

*Douglas Perkins Property
Forest Management Plan
January 14, 2020*



This forest management plan is a blueprint for responsible land stewardship. It is the result of a planning process that incorporated an assessment of the history and current conditions on the property, consideration of the various courses of future development that the forest could follow, and discernment as to which outcomes best suit my particular objectives.

By signing below, I certify that I approve of—and agree to manage my forestland according to—the following management plan. I further certify that any of my forestland that is enrolled in Vermont's Use Value Appraisal program is under active long-term forest management in accordance with the state's minimum acceptable standards for forest management. These standards include following Acceptable Management Practices to maintain water quality on logging operations.

Prepared by

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Owner

Douglas Perkins Living Trust
c/o Douglas Perkins
1750 Lake Dunmore Road
Leicester, VT 05733

Property

27.5 acres NA
Calais, VT
SPAN 120-037-10679
Map delineation based on VMP
Photo(s) 156208, 156212, 152208,
152212

Effective date of plan

April 1, 2020

Landowner

Date

Landowner

Date

Landowner

Date

Landowner

Date

This forest management plan meets the standards promulgated by the Vermont Department of Forests, Parks and Recreation as required for eligibility in the Use Value Appraisal Program.

County Forester

Date

Introduction

This plan Covers the ten year period from 2020 to 2029. It lays out the near- and medium-term actions that should guide the development of the Douglas Perkins Forest. It also qualifies the property for Use Value Appraisal (UVA) and commensurate reduction in property taxes.¹ Owners participating in the Use Value Appraisal program are obliged to manage their property according to the plan and to make any reasonable investments for improvement that the plan recommends.² Its recommendations were developed in accordance with the principles and practices of scientifically sound forestry, as described in the relevant management guidelines, textbooks and academic journals³.

¹ Further information about UVA and current valuations can be found at the Vermont Tax Department's website: <https://tax.vermont.gov/property-owners/current-use>.

² UVA management plan standards are determined by the Department of Forests, Parks, & Recreation and are available at https://fpr.vermont.gov/forest/your_woods/use_value_appraisal or through a County Forester.

³

Property Description

All of the 27.5 acre Douglas Perkins property is productive forestland that will be managed according to this plan. Its elevations range from 1320 to 1400 feet above mean sea level. No mapped streams cross the property, and surface waters flow to the Pekin in the south. Property boundaries are a bit hard to find, but the corner pins have all been located. Soils, forest health, and other pertinent topics are discussed in the individual stand area descriptions that follow.

Principles, Goals & Strategies For Forest Management

Conservation

The ecological functioning, productive capacity and biological diversity of the forest resource should be maintained or improved over time so as to provide opportunities for the current or future landowners to continue to enjoy and use the property. A management strategy that is sustainable in the long-term and viable in the short- and medium-terms offers a strong measure of protection against future development or conversion.

Timber management

Management should provide regular returns from timber harvesting. Long-term value growth is provided by maintaining full site occupancy with investment-grade stems: healthy trees capable of producing high quality sawtimber or veneer and worth retaining in the stand until they reach their full, site- and species-specific target diameters. Tree species which yield sought-after, high-value wood should be promoted within each stand or, when regenerating a new stand, attention should

be paid to providing the stand conditions which favor the establishment of those species. At a property-wide scale, a variety of species should be maintained, providing options for seizing future market opportunities and a hedge against species-specific market depreciation. Among desired species, additional preference should be given to individual trees of sufficient vigor and grade-potential for strong future value growth. Consideration of economic efficiency should inform the timing and coordination of infrastructure investments and stand maintenance, improvement and harvest operations.

Stand Descriptions & Management Recommendations

Presented below are detailed stand-by-stand descriptions of the forest, the long-term structural, compositional and functional goals for each stand, and the near-term silvicultural treatments or management activities that have been prescribed to advance each stand toward those goals. The data presented in the following pages was obtained from a field examination of the property in November of 2019. General conditions were assessed qualitatively in conjunction with quantitative sampling. Observational notes and sample summary statistics together provide the basis for the area descriptions and management recommendations. All sampling was done using a systematic sample and variable radius plots. In stands with uneven-aged structures, all trees 6" dbh and larger were measured in each plot. In stands with even-aged structures, all main-canopy trees were measured in each plot.

When contractors are used to implement silvicultural prescriptions, they should be highly skilled, properly equipped, fully insured, and closely supervised. A professional forester should prepare and administer commercial treatments, and logging operations should be timed to coincide with favorable weather conditions (working on wet soils only when they are frozen, for instance) and favorable timber markets. Use Value Appraisal program guidelines allow any management activities prescribed in this plan to be carried out up to three years before or after the date indicated. Landowners in the Use Value Appraisal program must file a Forest Management Activity Report with the County Forester by February 1st if any commercial logging occurred in the previous year.

The property should be reinventoried in 2029 and the findings brought to bear on a reassessment of the goals and strategies proposed in this plan, leading to a formal management plan update. At any point over the course of this management period, this plan may be updated to incorporate new information and to reflect any new thoughts, concerns or considerations on the part of the family or the

Management Schedule

2023

- Area 3: Group Selection

2025

- Area 1: Intermediate Thinning

2029

- Reinventory forest

foresters helping to manage their land.

Area 1

Norway spruce

5.63 legal acres | 5.89 measured acres

Site-specific information

- **Soils:**
Glover-Vershire complex (shallow to moderately deep, excessively drained to well drained, loose, very rocky glacial tills on summits, shoulders, and backslopes)
- **Site Class:**
II (determined from soil mapping and field assessment)
- **Access:**
Good access from town road. Less than 1 mile.
- **Stand history:**
Former pastureland, planted to Norway spruce in 1954. Carefully thinned by owner over the course of the last decade, though one section was missed and has much higher stocking (200 sq ft or so).

Current forest information

- **Age Class Structure:**
Even-aged
- **Species (% stocking):**
norway spruce (92%), white pine (8%)
- **Regeneration:**
Scattered patches of fir and red spruce where the stocking is lower.
- **Forest health:**
A number of the Norway spruce fork at 30 or 40 ft, but are still healthy and pose little risk. No exotic invasive plants noted.
- **Standing dead wood (sq ft/ac by size class):**
6-10": 5 | 11-16": 0 | 17-22": 0 | 23+": 0

Inventory information

- 2 points, 10 BAF, November, 2019

Long-term management system

Even-Aged Management

This stand should continue to be managed using even-aged techniques. We recommend a rotation age of 90 or 100, which will allow for one more thinning before regeneration is initiated (the stand is 66 now).

Diameter distributions for common species

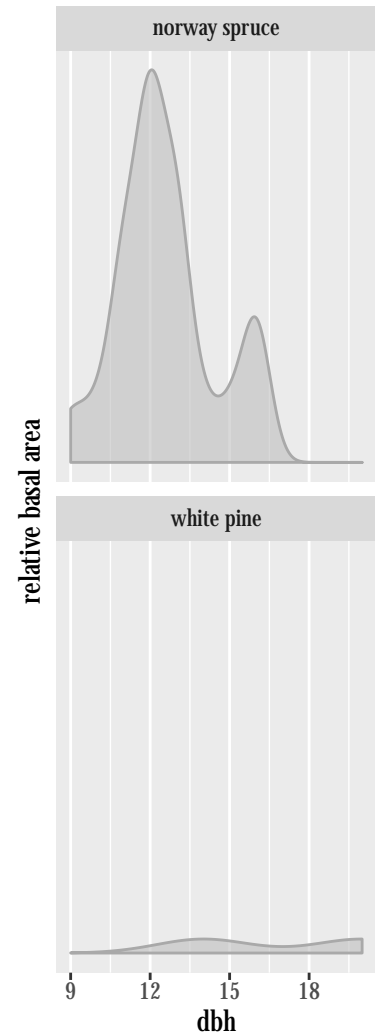
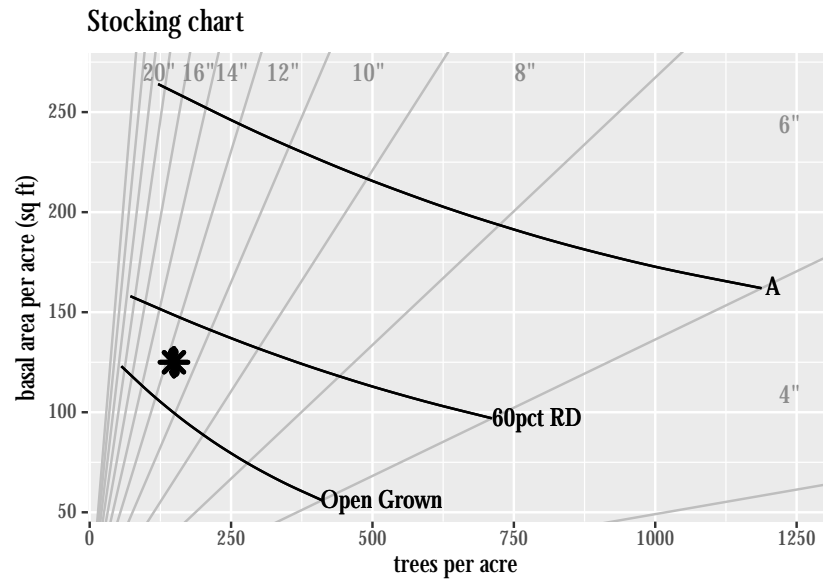


Figure 1: Distributions are approximated with kernel density estimation. Common species are those that account for at least 8 percent of the total stocking and areas under each curve represent species basal areas.



Reproduced from norway spruce stocking guide: Haligan and Nyland. 1999. NJAF 16(3) p.158

Figure 2: Points represent individual plots. Asterisk represents stand average. Radial lines are quadratic stand diameters.

Measure	Total	AGS	UGS
Basal area (sq ft/ac)	125	125	0
QSD (in)	12	12	NaN
Stems/ac	149	149	0

Table 1: Measures of stocking for all live trees (Total), acceptable growing stock (AGS), and unacceptable growing stock (UGS).

Size Class	Total	AGS	UGS
6-11 in.	30	30	0
12-15 in.	75	75	0
16-21 in.	20	20	0
22+ in.	0	0	0
Total	125	125	0

Table 2: Current basal area (sq ft/ac) of total growing stock, acceptable growing stock, and unacceptable growing stock by size class.

*Silvicultural prescription***Intermediate Thinning****Year:** 2025

The area that has not yet been thinned should be thinned, with the goal of making it look just like the rest of the stand. Dominant and co-dominant Norway spruce should be released and the overall stocking should be reduced to about 140 square feet (Halligan and Nyland 1999), which means removing between $1/4$ and $1/3$ of the stocking. Note that the inventory plots were all in spots that have already been thinned, so the quantitative stand data does not reflect the un-thinned area.

Area 2

Mixed softwood

8.22 legal acres | 8.60 measured acres

Site-specific information

- **Soils:**
Glover-Vershire complex (shallow to moderately deep, excessively drained to well drained, loose, very rocky glacial tills on summits, shoulders, and backslopes)
- **Site Class:**
II – III (determined from soil mapping and field assessment)
- **Access:**
Good access from town road. Less than 1 mile.
- **Stand history:**
Formerly pastureland, mostly planted to Norway spruce in 1954, but establishment largely failed, probably because of thinner soils. No tending has been done, but many stems are young and stand remains understocked.

Current forest information

- **Age Class Structure:**
Even-aged
- **Species (% stocking):**
norway spruce (36%), soft maple (28%), white pine (16%), fir (8%), spruce (8%), paper birch (4%)
- **Regeneration:**
Main cohort is still young.
- **Forest health:**
Slower growth on thin soils. Many pines are poorly formed or infected by blister rust. No exotic invasives noted.
- **Standing dead wood (sq ft/ac by size class):**
6-10": 2.5 | 11-16": 0 | 17-22": 0 | 23+": 0

Inventory information

- 4 points, 10 BAF, November, 2019

Diameter distributions for common species

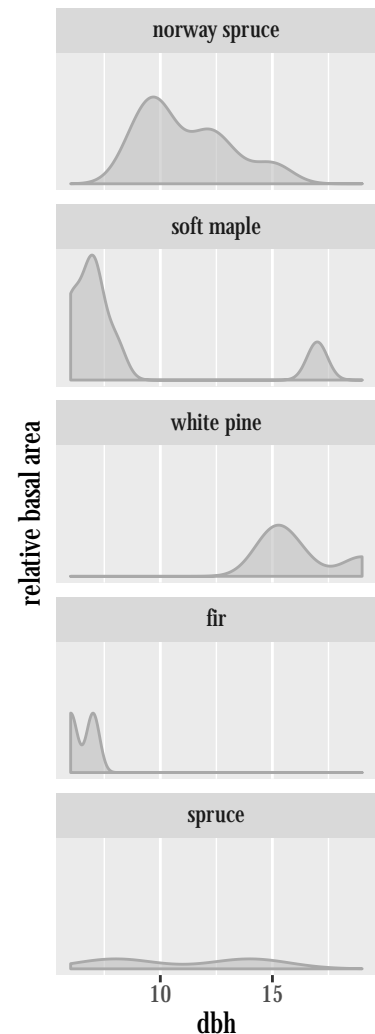
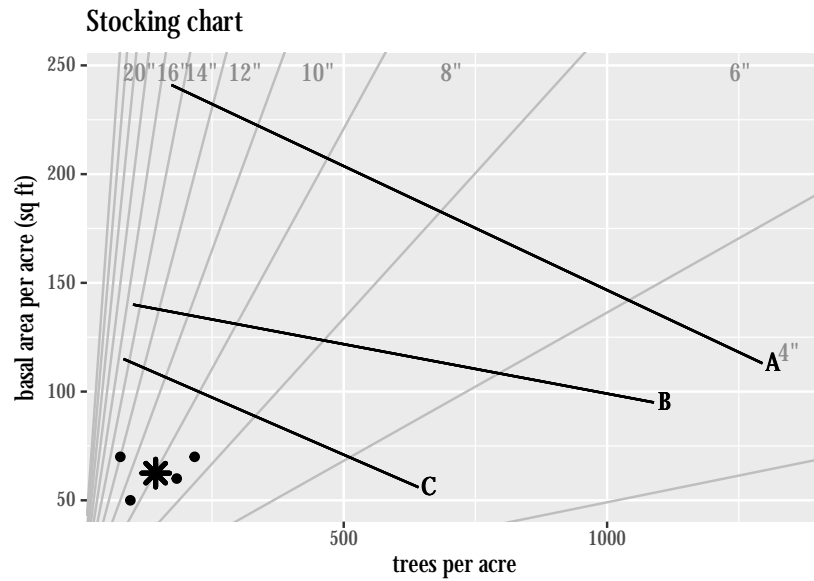


Figure 3: Distributions are approximated with kernel density estimation. Common species are those that account for at least 8 percent of the total stocking and areas under each curve represent species basal areas.



Reproduced from softwood stocking guide: Solomon, et al. 1995. NE-204

Figure 4: Points represent individual plots. Asterisk represents stand average. Radial lines are quadratic stand diameters.

Measure	Total	AGS	UGS
Basal area (sq ft/ac)	62	62	0
QSD (in)	9	9	Inf
Stems/ac	143	143	0

Table 3: Measures of stocking for all live trees (Total), acceptable growing stock (AGS), and unacceptable growing stock (UGS).

Size Class	Total	AGS	UGS
6-11 in.	38	38	0
12-15 in.	18	18	0
16-21 in.	8	8	0
22+ in.	0	0	0
Total	62	62	0

Table 4: Current basal area (sq ft/ac) of total growing stock, acceptable growing stock, and unacceptable growing stock by size class.

*Long-term management system***Even-Aged Management**

This stand should continue to be managed using even-aged techniques for the time being, with a rotation age of about 110. Later in the rotation, when more of the trees have reached commercial sizes, it may be desirable to move the stand toward an uneven-aged structure.

Silvicultural prescription

No work is necessary over the next decade, but the owner may wish to do some precommercial crop tree release to favor sapling- or pole-sized hardwoods with good form, large crowns, and no defects. Up to 40 such trees per acre could be released on all sides by cutting any trees with touching crowns.

Area 3

Northern hardwood

13.65 legal acres | 14.29 measured acres

Site-specific information

- **Soils:**
Glover-Vershire complex (shallow to moderately deep, excessively drained to well drained, loose, very rocky glacial tills on summits, shoulders, and backslopes)
- **Site Class:**
II (determined from soil mapping and field assessment)
- **Access:**
Pretty good through Areas 1 and 2. Less than 1 mile.
- **Stand history:**
Current stand developed from an old sugarbush, which was heavily cut many years ago. Owner has begun to remove unacceptable growing stock and trees at risk of dying.

Current forest information

- **Age Class Structure:**
Even-aged
- **Species (% stocking):**
hard maple (40%), beech (17%), black cherry (11%), paper birch (11%), ash (6%), soft maple (6%), yellow birch (6%), hophornbeam (2%)
- **Regeneration:**
Dominated by diseased beech suckers.
- **Forest health:**
Deer browse and suckering of diseased beech stems is impeding the regeneration of desirable species. Many of the overstory sugar maples are experiencing crow dieback. No exotic invasives noted.
- **Standing dead wood (sq ft/ac by size class):**
6-10": 1.7 | 11-16": 0 | 17-22": 1.7 | 23+": 0

Inventory information

- 6 points, 10 BAF, November, 2019

Diameter distributions for common species

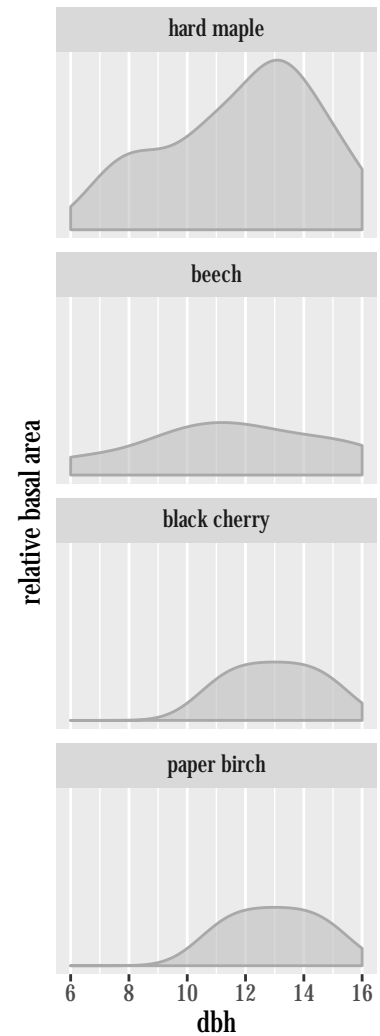


Figure 5: Distributions are approximated with kernel density estimation. Common species are those that account for at least 8 percent of the total stocking and areas under each curve represent species basal areas.

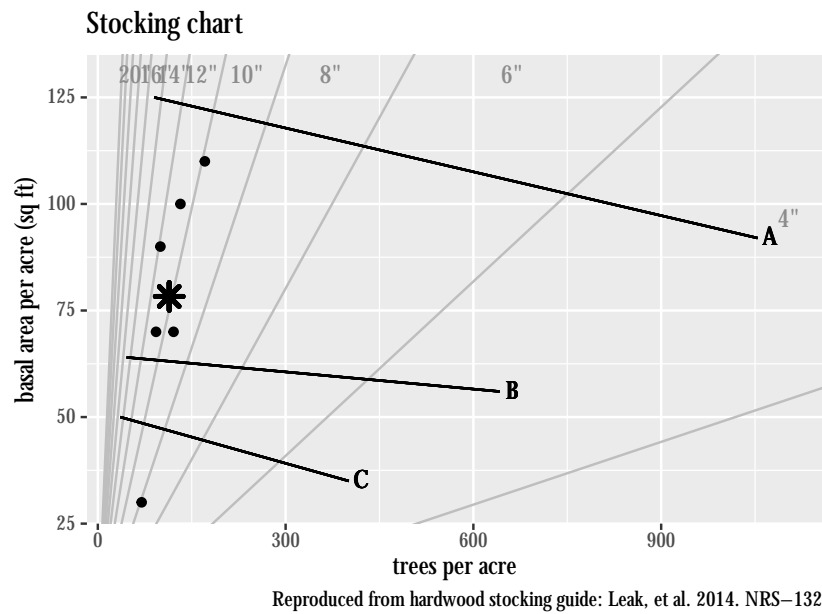


Figure 6: Points represent individual plots. Asterisk represents stand average. Radial lines are quadratic stand diameters.

Measure	Total	AGS	UGS
Basal area (sq ft/ac)	78	63	15
QSD (in)	11	12	9
Stems/ac	114	80	34

Table 5: Measures of stocking for all live trees (Total), acceptable growing stock (AGS), and unacceptable growing stock (UGS).

Size Class	Total	AGS	UGS
6-11 in.	25	15	10
12-15 in.	48	45	3
16-21 in.	5	3	2
22+ in.	0	0	0
Total	78	63	15

Table 6: Current basal area (sq ft/ac) of total growing stock, acceptable growing stock, and unacceptable growing stock by size class.

Long-term management system

Selection System

The stand should be converted to an uneven-aged structure (R. D. Nyland 2003), which will allow the owners to keep working with the valuable trees that are present now, while regenerating areas with little potential value growth. Eventually we will establish a system with harvests about every 10 years, which will remove mature trees, release immature trees, and establish or release new regeneration. Target diameters for crop trees will be specific to individual species as follows: 24 inches for sugar maple, yellow birch, and black cherry; and 18 inches for other commercial hardwoods (with exceptions allowed for all veneer quality hardwood stems).

Silvicultural prescription

Group Selection

Year: 2023

This treatment will begin the process of converting the stand to an uneven-aged structure using group selection; which R. D. Nyland (2003) refers to as a “patch cutting conversion strategy”. Groups of trees should be harvested to create openings in the canopy and allow for the establishment of desirable regeneration. These groups openings should be from 1/10 to one acre in size (about 35 to 100 feet in diameter), and should be located to remove concentrations of unacceptable growing stock, trees with severe crown dieback, and sawtimber size ash (which have a very high risk of dying from emerald ash borer infestation in the next decade). The group openings are preferable to Nyland’s “uniform cutting conversion strategies” because they have a better chance of overcoming diseased beech and securing regeneration of other species, but in order for them to be successful, all beech need to be removed from them, including saplings. If any saplings of desirable species are found in the openings, they should be kept and protected from damage. Desirable species that should be favored include sugar maple, yellow birch, black cherry, red maple, and paper birch. These are also the species we hope to regenerate. Overall, group openings should not cover any more than 1/3rd of the whole stand area.

Outside of and between openings, a light thinning should be carried out to remove unacceptable growing stock and sawtimber sized ash while maintaining full stocking. The basal area outside openings should not be reduced below about 70 square feet per acre (b-line; Leak, Solomon, and DeBald 1987). This will help to keep the beech problem in check.⁴

⁴ Above b-line, overstory trees should provide enough shade to prevent additional beech root suckering. Meanwhile, the high-light conditions inside the group openings should allow other species to out-compete the beech suckers there. The beeches become a problem at intermediate stocking levels, where they get some light while remaining competitive.

References

Halligan, J. P., and R. D. Nyland. 1999. "Relative Density Guide for Norway Spruce Plantations in Central New York." *Northern Journal of Applied Forestry* 16 (3): 154–59. doi:10.1093/njaf/16.3.154.

Leak, William B., Dale S. Solomon, and Paul S. DeBald. 1987. "Silvicultural Guide for Northern Hardwood Types in the Northeast (Revised)." Research paper NE-603. U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station.

Nyland, Ralph D. 2003. "Even- to Uneven-Aged: The Challenges of Conversion." *Forest Ecology and Management* 172 (2-3): 291–300. doi:10.1016/S0378-1127(01)00797-6.