites. Plant these sites in sugar maple, yellow birch, white pine, red spruce, hemlock, witch hazel and hobblebush.

Drop fallen trees to the ground so that they decompose more quickly.

There are already some areas with excessive balsam fir regeneration. This is a problem that will only get worse if the balsam fir manage to grow older. It will continue to be susceptible to both insects and diseases and will not be a valuable stand even if everything goes right. Care should be taken to favour other regenerating species and to remove dense clumps of fir while they can still be pulled.

**Stand #9 (1.34 ha):** White spruce dominated-stand on the north side of the woods road just before the red spruce plantation. It is generally made up of poor quality, low value white spruce and trembling aspen and lacks long-lived, high value species.

Origin: old field

Approximate age: 60

Main trees in canopy: white spruce and trembling aspen

Height of canopy: 16m                      Diameter: 20cm

Volume: \* there should be something about quality as well

Other tree species: large-toothed aspen, balsam fir, white birch and red maple

Plants: willow, beaked hazelnut, European mountain ash, serviceberry, veronica, Indian pipe, starflower, wild lily of the valley, bracken fern, wood fern

Regeneration: mostly red maple and balsam fir seedlings, with some red maple and white birch and a small amount of yellow birch

Coarse woody debris: trees are starting to fall down in the area

Wildlife trees: some of the trembling aspen are now large enough to have good cavities

Notes on wildlife:

**Treatment:** Create five patches per hectare, 16-18m in diameter and plant with red oak, white pine and yellow birch. Create some wildlife patches for winter birds, especially along the edge of the woods road, for planting highbush cranberry, American mountain ash and hawthorn.

Girdle some of the larger trembling aspen that are of poor quality to make them more attractive for cavity-nesting birds.

**Stand #10 (1.34 ha):** This is a mixed wood stand that contains one of the alder swales with a black spruce plantation. It contains one of the few large white pine (45cm dbh) on the property. The hardwoods will be part of a future fuelwood harvest as we move the stand to higher percentages of longer-lived species. There are large areas with excessive amounts of balsam fir regeneration that will cause problems in the future if not dealt with.

Origin: old field

Approximate age: 60

Main trees in canopy: white birch and red maple

Height of canopy: 19m                      Diameter: 20cm

Volume: \* there should be something about quality as well

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

Plants: beaked hazelnut, sarsaparilla, starflower, wild lily of the valley, wood fern, bracken fern

Regeneration: some areas are almost pure balsam fir. There are lots of red maples with some sugar maple and striped maple.

Coarse woody debris: medium amounts, much not in contact with the forest floor.

Wildlife trees: some good trees showing potential for larger cavities.

Notes on wildlife:

**Treatment:** Special care should be taken to protect the white pine and its regeneration. Some careful scarification of the ground surrounding this tree will aid in future regeneration of white pine.

Remove some blocks of white spruce, creating small patches up to 18m in diameter. These cuts should be replanted in yellow birch, sugar maple, red spruce and Eastern hemlock.

Limb all fallen trees so that they are in contact with the ground. This will ensure that the trees decompose more quickly, to provide nutrients and organic matter for future forests.

Plant Eastern hemlock, red spruce and white pine under the hardwoods to enrich the diversity and future value of the site.

Remove small clumps of speckled alder and replant with Eastern white cedar and white ash. Prune up selected red maple in the area to single stems.

**Stand #11 (4.75 ha):** This area on the Northern boundary line was clear cut in 2000. In 2001, the site was planted with blocks of Japanese larch to the West and red spruce to the East. In 2006 the site was for the most part overtopped with natural regeneration. Some of the red maple and white birch are twice the height of the red spruce. The Japanese larch is having very mixed results, with a few towering, a large number severely browsed by snowshoe hare and the rest somewhere under the canopy of the red maple and white birch. These areas could in the future become more productive woodlands by selecting good-quality (of whatever species) and ensuring that they have sufficient space to grow and are well-pruned. There are large piles of wood that were left on the side of the woods road.

Origin: clear cut

Approximate age: 6

Main trees in canopy: red maple, white birch and pin cherry

Height of canopy: pin cherry up to 5m, rest 3.5m Diameter: 7.5cm

Volume: \* there should be something about quality as well

Other tree species: red spruce, Japanese larch, gray birch, beech, balsam fir, white spruce, trembling aspen, apple

Plants: European mountain ash, serviceberry, bayberry, beaked hazelnut, highbush cranberry, sheep laurel, blueberry, raspberry, blackberry, bristly sarsaparilla, wild strawberry, goldenrod, veronica, bracken fern

Regeneration: mainly grasses and moss, with some

Coarse woody debris: mainly on woods road

Wildlife trees: few

Notes on wildlife:

**Treatment:** Identify potential crop trees every 8-10m and provide sufficient space for good growth. These should be the best and healthiest trees regardless of the species. Proper pruning of lower branches and to create single-stemmed trees will pay off in the future. These are the only trees that should have much investment of time as there are plenty of other stems to offer good protection and to provide fuelwood in a future commercial thinning.

Areas without trees should be planted with red oak, white ash, white pine and yellow birch, and this would also be a good place to add witch hazel, eastern hemlock and other rare uncommon plants.

**Stand #12 (7.92 ha):** This area is the jewel of the property, containing two streams and the finest hardwoods and hemlock. The land has never been ploughed and it is by far the best area for larger wildlife trees. Despite past harvests that high-graded the stand, it still contains some larger specimens and shows the potential of the property. Light removal of some of the worst-formed trees may actually produce some very interesting product material - forked yellow birch and twisted maples for bowls and curved beech for benches and headboards. Removal should always favour leaving the best trees, especially the yellow birch and sugar maple.

Origin: partial harvest

Approximate age: 120

Main trees in canopy: yellow birch, red maple and sugar maple

Height of canopy: 18-20m                      Diameter: 25cm

Volume: \* there should be something about quality as well

Other tree species: beech, Eastern hemlock, balsam fir, white spruce, red spruce, striped maple, white birch

Plants: ground hemlock, beaked hazelnut, red-berried elder, mountain maple, European mountain ash, bristly black current, watercress, wood horsetail, sarsaparilla, goldthread, Indian pipe, starflower, bluebead lily, wild lily of the valley, veronica, common lady's slipper, bunchberry, wood sorrel, twinflower, marsh bedstraw, enchanter's nightshade, pyrola, false soloman's seal, cinnamon fern, bracken fern, wood fern, sensitive fern, running clubmoss, ground pine

Regeneration: lots of red maple and balsam fir seedlings, with lesser amounts of yellow birch, sugar maple and striped maple

Coarse woody debris: large amounts on the ground

Wildlife trees: excellent area containing extremely large wildlife trees

Notes on wildlife: blue jays, hairy woodpecker, vireo (sp.), black-capped chickadees and a barred owl (seen repeatedly in the area). Red squirrels common.

**Treatment:** Ground hemlock can be harvested from the site with strict adherence to provincial guidelines if the market for the product is strong.

Selective harvesting should only take place of the worst-form trees (containing crooks, forks or interesting twists) that will improve the overall quality of the stand while removing wood that can be turned into high-value products.

Enrichment planting should be carried out in both riparian zones, especially the feeder stream that has large amounts of white spruce and balsam fir that are starting to blow over. Underplanting will give a great start to a future forest in this area that has eastern hemlock, sugar maple and some of our rarer plants.

**Stand #13 (.35 ha):** A small stand, low-value stand resulting from a clear cut in an older mixed wood stand (this area was part of Stand #12). Due to the past harvest, a large majority of the stems are from stump sprouts and there are few strong saplings of value that have grown from seed. The area has obvious potential to grow large trees and direction should be towards seeded trees rather than reliance on low-value stump sprouts. There is a lack longer-lived conifers in this area.

Origin: clear cut

Approximate age: 15

Main trees in canopy: pin cherry, balsam fir, white birch and red maple

Height of canopy: 8m                  Diameter: 7.5cm

Volume: \* there should be something about quality as well

Other tree species: white birch, red maple, small amount of sugar maple, striped maple and white spruce

Plants: alternate-leaf dogwood, raspberry, bunchberry, Indian pipe, bluebead lily, veronica, starflower, wood fern, bracken fern

Regeneration: lots of red maple, white birch and balsam fir seedlings, with smaller amounts of sugar maple and striped maple

Coarse woody debris: little on the ground

Wildlife trees: lack of large dead trees

Notes on wildlife:

**Treatment:** Release and prune future crop trees throughout the stand. Favour yellow birch and sugar maple and then red maple and white birch, keeping in mind the quality (or potential quality) of the trees. Any pin cherry or balsam fir overtopping one of the above species should be removed. Pruning will greatly increase the future value of this stand.

Favour yellow birch, sugar maple seedlings, releasing where necessary.

In the existing holes through the stands, plant 6 each of red spruce, white pine, eastern hemlock, sugar maple and yellow birch. Remove some of the dense areas of balsam fir where necessary to slightly enlarge the holes.

**Stand #14 (.33 ha):** The second, small stand resulting from a clear cut in an older mixed wood stand (this area was also part of Stand #12). Due to the past harvest, a large majority of the stems are from stump sprouts and there are few strong saplings of value that have grown from seed. The area has obvious potential to grow large trees, with a better mix of more valuable trees than Stand #13. Direction should be towards seeded trees rather than reliance on low-value stump sprouts. There is a lack longer-lived conifers in this area.

Origin: clear cut

Approximate age: 15

Main trees in canopy: pin cherry and balsam fir

Height of canopy: 8m                  Diameter: cm

Volume: \* there should be something about quality as well

Other tree species: white birch, red maple, small amount of sugar maple, striped maple and white spruce

Plants: ground hemlock, beaked hazelnut, raspberry, bunchberry, Indian pipe, bluebead lily, wood fern, bracken fern

Regeneration: lots of red maple and white birch seedlings, with smaller amounts of sugar maple and striped maple

Coarse woody debris: little on the ground

Wildlife trees: lacking in large dead trees

Notes on wildlife:

**Treatment:** Release and prune future crop trees throughout the stand. Favour yellow birch and sugar maple and then red maple and white birch, keeping in mind the quality (or potential quality) of the trees. Pruning will greatly increase the future value of this stand.

Favour yellow birch, sugar maple seedlings, releasing where necessary.

In the existing holes through the stands, plant 6-10 each of red spruce, white pine and eastern hemlock. Remove some of the dense areas of balsam fir where necessary to slightly enlarge the holes.

- 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 high-profile areas such as the opening on the Selkirk Road with species such as white ash and red oak that will provide invaluable seed sources in the future.
  3. Plant any openings along the edges of the roadway with 2-300 appropriate native plants that are especially attractive to wildlife, including fruit-bearing shrubs and red oak.
  4. Plant holes in the red spruce and Japanese larch plantations in Stand #11, using the existing regeneration to help grow taller, straighter trees.
  5. Start string-of-pearl patch cuts in Stands #8 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.
  6. In any of the stands that lack sufficient numbers of wildlife trees, some of the larger trees, especially the trembling aspen, should be girdled to provide more potential homes for cavity-nesting birds.
  7. Prune smaller trees in Stands #4, #13 and #14 and replant any holes.
  8. Selectively harvest some of the worst-quality trees in Stand #12.
  9. Release and prune all yellow birch in Stand #5.
  10. Any of the wood that has been left in large piles along the road from previous forest harvesting, if still movable, should be placed in the old-field areas to provide nutrients and organic matter, improve water retention, act as nursery beds and enhance wildlife habitat.

**Additional comments:** Some of the small, suppressed red spruce in the plantation in Stand #11 could be transplanted, along with yellow birch, sugar maple, red maple and striped maple regeneration growing on the woods road to any of the white spruce patch cuts. Direct seeding of red oak and yellow birch should also be tested as an inexpensive but effective way to propagate these high-value species.

Once the woody plantings are done, we will be adding wildflowers and ferns that would help make the property both more diverse and more attractive to wildlife.