Perdue Property
Forest Management Plan
January 13, 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 (Leak, Yamasaki, and Holleran 2014).

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.

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Owner
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Property
295 acres and two dwellings
Worcester, VT
SPAN 788-251-10339
Map delineation based on VMP
Photo(s) 148212, 148208

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 Perdue 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 journals.

[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.

Property Description

Some 2 percent of the 295 acre Perdue property is productive forestland that will be managed according to this plan. Its elevations range from 1110 to 1480 feet above mean sea level. NA NA Soils, forest health, and other pertinent topics are discussed in the individual stand area descriptions that follow.

Principles, Goals & Strategies For Forest Management

Ecological integrity, wildlife habitat, and biodiversity

Management should prioritize the protection of critical ecological functions, water resources, and threatened or rare plant and wildlife communities. Wetlands and stream-side riparian zones should be carefully delineated and protected; and management should give consideration to the habitat needs of native wildlife populations and to the relationship between the property, its neighbors and the larger landscape they are nested within. Management should be informed by and aim to improve landscape diversity, wildlife travel corridors, and habitat connectivity. Locally under-represented habitat types should be identified and promoted. Stand scale and sub-stand scale management should focus on developing or maintaining species-specific habitat needs, such as nesting sites, cover, mast production, preferred browse or other unique structural and compositional requirements.

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 September 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

Management Schedule

2023

- Area 1: Group Selection
- Area 3: Continuous Cover Irregular Shelterwood
- Area 4: Precommercial Thinning
- Area 5: Continuous Cover Irregular Shelterwood
- Area 6: Group Selection
- Area 7: Hybrid Selection

2029

- Reinventory forest

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 foresters helping to manage their land.

Area 1

Northern hardwood
1.00 legal acres | 1.00 measured acres

Site-specific information

- **Soils:**
  NA
- **Site Class:**
  II (determined from soil mapping and field assessment)
- **Access:**
  Good. Less than 1 mile
- **Stand history:**
  Established c. 1940, possibly from abandoned pasture. Highgraded, most recently c. 1990.

Current forest information

- **Age Class Structure:**
  Even-aged
- **Species (% stocking):**
  hard maple (28%), soft maple (20%), yellow birch (15%), ash (14%), beech (12%), hemlock (7%), red oak (2%), black cherry (1%), paper birch (1%), spruce (1%)
- **Regeneration:**
  Well established beech understory.
- **Forest health:**
  Beech bark disease (probably coupled with high deer browse pressure) is a severe impediment to regeneration. Overstory health and quality are low because of past highgrading. No exotic invasives noted.
- **Standing dead wood (sq ft/ac by size class):**
  6-10": 5.5 | 11-16": 1.8 | 17-22": 0.9 | 23+": 0

Inventory information

- 11 points, 10 BAF, September, 2019

Long-term management system

NA
NA

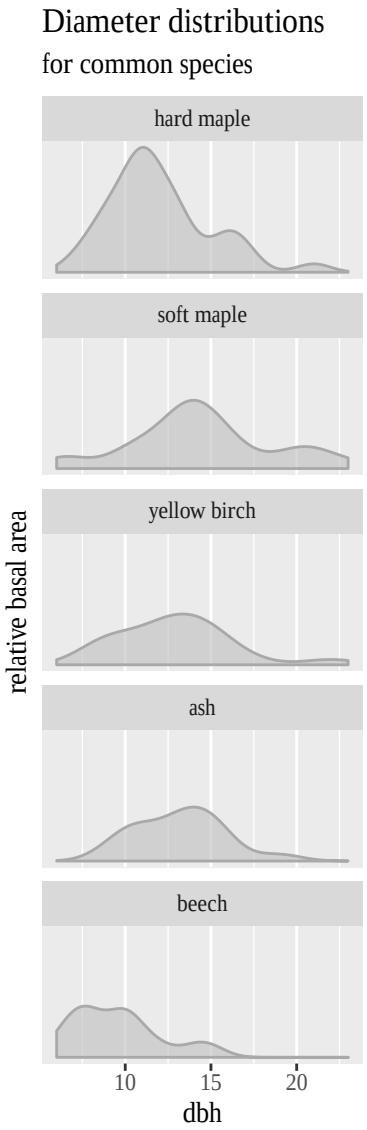


Figure 1: Distributions are approximated with kernel density estimation. Common species are those that account for at least 8 percent of the total stocking and areas under each curve represent species basal areas.

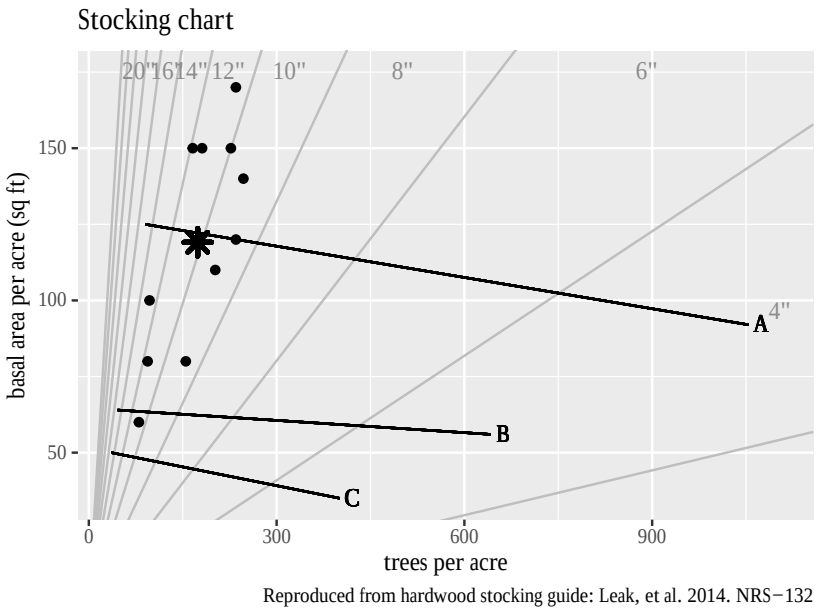


Figure 2: Points represent individual plots. Asterisk represnts stand average. Radial lines are quadratic stand diameters.

Measure	Total	AGS	UGS
Basal area (sq ft/ac)	119	77	42
QSD (in)	11	11	11
Stems/ac	174	108	66

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.	49	30	19
12-15 in.	52	39	13
16-21 in.	15	7	8
22+ in.	3	1	2
Total	119	77	42

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

Silvicultural prescription

Group Selection

Year: 2023

clear-cut & treat beech, groups and treat beech, avoid dealing with.

Area 2

White pine
1.00 legal acres | 1.00 measured acres

Site-specific information

- **Soils:**
  NA
- **Site Class:**
  II (determined from soil mapping and field assessment)
- **Access:**
  Excellent. Less than one mile.
- **Stand history:**
  Previous plan reports the area as pasture land that was abandoned c. 1950. We suspect abandonment was more like 1930. Well tended through several thinnings, around 1995 and in 2001.

Current forest information

- **Age Class Structure:**
  Two-aged
- **Species (% stocking):**
  white pine (51%), soft maple (31%), spruce (18%)
- **Regeneration:**
  Abundant fir, soft maple, striped maple, and black cherry in most areas. Other valuable hardwoods (including red oak) are present as seedlings.
- **Forest health:**
  Very few diseases in pines. Soft maple is of mixed quality. No exotic invasives noted.
- **Standing dead wood (sq ft/ac by size class):**
  6-10": 5 | 11-16": 0 | 17-22": 0 | 23+": 0

Inventory information

- 4 points, 10 BAF, September, 2019

Long-term management system

NA
NA

Silvicultural prescription

NA

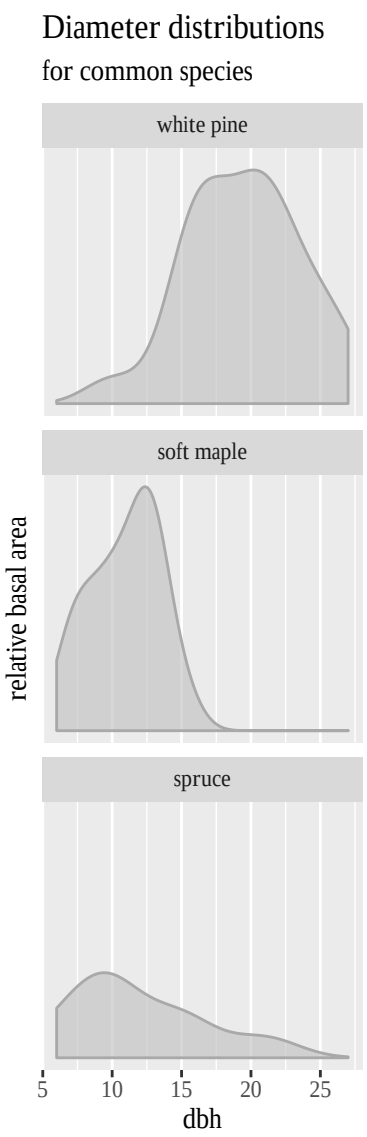


Figure 3: Distributions are approximated with kernel density estimation. Common species are those that account for at least 8 percent of the total stocking and areas under each curve represent species basal areas.

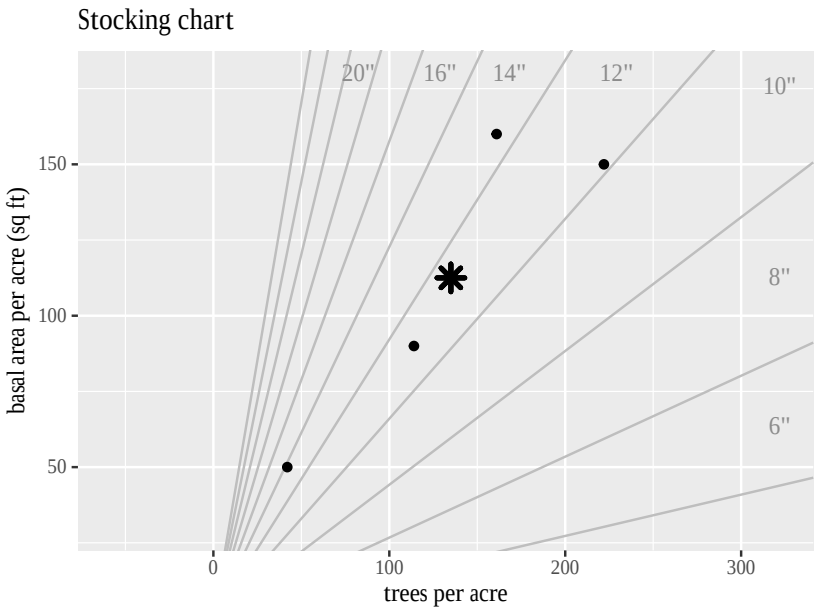


Figure 4: Points represent individual plots. Asterisk represnts stand average. Radial lines are quadratic stand diameters.

Measure	Total	AGS	UGS
Basal area (sq ft/ac)	112	90	22
QSD (in)	12	13	11
Stems/ac	135	98	37

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.	32	25	8
12-15 in.	28	15	12
16-21 in.	35	32	2
22+ in.	18	18	0
Total	112	90	22

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

Area 3

Mixedwood
1.00 legal acres | 1.00 measured acres

Site-specific information

- **Soils:**
  NA
- **Site Class:**
  II (determined from soil mapping and field assessment)
- **Access:**
  Fair. Less than one mile.
- **Stand history:**
  Probably continuously forested. Periodic logging. Highgraded c. 1990.

Current forest information

- **Age Class Structure:**
  Uneven-aged
- **Species (% stocking):**
  soft maple (46%), hemlock (33%), fir (10%), spruce (5%), hard maple (3%), white pine (3%)
- **Regeneration:**
  Well established fir and spruce, except where stocking rains high.
- **Forest health:**
  Generally poor quality because of highgrading. No exotic invasives noted.
- **Standing dead wood (sq ft/ac by size class):**
  6-10“: 3.3 | 11-16”: 3.3 | 17-22”: 0 | 23+”: 3.3

Inventory information

- 3 points, 10 BAF, September, 2019

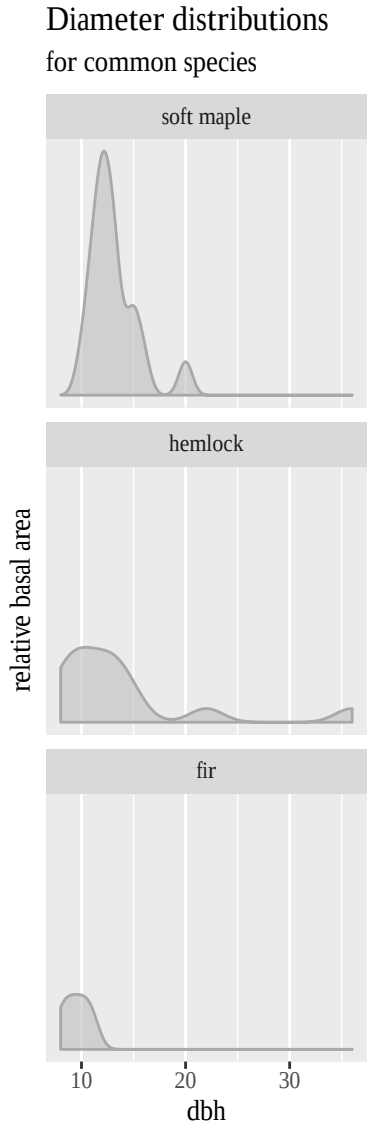


Figure 5: Distributions are approximated with kernel density estimation. Common species are those that account for at least 8 percent of the total stocking and areas under each curve represent species basal areas.

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

Measure	Total	AGS	UGS
Basal area (sq ft/ac)	130	110	20
QSD (in)	12	12	13
Stems/ac	173	152	21

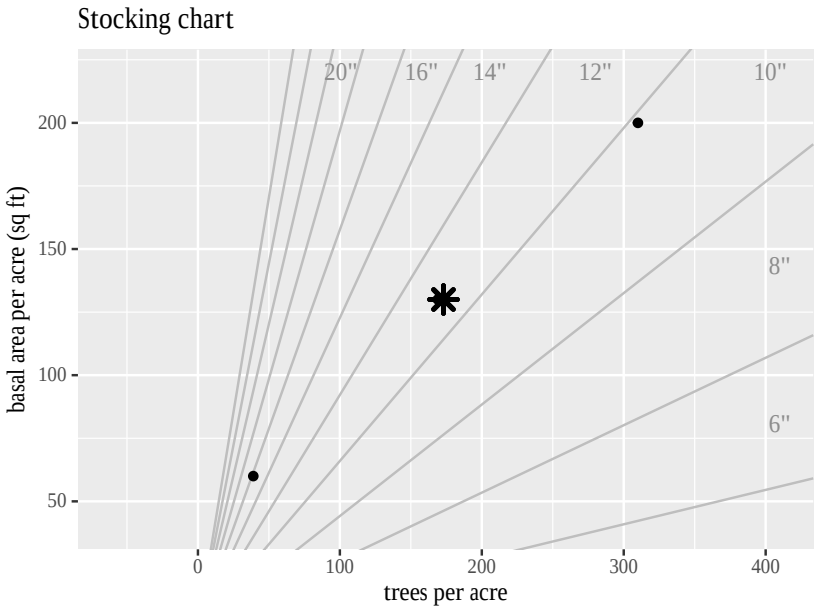


Figure 6: Points represent individual plots. Asterisk represnts stand average. Radial lines are quadratic stand diameters.

Size Class	Total	AGS	UGS	Target
6-11 in.	50	43	7	30
12-15 in.	60	53	7	30
16-21 in.	13	13	0	25
22+ in.	7	0	7	15
Total	130	110	20	100

Table 6: Current (total, acceptable, and unacceptable growing stock) and post-harvest target basal areas (sq ft/ac) by size class.

Long-term management system

NA

NA

Silvicultural prescription

Continuous Cover Irregular Shelterwood

Year: 2023

Group and individual tree selection with focus on quality.

Area 4

Mixedwood
1.00 legal acres | 1.00 measured acres

Site-specific information

- **Soils:**
  NA
- **Site Class:**
  II (determined from soil mapping and field assessment)
- **Access:**
  Good access from adjacent fields. Less than one mile.
- **Stand history:**
  Progressive pasture abandonment. Western edge abandoned c. 1930s. Occasional grazing elsewhere until early 1980s.

Current forest information

- **Age Class Structure:**
  Even-aged
- **Species (% stocking):**
  soft maple (24%), fir (23%), white pine (23%), spruce (10%), hard maple (5%), ash (4%), aspen (3%), yellow birch (3%), other hardwood (2%), beech (1%), paper birch (1%)
- **Regeneration:**
  Most of stand is still in stem exclusion stage.
- **Forest health:**
  Many pines are poorly formed, especially where grazing continued. Blister rust present on some pines. No exotic invasives noted.
- **Standing dead wood (sq ft/ac by size class):**
  6-10": 4.3 | 11-16": 7.1 | 17-22": 0 | 23+": 1.4

Inventory information

- 7 points, 10 BAF, September, 2019

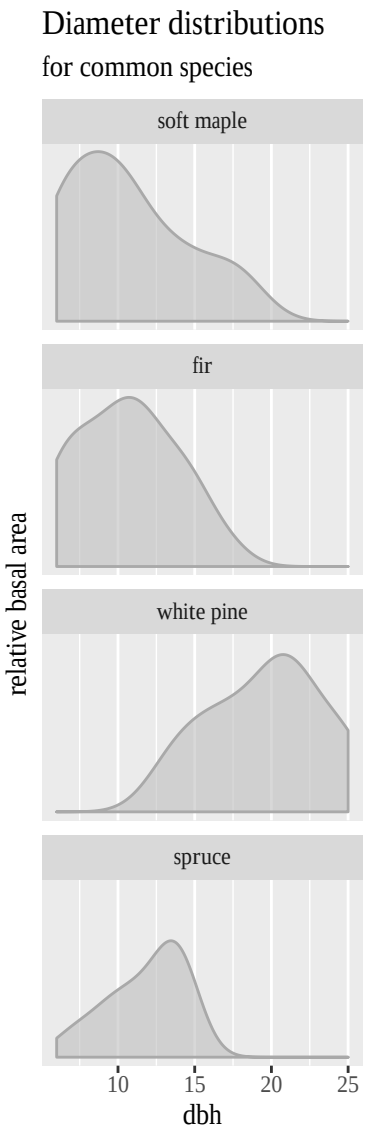


Figure 7: Distributions are approximated with kernel density estimation. Common species are those that account for at least 8 percent of the total stocking and areas under each curve represent species basal areas.

Table 7: Measures of stocking for all live trees (Total), acceptable growing stock (AGS), and unacceptable growing stock (UGS).

Measure	Total	AGS	UGS
Basal area (sq ft/ac)	137	109	28
QSD (in)	10	10	11
Stems/ac	232	188	44

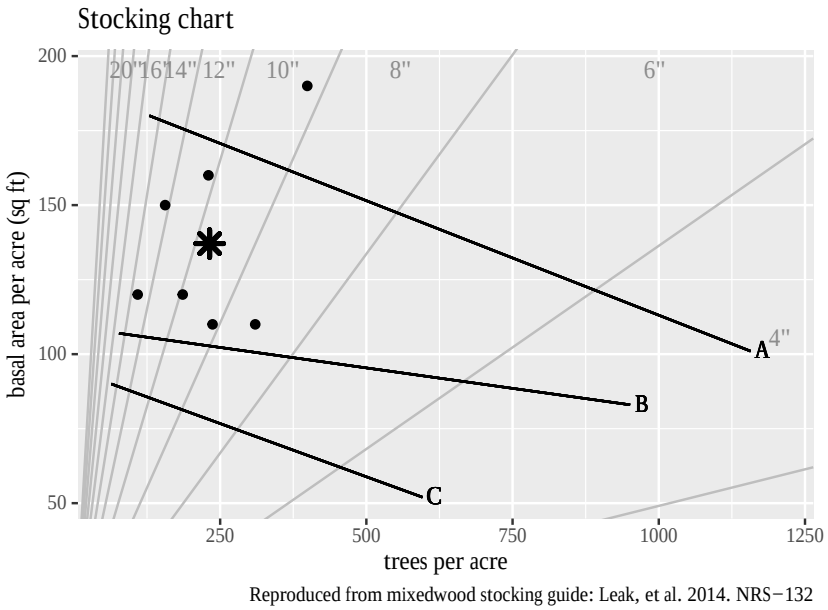


Figure 8: Points represent individual plots. Asterisk represnts stand average. Radial lines are quadratic stand diameters.

Size Class	Total	AGS	UGS
6-11 in.	57	49	9
12-15 in.	43	34	9
16-21 in.	27	17	10
22+ in.	10	9	1
Total	137	109	29

Table 8: Current basal area (sq ft/ac) of total growing stock, acceptable growing stock, and unacceptable growing stock by size class.

Long-term management system

NA
NA

Silvicultural prescription

Precommercial Thinning
Year: 2023
Precommercial release or wait.

Area 5

Pine-hardwood
1.00 legal acres | 1.00 measured acres

Site-specific information

- **Soils:**
  NA
- **Site Class:**
  III (determined from soil mapping and field assessment)
- **Access:**
  Steep ledgy terrain limits maneuverability, but skid roads are established in many areas. Small landing located on Eagle Ledge Road.
- **Stand history:**
  Continuously forested with occasional logging, most recently in . Older cohort appears to date to c. 1920.

Current forest information

- **Age Class Structure:**
  Two-aged
- **Species (% stocking):**
  soft maple (28%), hemlock (19%), spruce (13%), hard maple (12%), fir (9%), yellow birch (7%), ash (4%), paper birch (4%), aspen (1%), hophornbeam (1%), red pine (1%)
- **Regeneration:**
  Spruce, fir, and/or beech fairly well established in most places.
- **Forest health:**
  Beech are impeding regeneration in places. No exotic invasives noted.
- **Standing dead wood (sq ft/ac by size class):**
  6-10": 10 | 11-16": 12.2 | 17-22": 0 | 23+": 0

Inventory information

- 9 points, 10 BAF, September, 2019

Long-term management system

NA
NA

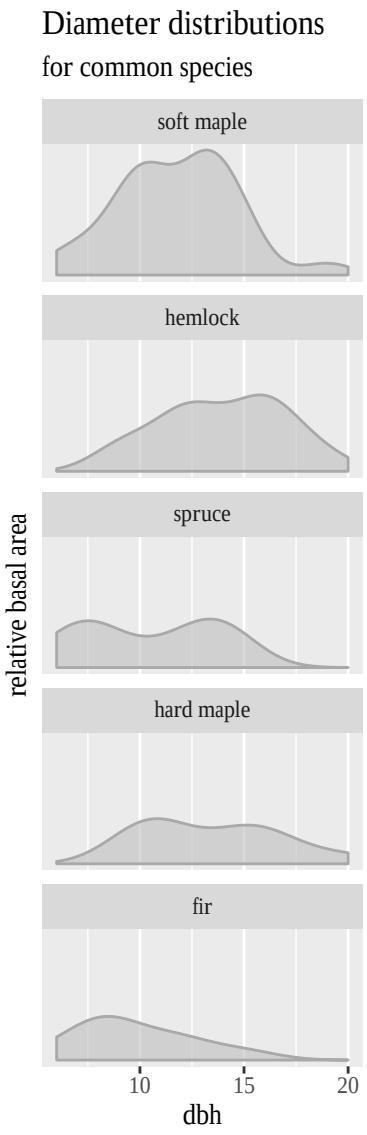


Figure 9: Distributions are approximated with kernel density estimation. Common species are those that account for at least 8 percent of the total stocking and areas under each curve represent species basal areas.

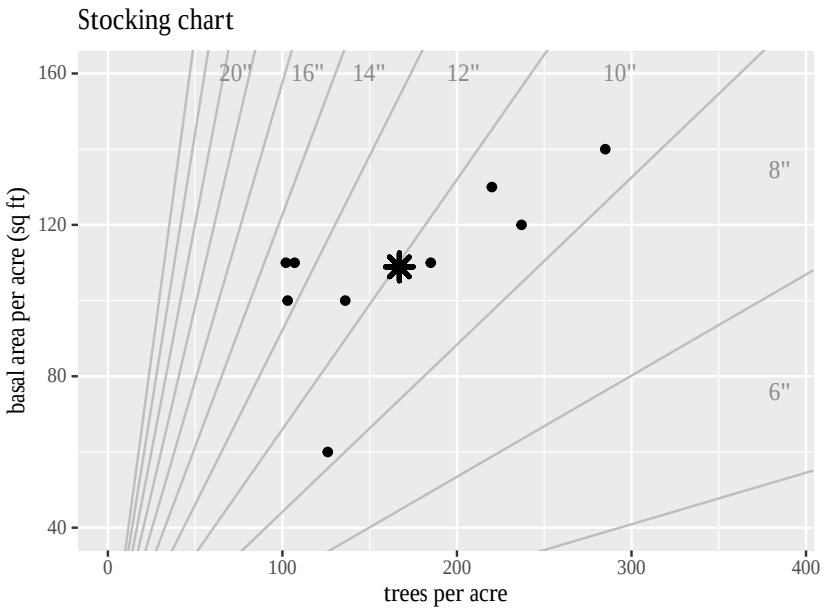


Figure 10: Points represent individual plots. Asterisk represnts stand average. Radial lines are quadratic stand diameters.

Measure	Total	AGS	UGS
Basal area (sq ft/ac)	109	87	22
QSD (in)	11	11	12
Stems/ac	167	138	29

Table 9: Measures of stocking for all live trees (Total), acceptable growing stock (AGS), and unacceptable growing stock (UGS).

Size Class	Total	AGS	UGS	Target
6-11 in.	44	37	8	30
12-15 in.	43	34	9	30
16-21 in.	19	14	4	25
22+ in.	2	1	1	15
Total	109	87	22	100

Table 10: Current (total, acceptable, and unacceptable growing stock) and post-harvest target basal areas (sq ft/ac) by size class.

Silvicultural prescription

Continuous Cover Irregular Shelterwood
Year: 2023

Hybrid selection or wait.

Area 6

Northern hardwood
1.00 legal acres | 1.00 measured acres

Site-specific information

- **Soils:**
  NA
- **Site Class:**
  II (determined from soil mapping and field assessment)
- **Access:**
  Probably best accessed from small landing on Eagle Ledge road, via steep skid trail. Access from south may be possible too.
- **Stand history:**
  Probably pastured some, but never plowed. Oldest trees date to c. 1920s. Probably logged several times, most recently in 2005/06, when mature, declining, and low quality trees were removed.

Current forest information

- **Age Class Structure:**
  Even-aged
- **Species (% stocking):**
  soft maple (30%), yellow birch (19%), beech (17%), hard maple (11%), ash (7%), hemlock (7%), black cherry (4%), aspen (2%), paper birch (1%), spruce (1%)
- **Regeneration:**
  Beech saplings are problematic over most of the stand. Limited spruce and fir also present.
- **Forest health:**
  Beech bark disease is impeding regeneration. Many overstory trees are of marginal quality. No exotic invasives noted.
- **Standing dead wood (sq ft/ac by size class):**
  6-10": 2.9 | 11-16": 10 | 17-22": 0 | 23+": 0

Inventory information

- 7 points, 10 BAF, September, 2019

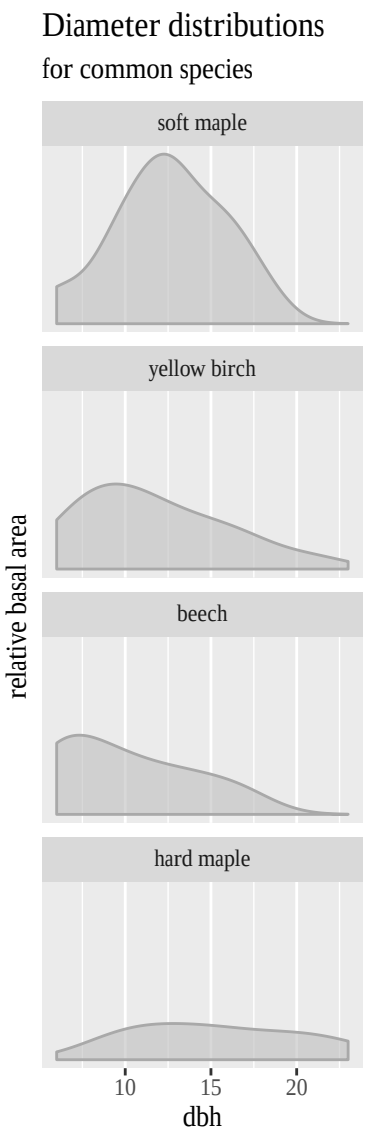


Figure 11: Distributions are approximated with kernel density estimation. Common species are those that account for at least 8 percent of the total stocking and areas under each curve represent species basal areas.

Long-term management system

NA
NA

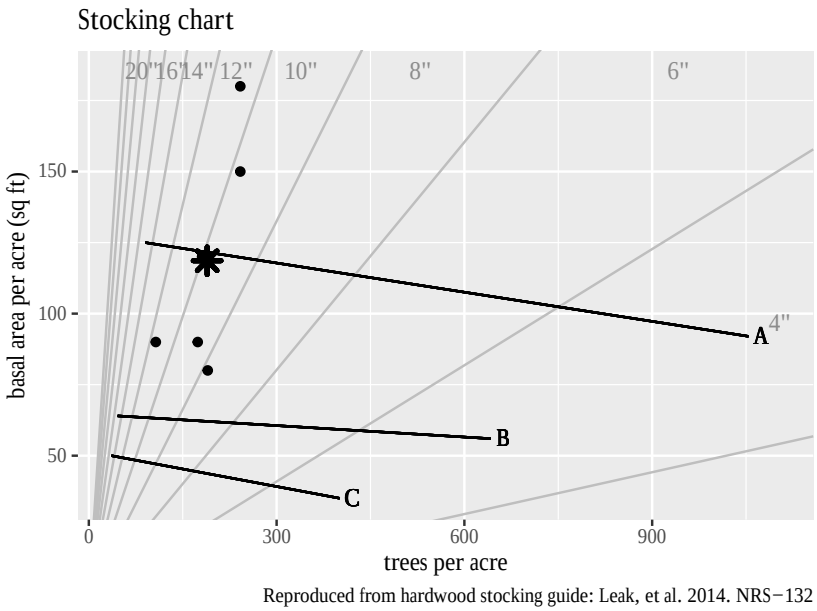


Figure 12: Points represent individual plots. Asterisk represnts stand average. Radial lines are quadratic stand diameters.

Measure	Total	AGS	UGS
Basal area (sq ft/ac)	119	86	33
QSD (in)	11	12	9
Stems/ac	189	120	69

Table 11: 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.	43	24	19
12-15 in.	44	39	6
16-21 in.	30	23	7
22+ in.	1	0	1
Total	119	86	33

Table 12: Current basal area (sq ft/ac) of total growing stock, acceptable growing stock, and unacceptable growing stock by size class.

Silvicultural prescription

Group Selection
Year: 2023
Group selection with beech control or wait.

Area 7

Mixedwood
1.00 legal acres | 1.00 measured acres

Site-specific information

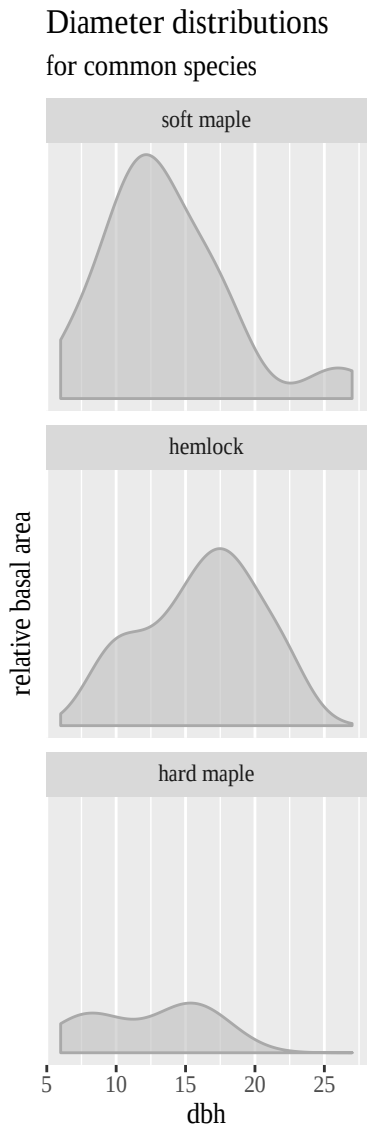
- **Soils:**
  NA
- **Site Class:**
  II (determined from soil mapping and field assessment)
- **Access:**
  One main skid trail provides the only access from a small landing on Eagle Ledge road. Wet soils restrict movement at certain times of year. Best to enter in dry conditions.
- **Stand history:**
  Parts were probably pastured to a limited degree, but never plowed. The oldes trees are probably over 100, while the majority of the overstory dates to between 1930 and 1950. Logged several times, most recently in 2005/06, when soft maple, spruce, and fir were targeted.

Current forest information

- **Age Class Structure:**
  Two-aged
- **Species (% stocking):**
  soft maple (35%), hemlock (27%), hard maple (8%), beech (7%), fir (7%), yellow birch (7%), spruce (5%), paper birch (2%), ash (1%), white pine (1%)
- **Regeneration:**
  spruce, fir, hemlock, and yellow birch well established in places.
- **Forest health:**
  Shallow and/or wet soils limit rooting and increase risk of windthrow somewhat. No exotic invasives noted.
- **Standing dead wood (sq ft/ac by size class):**
  6-10": 3.8 | 11-16": 15 | 17-22": 0 | 23+": 0

Inventory information

- 8 points, 10 BAF, September, 2019



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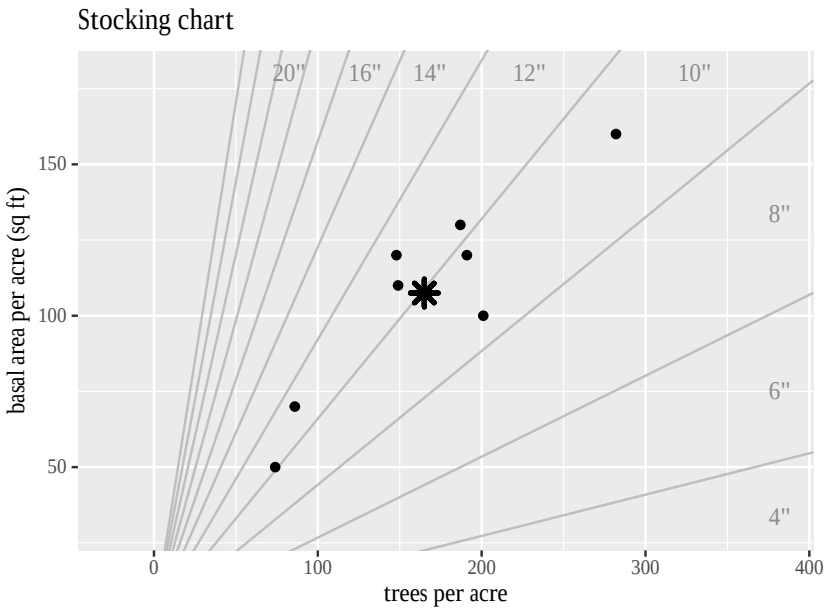

Figure 14: Points represent individual plots. Asterisk represnts stand average. Radial lines are quadratic stand diameters.

Measure	Total	AGS	UGS
Basal area (sq ft/ac)	108	82	26
QSD (in)	11	11	10
Stems/ac	165	120	45

Table 13: Measures of stocking for all live trees (Total), acceptable growing stock (AGS), and unacceptable growing stock (UGS).

Size Class	Total	AGS	UGS	Target
6-11 in.	42	31	11	30
12-15 in.	30	26	4	20
16-21 in.	26	20	6	40
22+ in.	9	5	4	2
Total	108	82	25	92

Table 14: Current (total, acceptable, and unacceptable growing stock) and post-harvest target basal areas (sq ft/ac) by size class.

Long-term management system

NA

NA

Silvicultural prescription

Hybrid Selection

Year: 2023

Hybrid selection or wait.

References

Leak, William B., Mariko Yamasaki, and Robbo. Holleran. 2014. "Silvicultural Guide for Northern Hardwoods in the Northeast." NRS-GTR-132. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. doi:10.2737/NRS-GTR-132.