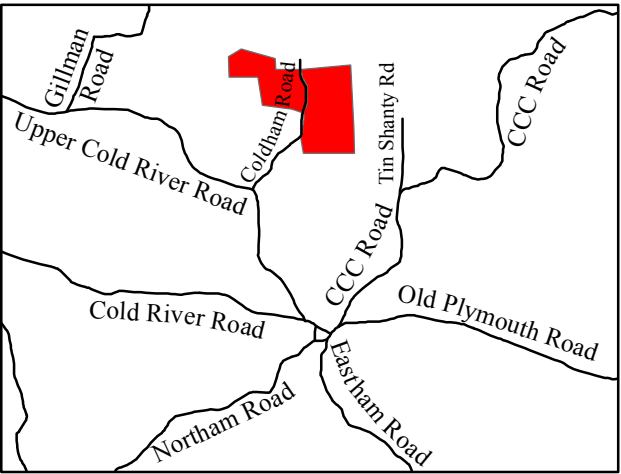


UVA FOREST MANAGEMENT MAP
for the lands of
Jockey Hill Associates

Shrewsbury, Vermont
SPAN: 594-187-10343

Locus Map



n/f US Park Service -
Appalachian Trail corridor

n/f Shrewsbury
Forest LLC

Area 1

N 117300
E 472900

N 117300
E 473700

n/f State of Vermont -
Coolidge State Forest

n/f Brigham

some red blazes

red blazes

n/f Rice Trust

Area 2

Area 4

Area 5

red blazes

Area 3

Area 6A

Area 6B

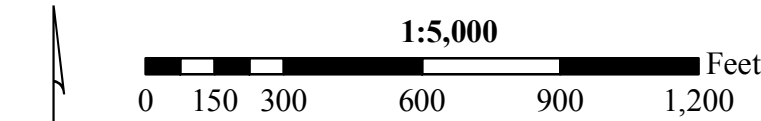
Area 8

red blazes

n/f Rice Trust

n/f State of Vermont - Coolidge State Forest

- property boundary
- stand boundary
- excluded land
- non-productive land - wet
- open land
- pond
- stream
- intermittent stream
- wet area
- stonewall
- town highway
- driveway
- woods road
- building



This is not a survey - boundaries are approximate
Based on Vermont orthophoto #473116 (2016)

Chart of Acreage Adjustment - Jockey Hill Associates - Shrewsbury, VT

Town listed acres in parcel	173.2
Actual acres to be excluded as measured on orthophoto	2.2
Acres to be entered	171.0
Acres to be entered according to map calculations	188.7
Factor to prorate acres	0.9062

Area type	Map Acres	Factor	Prorated Acres
Productive Forest Land			
Area 1 - red maple-red spruce-white birch	17.1	0.9062	15.5
Area 2 - sugar maple-mixed hardwoods - sugarbush	44.1	0.9062	40.0
Area 3 - red spruce-red maple-balsam fir	12.3	0.9062	11.2
Area 4 - red spruce-hemlock-mixedwood	15.8	0.9062	14.3
Area 5 - red spruce-mixedwood	19.2	0.9062	17.4
Area 6 - plantation/former plantation	7.4	0.9062	6.7
Area 7 - red maple-white pine-popple	5.3	0.9062	4.8
Area 8 - white pine-red maple-mixedwood	16.6	0.9062	15.0
Area 9 - red spruce-balsam fir-mixedwood	30.8	0.9062	27.9
Total Productive Forest Land	168.6	0.9062	152.8
Non-productive Land			
NP 1 - streamside wetland	1.4	0.9062	1.3
Total Non-productive Land	1.4	0.9062	1.3
Open Land			
Open A - maintained open field	0.6	0.9062	0.5
Open B - maintained open field	0.7	0.9062	0.6
Open C - maintained open field	7.7	0.9062	7.0
Open D - maintained open field	0.4	0.9062	0.4
Open E - maintained open field	5.7	0.9062	5.2
Open F - maintained open field	3.6	0.9062	3.2
Total Open Land	18.7	0.9062	16.9
Enrolled land (adjusted)	171.0		
Excluded land - house site (actual)	2.2		
Total Grand List acreage	173.2		

N 116200
E 472900

N 116200
E 473700

Coldham Road
to Upper Cold River Road (0.25 miles)



MAP PRODUCED BY



**Calfee Woodland
Management LLC**

Dorset, Vermont
802-231-2555

31 March 2020,
excluded land
updated
22 April 2020

MTW

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

The Forest Management Process

This management plan describes the parcel as it exists today, and to assure improved resource quality it specifies activities for the next ten to twenty years. This temporal perspective recognizes that active forest management requires a long term perspective tempered with careful seasonal and annual evaluations. Active, yet conservative management improves the likelihood that the assets this property contains will increase in value. On this property, the assets are the natural resources, represented by their benefit to the landowner and the environment. The tangible assets represented by **forest products** (e.g. veneer, sawlogs, pulpwood, syrup and firewood) offer a potential, occasional source of monetary revenue which can be carefully managed to offset costs of ownership. The less tangible natural resource assets include **ecosystem services** (e.g., ground water filtration) **wildlife habitats, scenic views** and **recreational opportunities**; each of these adds to the overall value.

The forest management planning process involves identifying landowner objectives, carefully assessing the resources on the parcel, developing management objectives and proposing management activities with careful consideration of the landowner objectives and the resource assessment. This process ensures prudent, balanced management practices which will benefit the land and the landowners in perpetuity.

The management planning process and the actual management of the forest on the property must involve the consideration for the development of a forest over time and the understanding that this development is not exactly predictable. Many factors will change over the course of implementing this and future management plans. A conservative approach will improve the chances that resources will not be negatively impacted by uses or activities.

Landowner Objectives

The reason why the landowners own the property and their objectives for the land determine what characteristics are assessed during the creation of the management plan and what management activities are prescribed and executed. Below are the main objectives of the landowners for this property.

The main objectives of the landowners are:

- Careful long-term stewardship of the land and its natural resources.
- Retain and/or perpetuate of multiple cover types and land uses across the property.
- Protect soil and water quality.
- Increase structural diversity within the forest using uneven-aged management techniques and targeting old-forest characteristics.
- Maintain and/or improve wildlife habitat for a diversity of species.
- Minimize non-native invasive plant populations.
- Increase the quantity of carbon stored in the above and below-ground pools of the forest.
- Manage forest proactively to accommodate changes in climatic conditions.
- Maintain a network of woods roads and trails for recreational access.
- Monitor the health of the forest and its components, such as white ash trees.
- Investigate the potential for enrolling the land in a carbon credit program, possibly as part of a cooperative of neighboring landowners.

--- continued on next page ---

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

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Landowner Objectives, continued

- Partner with conservation organizations on management activities and demonstrations to professionals and the general public.
- Integrate new management practices and procedures.
- Periodically harvest timber products to help offset cost of property ownership and contribute to the forest-products economy.

Introduction

Property, Land, Water and Landscape

This management plan covers the forest on the approximately 173 acre parcel belonging to Jockey Hill Associates, located east and west of Coldham Road in the northeast quadrant of the town of Shrewsbury. The property has frontage on and is accessed from Coldham Road, a narrow but good Class 3 gravel town dirt road. The section of Coldham Road to the north of the intersection with the driveway for this property is rougher and is not maintained in the winter. Access to the property from Coldham Road for forest management is from several points. The portion of the forest west of Coldham Road can be accessed from the town road, directly across the lands of Jockey Hill Associates, or across the lands David and Dorothy Rice, a relative to the owners of Jockey Hill Associates. Access to the land east of Coldham Road is complicated by Gould Brook. A narrow bridge carries the driveway to the house on the property and can be used for small and medium-sized vehicle to access the property east of Coldham Road but may not be able to handle log trucks. To extract logs from the forest east of Coldham Road, logs could be routed across the bridge with a forwarded (a machine that carries logs from the forest, rather than skidding them) to a landing west of Coldham Road or could be routed south across the lands of David and Dorothy Rice to the lands of Rebecca Rice, whose parcel provides access from Coldham Road without needing to cross Gould Brook. Several existing interior woods roads provide access to portions of the property.

Stonewalls, blazes and wire fences appear to mark some of the perimeter of the Jockey Hill Associates ownership, though the accuracy of these features was not verified. Portions of the northcentral and eastern boundaries are marked with stonewall and/or red blazes. The northwest line is marked with yellow blazes. Portions of the western line are marked by stonewalls, but in other places are unmarked. There is intermittent wire fence along the southern line in the east, but other sections are unmarked. Sections of the boundary between Jockey Hill Associates and David and Dorothy Rice are unclear. The land surrounding this parcel is a mix of public and private ownership. All of the land south of the subject property is owned by David and Dorothy Rice (as a Trust). The land to the northwest is owned by the federal government, as part of the Appalachian Trail corridor (controlled by the US Park Service and administered by the US Forest Service) and land to the



A section of stonewall along the northern boundary of the property. This wall was constructed in the 1800s when the surrounding land was pasture.

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east is the Coolidge State Forest, controlled by the Vermont by the Department of Forests, Parks and Recreation. Land adjacent to a small section of the western boundary is owned by Shrewsbury Forest LLC and a section of the northern boundary is owned by Brigham, two private landowners.

The property is located low on the south slope of Jockey Hill and the west slope of Russell Hill, two small knobs on the southern ridges of Shrewsbury Peak, a 3700 foot mountain located to the northeast, part of the Coolidge Range. Limited portions of land in the northwest and north-center of the parcel are steeply sloped while most of the remainder is gentle to moderately sloped. There are pockets of relatively flat, particularly in the east and south. Most of the land has a southern or western aspect. Elevations range from about 1720 feet (above sea level) in the south along Gould Brook and its eastern tributary to 2060 feet in the northwest corner.

The bedrock underlying the property is metamorphic, generally originating from sediments or from sub-volcanic intrusions. The bedrock is predominantly the biotite-quartz-plagioclase gneiss common to the region of the Green Mountains with some schists and quartzites. Soils on the forested portion of the property are generally of moderate productivity. Portions of the land in the west have higher productivity. Productivity is lower in portions of the east where the water table is high for portions of the year and in the northwest corner, where soils are shallow.



A pocket of maidenhair fern in the stand of sugar maple in the northwest of the property. Maidenhair fern and sugar maple are indicators of enriched soils.

There is one medium-sized stream, numerous smaller streams, three small man-made ponds, a wetland and a number of wet areas on the property. Gould Brook, a tributary to Cold River, and the largest stream on the property, is the waterway which all the land on the parcel drains. The smaller streams are mainly

intermittent, generally flowing in the spring, fall and following large rain events or during other extended wet periods. One of the ponds is near the house but the other two ponds are located in the forest. These appear to have been constructed to supply water to livestock when the property was used for agriculture. There is a wetland adjacent to one of the tributaries of Gould Brook, south of the house, dominated by wetland shrubs and herbaceous plants. The wet areas are scattered through the property and range from areas of consistently saturated soils dominated by herbaceous plants to forested areas with moist to wet soils at various times of year. The wet areas that remain saturated enough to prohibit trees from establishing are small while the forested areas with moist to wet soil are larger, the two largest being in the east of the property.

In the larger context, this land is in the southern Green Mountains, the mountain range that runs north-south through Vermont and into Massachusetts. Given the mountainous nature, much of the land in the region is forested, though there is scattered open land and development along the flatter ground and valley bottoms adjacent to town roads and in villages. Despite its historic use as farm land, there is little active agriculture in the region. There are some pastures and hay land but most of the open

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land is maintained through periodic mowing for aesthetics and/or wildlife habitat. The land to the north and east of this property is particularly undeveloped and ties into tens of thousands of acres of forest, mainly located along the higher ridges of the Green Mountains. This block of higher elevation forest land to the north is eventually fragmented by Killington and Pico ski area and their associated development.

Land Use History

In this region of Vermont the original forest began to be cleared in the mid to late-1700s by the early settlers of European descent. Before Europeans arrived there was likely little Native American manipulation of the landscape in the higher elevation lands, though it is unclear what impact the Native Americans had on this landscape. The original clearing by European settlers was small-scale and mostly for subsistence farming but became widespread by the mid-1800s as a sheep farming boom got underway and more pastureland was needed. For a few decades in the mid-1800s the area was a major world producer of wool and by the 1850s, a large portion of the region was cleared for pasture. Some of the trees cut during the clearing may have been used for timber but most were probably either used for fuel or burned simply to remove the material to convert the land. Shortly after the middle of the 19th Century the wool industry quickly collapsed and the area lost its place as a player in the world wool market. The agricultural focus shifted from wool to dairy and as cows could not utilize the steeper or more remote pastures, much of the land that was cleared a few decades earlier was abandoned for agricultural purposes and the forest was allowed to return.

On this property, most of the acreage was cleared for conversion to pasture or crop land, likely in the early to mid-1800s. Although the sheep industry diminished in the area in the mid-1800s and land in the region was abandoned for farming purposes, agricultural use of most of this property continued, in part because of its relatively moderate terrain. The steeper land in the northwest and along Gould Brook was poorly suited for cows so these areas were quickly abandoned but the remaining land remained open initially. Over the course of the first three-quarters of the 1900s, however, agricultural use decreased and finally ceased and the forest returned to most of the land once pasturing use was not sufficient to keep tree seedlings from establishing. Stonewalls and wire fences erected during the agricultural phase are still evident around the property and old apple trees are still growing within the forest northeast of the house, part of the small orchard for the farm.

Since the current forest established there have been several timber harvests and forest management practices have been carried out. Timber and firewood was likely cut in the first half of the 1900s on the portions of the property that were first abandoned for agriculture. In the 1930s Scotch pine were planted on about six acres. Most of these trees were cut and between the 1980s and 2006 and about one and half acres were replanted to white spruce, Scotch pine and white pine in the 1980s. Light logging occurred



A stump in the sugarbush, probably from logging in the 1980s. This area has been tapped to harvest maple sap for decades.

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in the 1980s and 90s and small groups and patches were cut between 2005 and 2015. Some of this cutting was to salvage damaged trees that resulted from wind storms in 1999 and 2005. Maples have been tapped in an area west of Coldham Road for decades, with the area tapped increasing periodically.

The Current Forest

Currently, approximately 90% of the parcel is forested and the remainder is a combination of open fields and a house site. For the purposes of management, the forested portion of the property has been divided into stands, or areas – contiguous regions having similar species composition and structure and that can be treated at the same time during a management activity. Although most of the forest within a stand is similar, that is not to say that entire block of forest is homogenous. There are pockets within the stands that may be considerably different in composition than the remainder of the forest but these regions are relatively small and they can be managed using the same silvicultural treatments as the adjacent regions. Nine forest stands have been designated on this property and have been labeled Areas 1 through 9. Some of the stands approximately follow boundaries established by the previous forester for earlier management plans, while some boundaries have been considerably redrawn. In addition to the forest land, one wetland (Area NP 1) and seven open areas are present and labeled Open A through F.

Across the property, the overstory forest is approximately an even mix of hardwood and softwood trees. Several stands (Area 2 and 7) are predominantly hardwoods, while several stands (Areas 4, 5 and 9) are predominantly softwoods. Red spruce, red maple and sugar maple are the most common species on the property, accounting for about two-thirds of the number of trees and the basal area of the overstory trees. White birch, white pine, hemlock and balsam fir are common in pockets. At least 13 native tree species are present on the property. Planted white spruce and Scotch pine are found in Area 6. These species are not native to the region; white spruce is native to northern Vermont, while Scotch pine is native to Eurasia.

As indicated above, the current forest established on old farm land or following heavy cutting of the forest that established following agricultural abandonment. The bulk of the trees in the forest are between 50 and 90 years old, with several pockets younger and a few pockets older. The oldest trees are in the sugarbush of Area 2 while the youngest trees are in the several small groups cut in Area 9 in 2015. Younger forest is also present in pockets of Areas 5, 6 and 8.



Balsam fir and red spruce regeneration in the four acre patch in Area 5, cut to salvage trees in the area that were damaged by the remnants of Hurricane Floyd in September 1999.

The forest understory on the property is quite variable. Generally, the density of seedlings and saplings is light to moderate but with pockets of moderate to heavy. Red spruce, balsam fir and beech

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are the dominant species of regeneration. Most of the groups and patches cut between 1999 and 2015 resulted in the establishment of an adequate regeneration but the groups cuts in Area 9 in 2015 and one group cut in 2005-06 are currently mostly dominated by herbaceous plants. Hopefully, with time, these groups will be colonized by tree regeneration.

Most of the trees on the property are generally healthy. Some balsam fir mortality occurred between 2010 and 2015, likely due to balsam wooly adelgid. The crowns of some white ash are thin, though many look vigorous. No evidence of emerald ash borer was observed and the thinning crowns in some ash may be the result of ash yellows, caused by a bacteria, or ash decline, a poorly understood condition with no known specific causal agent. As is the case with beech throughout the region, beech bark disease is causing decline in the beech population. Some white birch is showing signs of dieback and decline, likely a result of tree age and/or competition. The minor popple population is over-mature and declining. Productivity is limited in pockets in the northwest due to dry soils and in several pockets in the west and east due to poorly drained soils.

Ferns are quite common on the forest floor in much of the property. The distribution of these plants is generally patchy and their density ranges from light to heavy. Massachusetts and intermediate wood fern are the most common species, but hay-scented, sensitive, cinnamon fern and long beech fern are present in places. Once established, ferns are effective at holding onto growing space and can interfere with the establishment and growth of other plant species. Another concern regarding the establishment and growth of plants in the forest is non-native, invasive plants. Non-native, invasive plants are covered in more depth below.

Non-native Invasive Plants

Non-native invasive plants are those plants that are not indigenous to the region, and which due to their growth characteristics (e.g., frequent and prolific seed production, successful germination, early bud break and late leaf drop) and lack of controlling agents (i.e., herbivores or diseases/pests), have the potential to have considerable population growth, while outcompeting native vegetation. In this region most of the problem non-native invasive species are woody shrubs but there are also herbaceous perennial plants, biennials, woody vines and trees. In most cases, in the absence of control efforts, non-native invasive plants increase in size and number, and in forests, particularly benefit from disturbances to the overstory vegetation, such as experienced as the result of a wind storm or timber harvest. As non-native plant populations increase, the forest composition and structure can be considerably altered. Although we don't know how non-native invasive plant populations will develop over an extended period of time, a century for example, it seems that once the invasive population is high enough, they could control a site indefinitely, changing a forest into a shrubland.



A non-native invasive Asiatic bittersweet vine, with fruit, growing on a red spruce sapling in a small group in Area 9. The non-native invasive plant population on the property is small but has the potential to grow, in part due to the prolific seed production, as seen on this bittersweet vine.

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Fortunately, on this property, the non-native invasive plant population is quite small. During the 2019 forest inventory only a scattering of plants were observed, and only in two forest stands and one open area. The non-native invasive plants known to be on the property are honeysuckle, multiflora rose, bittersweet, common buckthorn and goutweed. Goutweed, an herbaceous plant, is present mainly along Coldham Road south of the driveway to the housesite, though it may be present elsewhere; one plant was observed in the woods road on the Rice property that passes just to the south of the southwest corner of this property (Area 3). The other non-native invasives observed on the property are woody plants. Honeysuckle and multiflora rose are shrubs, common buckthorn is a shrub/small tree and bittersweet is a vine. The buckthorn observed was a very small seedling (and was pulled during the forest inventory) in the undisturbed forest of Area 2. The other woody plants observed are in Area 9, mainly in or adjacent to the pockets that were cut in 2005-06 or 2015. These plants are generally small to medium-sized but because of access to sunlight through the gaps in the forest canopy, some are growing vigorously. Treating the invasive plants currently on the property and periodically monitoring and controlling newly established plants will be much cheaper and better for the forest than allowing the population to grow before treatment.

Carbon Storage

Forests and other natural areas have the capacity to sequester carbon from the atmosphere and store it in solid form through the photosynthesis and metabolic processes of living organisms. This sequestration and long-term storage of carbon has the capacity to reduce atmospheric carbon dioxide levels, thus reducing the impact of this greenhouse gas on the earth's climate. On this property, the forest has the greatest carbon storing capacity. Carbon in forests is stored in five major pools; aboveground living biomass, belowground living biomass, above ground dead biomass, forest floor dead biomass and belowground soil organic material. In a mid-aged forest the majority of carbon stored in live above and below ground vegetation and in the soil.



An old tree lying on the forest floor. Although most of the carbon in this tree will reenter the atmosphere as carbon dioxide in the next decade, some will enter the forest floor dead biomass and belowground soil organic material pools and be sequestered for much longer.

The amount of carbon a forest currently stores, the rate at which it can sequester carbon and the total carbon storage capacity of a forest are dependent on species composition, age, productivity and management of the forest. In general, younger forests sequester carbon at a faster rate but old forests generally store the largest amount of carbon. Managing the forest by cutting trees changes both the sequestration rate and the storage capacity. Management can increase or decrease the sequestration rate but management generally decreases the storage capacity of the forest. Management in the short-term can increase both sequestration rate and storage capacity in the long-term and make the forest better suited grow in potentially different climatic conditions.

The forest on this property is on the young-side, most having established 50-90 years ago. The clearing and use as agricultural land during the 1800 and 1900s released much of the forest stored in

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the pre-settlement forest, both above ground and below ground. Carbon has been accumulating on the wooded acreage since the forest reestablished and future management will focus on growing the amount of carbon stored on the ownership.

For a more comprehensive overview of forest carbon storage and the effect of forest management on carbon storage, see Catanzaro and D'Amato (2019).

Climate Change

In the coming decades the average temperature and amount of precipitation in the northeast is predicted to continue to increase. Precipitation events will become more erratic and intense. Longer growing seasons, changes in the maximum and minimum yearly temperatures and changes to precipitation amounts and patterns have the potential to favor some plant species over others. Species not currently on the property may be better suited than those present but natural plant migration may not occur at a rate fast enough to get those species on site and facilitated migration (through planting) may be cost prohibitive. Therefore, it's more practical to work with the existing forest to create conditions that can handle the changes in temperature and precipitation and stay healthy and productive. The management of forests in the scope of a changing climate must focus on the adaptability and resilience of the current forest and the basic principles guiding the management of a forest in a changing climate are similar to those of the general principles of good forestry: maintain or encourage a diversity of species suited to the site now and in the future, maintain or encourage a diversity of forest structures, protect soil from erosion, compaction and degradation, control non-native invasive plants and periodically assess forest conditions and adjust future management accordingly.

Forest Management

The management activities proposed in this management plan are aimed at improving the quality and vigor of the trees in the forest over the long term while attempting to increase the carbon stored in the forest to lower atmospheric greenhouse gas concentrations and make the forest more resilient for the expected changes in climatic conditions. The intent of this forest management plan is to outline the objectives for the forestland and a schedule and details of activities that will be carried out to meet these objectives. Timber management activities scheduled during the management planning period covered by this plan will focus on thinning the forest to increase the growth of the remaining trees and establishing a new cohort of trees of desirable species in the productive forest, while increasing the diversity of forest structure. Despite the focus of this specific plan being only 10 to 20 years, it is part of the forest management process that stretches decades into the future. This planning process is important because it puts the long-term good of the forest and the land-owner ahead of any short-term gains that can jeopardize the value (economical as well as ecological) of the forest.

This property is enrolled in the State of Vermont Use Value Appraisal (UVA) Program. The primary objectives of the UVA Program are to keep Vermont's open and forest land actively used, help slow the subdivision and development of open land while achieving greater equity in property taxation on undeveloped land. For actively managing the forest and open land, the land is taxed at its value as forest or farm land ("use value") and not at its potential developmental value, thus lowering the property taxes.

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To remain in good standing in the UVA Program, any activity (i.e., tree cutting or manipulation of the forest) carried out on the forestland must be specified for in the forest management plan and any activity scheduled in the plan must be completed within three years of the scheduled date. A conformance report needs to be filed by February 1st of the following year with the County Forester to document any forest management activity that is carried out on the property. Additionally, the forest management plan needs to be updated every 10 years.

Further directing the management of this property is a conservation easement held by the Vermont Land Trust. The easement placed development and use limitations on most of the property. Additionally, the forest management plan for the protected lands must be approved by the Vermont Land Trust's forester and all forest management activities carried out on the land must conform to the conditions of the easement.

With this plan comes an attempt at understanding and promoting the forest's vigor and productivity – measured in part, and specifically for the Use Value Appraisal Program, by the production of forest products (logs, firewood, maple sap, etc.) but also by the ecosystem services it provides, such as wildlife habitat and carbon storage, and more generally by the experiences it offers those who spend time on it.



White ash seedlings in the north of Area 2. Establishing a young cohort of ash may help perpetuate the species following the presumed arrival of the emerald ash borer beetle and the wide-spread mortality of mature trees.

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Area 1

Area 1 – Description

Forest Type: red maple-red spruce-white birch

Acres: 17 (mapped)

Composition: red maple (48%), red spruce (28%), white birch (20%), black cherry (2%), beech (2%)
(by basal area of overstory trees)

Site Class: II/III (determined using the Rutland County Soil Survey and estimation)

Predominant Soil Series: Tunbridge-Berkshire Complex, rocky, Berkshire Gravelly Fine Sandy Loam and Lyman-Tunbridge-Rock Outcrop Complex, very stony

Access Distance: 0.3 to 0.5 miles (straight line distance to landing)

Age Structure: even-aged

Stem Density and Stocking Level: 229 trees/acre – between the A and B Lines

Mean Stand Diameter: 9.6" (quadratic mean diameter) **q factor:** 1.23

Total BA: 115 ft²/acre **AGS BA:** 68 ft²/acre **UGS BA:** 47 ft²/acre **Cull BA:** 3 ft²/acre

Merchantable Volumes:

Sawtimber grade material volume: 2180 board feet/acre (bf/ac)

Primary species of acceptable growing stock: red spruce (1100 bf/ac) and red maple (940 bf/ac)

Pulp/firewood grade material volume: 19.3 cords/acre

Coarse Woody Debris Density: 1.5 (out of 5, 5 being high)

Standing Dead Tree Density: 1 (out of 5, 5 being high)

Regeneration:

overall: light to light moderate, some moderate density, with a few pockets of saplings (2 to 5" dia.)
from heavy cutting in the 1981 harvest

red spruce (¼ to 4" diameter) – light to light moderate, present in much of stand

beech (¼ to 2" dia.) – light to moderate, in pockets

striped maple (¼ to 3" dia.) – very light to moderate, in pockets

also a few yellow birch (2 to 3" dia.), stagnant

wood fern – limited pockets of light to moderate

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USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

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Area 1 – Description (continued)

Stand History: The forest in this stand was cleared and used for sheep pasture in the early-mid 1800s. Forest returned to most of the stand by the early 1900s after agricultural abandonment, though a pocket in the northwest of the stand remained open into the mid-1900s, either from continued pasture use or a delay in the establish of tree seedlings. A timber harvest occurred in 1981, reportedly focused on mature white birch.

Non-native Invasive Plants: No non-native invasive plants were observed in Area 1.

Tree/Forest Health: No specific tree pest or pathogen issues were noted. The northwest corner of the stand contains rocky ground with shallow soils and slow tree growth rates. Wood fern is present in limited pockets and has the potential to interfere with the establishment and growth of other plants.

Inventory Information: 4 plots, 10-factor prism, processed with NED-2 software. Data were collected in August and September 2019. All stand statistics are based only on trees in the overstory (intermediate canopy class and above).

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Area 1 – Management

LONG-RANGE OBJECTIVE AND SCHEDULED TREATMENT

Long-Range Objectives: Convert to an uneven-aged structure using single tree and small group selection harvests and a roughly 25 year cutting interval. Maintain as a mixedwood stand, favoring the growth of red maple and red spruce while encouraging a mix of other species. Limit the amount of beech, striped maple and fern in the understory. Attempt to keep the stand free or nearly free of non-native invasive plants. Regenerate desirable species. Establish and maintain a diversity of age classes to improve structural diversity and enhance wildlife habitat. Grow and maintain some large diameter trees for seed source and wildlife habitat. Create and retain coarse woody debris on the forest floor and standing dead trees. Increase carbon stored in the forest, attempting to maximize carbon storage in long-term. Manage the composition and structure of the forest to increase its resiliency to climate change. Ensure there is soil stability and protect water quality, sensitive areas and special features during and after management activities. Promote high-quality sawlogs and veneer. Maximum diameter goals are 18” for red maple and red spruce, 16” for black cherry and beech and 14” for white birch.

Scheduled Treatment:

2020 Area 1 – Allow stand to grow.

Reference: Prescription G from Leak, W. B., D. S. Solomon, and P. S. DeBald. 1987. Silvicultural guide for northern hardwood types in the Northeast, revised. USDA. Forest Service Research Paper NE-603.

2030 Area 1 – Monitor for and control non-native invasive plants.

2030 All Areas - Update Use Value Appraisal forest management plan.

2032 Area 1 – Single tree and small group selection harvest if stocking is suitable.

2040 Area 1 – Monitor for and control non-native invasive plants.

2040 All Areas - Update Use Value Appraisal forest management plan.

ADDITIONAL MANAGEMENT CONSIDERATIONS

Recreation Considerations: There are no developed recreational features in Area 1.

Areas of Special Concern and Special Management Considerations:

- Moderate to steep slopes are present in portions of the stands. Machinery use should be well planned and roads should be water-barred according to Acceptable Management Practices (AMPs) guidelines to prevent erosion and sedimentation.
- Three small intermittent streams flow through Area 1, one near the center and two in the east. One of the streams in the east flows through a roughly 1 acre wet area. Keep machinery out of a 25 foot buffer on each side of the streams and wet ground and limit cutting along the streams, allowing for only light single tree selection removals within a variable width buffer based on degree of slope of ground, as outlined in the AMP guidelines.
- The western-most of the small intermittent streams flows through a moist area and down a short section of steep ground and into a small bowl of land. Follow AMP guidelines for limiting cutting to protect this area interesting topographic feature.

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 2

Area 2 – Description

Forest Type: sugar maple-mixed hardwoods – sugarbush

Acres: 44 (mapped)

Composition: sugar maple (62%), white ash (13%), white birch (8%), red maple (6%), red spruce (5%), yellow birch (4%), beech (3%) (by basal area of overstory trees)

Site Class: I (determined using the Rutland County Soil Survey and estimation)

Predominant Soil Series: Berkshire Gravelly Fine Sandy Loam and Colton-Duxbury Complex, very stony

Access Distance: 0.1 to 0.4 miles (straight line distance to landing)

Age Structure: even-aged

Stem Density and Stocking Level: 185 trees/acre – between the A and B Lines

Mean Stand Diameter: 10.8" (quadratic mean diameter) **q factor:** 1.27

Total BA: 118 ft²/acre **AGS BA:** 54 ft²/acre **UGS BA:** 64 ft²/acre **Cull BA:** 4 ft²/acre

Merchantable Volumes:

Sawtimber grade material volume: 2390 board feet/acre (bf/ac)

Primary species of acceptable growing stock: white ash (1070 bf/ac) and sugar maple (570 bf/ac)

Pulp/firewood grade material volume: 22.6 cords/acre

Coarse Woody Debris Density: 1.1 (out of 5, 5 being high)

Standing Dead Tree Density: 0.6 (out of 5, 5 being high)

Regeneration:

overall: open/very light to moderate – very patchy and largely dependent on maple tapping, as the understory has been largely removed in tapped areas. Midstory light to moderate in places.

sugar maple (1 to 5" diameter) – light to moderate in the midstory, stagnant

beech (¼ to 3" dia.) – light to moderate, in pockets

red spruce (¼ to 3" dia.) – very light to moderate, in pockets, particularly in south

striped maple (¼ to 3" dia.) – very light to moderate, in pockets

balsam fir (¼ to 2" dia.) – light to heavy pockets, in south

also pockets of moderate to heavy sugar maple and some white ash seedlings, less than 1 foot tall

wood fern – pockets of moderate to heavy

Massachusetts fern – pockets of moderate to heavy

hay-scented fern – limited pockets of moderate to heavy

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USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 2 – Description (continued)

Stand History: The forest was cleared and used for sheep pasture in the early-mid 1800s. Forest returned to the stand between the late 1800s and mid-1900s and appears to have been cultured as a sugarbush. Trees in the northern half of the stand are several decades older than in the south. Small pockets in the center remained open into the mid-1900s. Scattered wolf sugar maples may have been tapped when the remainder of the stand was open or regrowing. Small volumes of timber and firewood were likely cut periodically in the 1900s and scattered stumps exist from limited cutting in the 1980s. Much of the stand is tapped commercially by a lessee, a practice that has occurred, and periodically expanded, over the last several decades.

Non-native Invasive Plants: One very small common buckthorn plant was observed, and pulled, during the 2019 inventory.

Tree/Forest Health: Defoliation by maple leaf cutter was moderate to heavy on sugar maple in much of the stand in 2019, part of a region-wide outbreak of the native insect that began in 2018. This insect does not typically cause long-term damage to trees, though it can further weaken trees already compromised by other stressors. Some ash in the stand have thin crowns, likely caused by ash yellows or ash decline. Wood fern, Massachusetts fern and hay-scented fern are present at varying densities in the stand and have the potential to interfere with the establishment and growth of other plants.

Inventory Information: 9 plots, 10-factor prism, processed with NED-2 software. Data were collected in August and September 2019. All stand statistics are based only on trees in the overstory (intermediate canopy class and above).

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 2 – Management

LONG-RANGE OBJECTIVE AND SCHEDULED TREATMENT

Long-Range Objectives: Although a portion of this stand is tapped for harvesting sap, the silviculture used to manage the entire stand will focus on the production of timber. Manage tapping according to the Vermont Department of Forests, Parks and Recreation's standards for sugaring on forest land enrolled in Current Use (Appendix A) and manage timber using the traditional hardwood silvicultural guide for timber (USDA - NE-603). Convert to an uneven-aged structure using single tree and small group selection harvests and a roughly 25 year cutting interval. Maintain as a predominantly hardwood stand, favoring the growth of sugar maple and white ash but increasing the component of other species, including red spruce. Limit the amount of beech, striped maple and fern in the understory. Attempt to keep the stand free or nearly free of non-native invasive plant population. Regenerate desirable species. Establish and maintain a diversity of age classes to improve structural diversity and enhance wildlife habitat. Grow and maintain some large diameter trees for seed source and wildlife habitat. Create and retain coarse woody debris on the forest floor and standing dead trees. Increase carbon stored in the forest, attempting to maximize carbon storage in long-term. Manage the composition and structure of the forest to increase its resiliency to climate change. Ensure there is soil stability and protect water quality, sensitive areas and special features during and after management activities. Promote high-quality sawlogs and veneer. Maximum diameter goals are 22" for sugar maple, 20" for white ash and yellow birch, 18" for red maple and red spruce, 16" for white birch and beech.

Scheduled Treatment:

- | | |
|--------|---|
| yearly | Area 2 – Tap maples to harvest sap. Follow standards for tapping forestland enrolled in the Use Value Appraisal Program (Appendix A). Ensure trees receive the appropriate number of taps based on diameter and health, small diameter trees are not tapped, new taps are spaced away from old tap holes and that taps are removed before trees leaf out in the spring. |
| 2020 | Area 2 – Explore for and control non-native invasive plants. Pay particularly attention to the land in the northeast where a small common buckthorn plant was observed in 2019. |
| 2028 | Area 2 – Single tree and small group selection harvest.
<u>Note:</u> The execution of this harvest will require the coordination of the sugarmaker who taps maple trees in this stand. Much of the tubing will have to be removed prior to cutting.

Prescription: Focus single tree selection on unacceptable growing stock (UGS) and mature, at-risk, stagnant or suppressed acceptable growing stock (AGS). Benefit crop trees and existing desired regeneration with release during single tree and group selection. |

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USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 2 – Management (continued)

Places small groups in pockets of low quality or mature timber or in places where desirable regeneration is established. Size group openings 1/8 to 1/2 acre and regenerate 4 acres in the entry (in and out of groups).

Reduce stand basal area to 70-80 ft²/ac. Aim for a low residual q-factor (<1.2).

Remove a portion of the suppressed shade tolerant stems of undesired species (e.g., beech) less than 6" in diameter. Favor mature, seed-producing individuals of all species where applicable to increase species richness. Recruit through girdling, several dead standing trees (snags) (where this can be done safely) per acre and recruit through felling and leaving several trees to create coarse woody debris. The selection of trees to be left as snags should take into account the safety of the sugarmaker.

Ensure there is soil stability and protect water quality during and after management activities.

Reference: Prescription D from Leak, W. B., D. S. Solomon, and P. S. DeBald. 1987. Silvicultural guide for northern hardwood types in the Northeast, revised. USDA. Forest Service Research Paper NE-603.

- 2030 Area 2 – Monitor for and control non-native invasive plants.
- 2030 All Areas - Update Use Value Appraisal forest management plan.**
- 2040 Area 2 – Monitor for and control non-native invasive plants.
- 2040 All Areas - Update Use Value Appraisal forest management plan.**

ADDITIONAL MANAGEMENT CONSIDERATIONS

Recreation Considerations: Several woods road in the stand receive recreational traffic. These roads should be closed-out appropriately following timber harvesting activities to allow for this continued use, while remaining stable. A small lean-to is present in the northwest of the stand. Avoid disturbing this structure during timber harvesting.

Areas of Special Concern and Special Management Considerations:

- Moderate to steep slopes are present in portions of the stands. Machinery use should be well planned and roads should be water-barred according to Acceptable Management Practices (AMPs) guidelines to prevent erosion and sedimentation.
- Three small intermittent streams flow into Area 2 and combine to form one stream within the stand, before dispersing underground in the south of the stand. There are pockets of wet ground around the streams and two small dug ponds located near the consolidated stream. Keep machinery out of a 25 foot buffer on each side of the streams, ponds and wet ground and limit cutting along the streams, wet areas and ponds, allowing for only light single tree selection removals within a variable width buffer based on degree of slope of ground, as outlined in the AMP guidelines.

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 3

Area 3 – Description

Forest Type: red spruce-red maple-balsam fir

Acres: 12 (mapped)

Composition: red spruce (29%), red maple (29%), balsam fir (14%), yellow birch (9%), sugar maple (3%), popple (3%), white birch (3%), beech (3%) (by basal area of overstory trees)

Site Class: II (determined using the Rutland County Soil Survey and estimation)

Predominant Soil Series: Colton-Duxbury Complex, very stony

Access Distance: 0.1 to 0.2 miles (straight line distance to landing)

Age Structure: even-aged

Stem Density and Stocking Level: 237 trees/acre – between the A and B Lines

Mean Stand Diameter: 9.5" (quadratic mean diameter) **q factor:** 1.26

Total BA: 117 ft²/acre **AGS BA:** 70 ft²/acre **UGS BA:** 47 ft²/acre **Cull BA:** 0 ft²/acre

Merchantable Volumes:

Sawtimber grade material volume: 2510 board feet/acre (bf/ac)

Primary species of acceptable growing stock: red spruce (1780 bf/ac) and white ash (490 bf/ac)

Pulp/firewood grade material volume: 18.8 cords/acre

Coarse Woody Debris Density: 2 (out of 5, 5 being high)

Standing Dead Tree Density: 2 (out of 5, 5 being high)

Regeneration:

overall: light to moderate density

balsam fir (¼ to 3" diameter) – very light to moderate, present in much of stand

red spruce (¼ to 3" dia.) – very light to light, with pockets of moderate, present in much of stand

beech (¼ to 3" dia.) – very light, present scattered in much of stand

striped maple (½ to 1" dia.) – few, in limited places

wood fern – pockets of light to moderate

Stand History: The forest was cleared and used for sheep pasture in the early-mid 1800s. Forest returned in the early to mid-1900s after agricultural abandonment. Some pasturing may have occurred into the mid-1900s as the forest reestablished. Limited timber harvesting occurred in the 1980s.

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USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 3 – Description (continued)

Non-native Invasive Plants: No non-native invasive plants were observed in Area 3.

Tree/Forest Health: Some ash in the stand have thin crowns, likely caused by ash yellows or ash decline. Several spruce and fir saplings were knocked over in 2019, likely due to the weight of heavy snow. Wood fern is present at varying densities in the stand and has the potential to interfere with the establishment and growth of other plants.

Inventory Information: 3 plots, 10-factor prism, processed with NED-2 software. Data were collected in August 2019. All stand statistics are based only on trees in the overstory (intermediate canopy class and above).

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 3 – Management

LONG-RANGE OBJECTIVE AND SCHEDULED TREATMENT

Long-Range Objectives: Convert to an uneven-aged structure using single tree and small group selection harvests and a roughly 25 year cutting interval. Maintain as a mixedwood stand, favoring the growth of red maple and red spruce while encouraging a mix of other species. Limit the amount of beech, striped maple and fern in the understory. Attempt to keep the stand free or nearly free of non-native invasive plants. Regenerate desirable species. Establish and maintain a diversity of age classes to improve structural diversity and enhance wildlife habitat. Grow and maintain some large diameter trees for seed source and wildlife habitat. Create and retain coarse woody debris on the forest floor and standing dead trees. Increase carbon stored in the forest, attempting to maximize carbon storage in long-term. Manage the composition and structure of the forest to increase its resiliency to climate change. Ensure there is soil stability and protect water quality, sensitive areas and special features during and after management activities. Promote high-quality sawlogs and veneer. Maximum diameter goals are 20" for sugar maple and white ash, 18" for red maple, red spruce and yellow birch, 16" for beech, and 14" for balsam fir, white birch and popple.

Scheduled Treatment:

2024

Area 3 – Single tree selection improvement cut.

Note: This will be a light non-commercial cut and involve cutting and leaving or girdling trees. The intent is to free up growing space for acceptable growing stock (AGS) while adding snags and coarse woody debris to the stand and eventually increasing the amount of carbon stored in the forest floor dead biomass and belowground soil organic material pools.

Prescription: Focus single tree selection on unacceptable growing stock (UGS), particularly those competing with crop trees or shading existing desired regeneration.

Reduce stand basal area to 100-110 ft²/ac. Aim for a low residual q-factor (<1.2).

Remove a portion of the suppressed shade tolerant stems of undesired species (e.g., beech) less than 6" in diameter. Favor mature, seed-producing individuals of all species where applicable to increase species richness. The selection of trees to be left as snags should take into account the location of woods roads used for recreation and sugaring tubing for tapping in Area 2 and the safety of the users.

Reference: Prescription F from Leak, W. B., D. S. Solomon, and P. S. DeBald. 1987. Silvicultural guide for northern hardwood types in the Northeast, revised. USDA. Forest Service Research Paper NE-603.

2030

Area 3 – Monitor for and control non-native invasive plants.

2030

All Areas - Update Use Value Appraisal forest management plan.

2040

Area 3 – Monitor for and control non-native invasive plants.

2040

All Areas - Update Use Value Appraisal forest management plan.

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 3 – Management (continued)

ADDITIONAL MANAGEMENT CONSIDERATIONS

Recreation Considerations: A main woods road in Area 3 receives recreational traffic. This road should be closed-out appropriately following timber harvesting activities to allow for this continued use, while remaining stable.

Areas of Special Concern and Special Management Considerations:

- Moderate to steep slopes are present in portions of the stands. Machinery use should be well planned and roads should be water-barred according to Acceptable Management Practices (AMPs) guidelines to prevent erosion and sedimentation.
- There are pockets of moist to wet ground in Area 3. Machinery should be kept out of these areas during management activities.

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 4

Area 4 – Description

Forest Type: red spruce-hemlock-mixedwood

Acres: 16 (mapped)

Composition: red spruce (49%), hemlock (22%), red maple (7%), white birch (7%), beech (5%), white pine (4%), balsam fir (4%), yellow birch (2%) (by basal area of overstory trees)

Site Class: II (determined using the Rutland County Soil Survey and estimation)

Predominant Soil Series: Colton-Duxbury Complex, very stony, Sheepscot Fine Sandy Loam and Lyme Fine Sandy Loam, very stony

Access Distance: 0 to 0.3 miles (straight line distance to landing)

Age Structure: even-aged

Stem Density and Stocking Level: 273 trees/acre – between the A and B Lines

Mean Stand Diameter: 9.6" (quadratic mean diameter) **q factor:** 1.23

Total BA: 138 ft²/acre **AGS BA:** 108 ft²/acre **UGS BA:** 30 ft²/acre **Cull BA:** 5 ft²/acre

Merchantable Volumes:

Sawtimber grade material volume: 5870 board feet/acre (bf/ac)

Primary species of acceptable growing stock: red spruce (3960 bf/ac) and hemlock (1230 bf/ac)

Pulp/firewood grade material volume: 16.6 cords/acre

Coarse Woody Debris Density: 1.5 (out of 5, 5 being high)

Standing Dead Tree Density: 2 (out of 5, 5 being high)

Regeneration:

overall: very light to heavy density

beech (¼ to 3" diameter) – very light, with limited pockets of moderate, present in much of stand

balsam fir (¼ to 3" diameter) – light to heavy, in patches

striped maple (¼ to 2" dia.) – few

yellow birch (¼ to ½" dia.) – few

also limited hemlock (1 to 4" dia.), some stagnant, and red maple (1 to 4" dia.), stagnant

wood fern – pockets of moderate to heavy

Stand History: The forest was cleared and used for sheep pasture in the early-mid 1800s. Forest began to return in the early and mid-1900s while light pasturing continued, as dairy cows replaced sheep. Pockets of semi-open land remained into the 1960s, at which time agricultural use ceased and trees returned. Limited timber harvesting occurred in the 1980s.

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USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 4 – Description (continued)

Non-native Invasive Plants: No non-native invasive plants were observed in Area 4.

Tree/Forest Health: No specific tree health issues were noted. Wood fern is present at varying densities in the stand and has the potential to interfere with the establishment and growth of other plants.

Inventory Information: 4 plots, 10-factor prism, processed with NED-2 software. Data were collected in August 2019. All stand statistics are based only on trees in the overstory (intermediate canopy class and above).

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 4 – Management

LONG-RANGE OBJECTIVE AND SCHEDULED TREATMENT

Long-Range Objectives: Convert to an uneven-aged structure using single tree and small group selection harvests and a roughly 25 year cutting interval. Maintain as a mixedwood stand, favoring the growth of red spruce, red maple and hemlock, while increasing the percentage of other species. Limit the amount of beech, striped maple and fern maple in the understory. Attempt to keep the stand free or nearly free of non-native invasive plants. Regenerate desirable species. Establish and maintain a diversity of age classes to improve structural diversity and enhance wildlife habitat. Grow and maintain some large diameter trees for seed source and wildlife habitat. Create and retain coarse woody debris on the forest floor and standing dead trees. Increase carbon stored in the forest, attempting to maximize carbon storage in long-term. Manage the composition and structure of the forest to increase its resiliency to climate change. Ensure there is soil stability and protect water quality, sensitive areas and special features during and after management activities. Promote high-quality sawlogs and veneer. Maximum diameter goals are 22” for white pine and hemlock, 20” for yellow birch, 18” for red maple and red spruce 16” for beech, and 14” for balsam fir and white birch.

Scheduled Treatment:

2020 Area 4 – Allow stand to grow.

Reference: Prescription 10 from Frank, R. M. and J. C. Bjorkbom. 1973. A silvicultural guide for spruce-fir in the northeast. USDA Forest Service General Technical Report – GTR-NE-6.

2030 Area 4 – Monitor for and control non-native invasive plants.

2030 All Areas - Update Use Value Appraisal forest management plan.

2034 Area 4 – Single tree and small group selection harvest if stocking is suitable.

2040 Area 4 – Monitor for and control non-native invasive plants.

2040 All Areas - Update Use Value Appraisal forest management plan.

ADDITIONAL MANAGEMENT CONSIDERATIONS

Recreation Considerations: There are no developed recreational features in Area 4.

Areas of Special Concern and Special Management Considerations:

- Moderate to steep slopes are present in portions of the stands. Machinery use should be well planned and roads should be water-barred according to Acceptable Management Practices (AMPs) guidelines to prevent erosion and sedimentation.
- A medium-sized stream bisects Area 4. Keep machinery out of a 25 foot buffer on each side of the stream and limit cutting along the streams, allowing for only light single tree selection removals within a variable width buffer based on degree of slope of ground, as outlined in the AMP guidelines.

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 5

Area 5 – Description

Forest Type: red spruce-mixedwood

Acres: 19 (mapped)

Composition: red spruce (61%), white pine (9%), yellow birch (7%), hemlock (7%), red maple (4%), white birch (4%), balsam fir (4%), black cherry (2%), white ash (2%), white ash (2%) (by basal area of overstory trees)

Site Class: II/III (determined using the Rutland County Soil Survey and estimation)

Predominant Soil Series: Sheepscot Fine Sandy Loam and Lyme Fine Sandy Loam, very stony

Access Distance: miles (straight line distance to landing)

Age Structure: even-aged

Stem Density and Stocking Level: 214 trees/acre – at the C Line

Mean Stand Diameter: 9.9" (quadratic mean diameter) **q factor:** 1.25

Total BA: 115 ft²/acre **AGS BA:** 105 ft²/acre **UGS BA:** 10 ft²/acre **Cull BA:** 0 ft²/acre

Merchantable Volumes:

Sawtimber grade material volume: 5390 board feet/acre (bf/ac)

Primary species of acceptable growing stock: red spruce (3120 bf/ac) and white pine (1180 bf/ac)

Pulp/firewood grade material volume: 11.3 cords/acre

Coarse Woody Debris Density: 1 (out of 5, 5 being high)

Standing Dead Tree Density: 3.5 (out of 5, 5 being high)

Regeneration:

overall: varied – open to moderate-heavy density. 4 acre patch in west with light to moderate balsam fir and red spruce (1 to 3" diameter), light to moderate herbs, and few red maple, yellow birch, white birch, Scotch pine and white pine (1 to 3" dia.) and pockets of moderate yellow birch saplings (1/2 to 3" dia.) in east from small group cuts in 1980s

red spruce (1/4 to 2" diameter) – very light to moderate

yellow birch (1/4 to 3" dia.) – very light to few pockets of moderate, some larger ones with potential

balsam fir (1/4 to 2" dia.) – very light to limited pockets of moderate

striped maple (1/4 to 2" dia.) – few

ferns – moderate pockets of wood, Massachusetts, sensitive and cinnamon

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USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 5 – Description (continued)

Stand History: The forest was cleared and used for sheep pasture in the early-mid 1800s. Forest began to return in the early and mid-1900s but pasturing continued, as dairy cows replaced sheep. A third of the stand remained open through the 1950s. Pasturing use ceased in the 1960s and the open land was reclaimed by forest. In 1999 wind and saturated soils associated with Hurricane Floyd resulted in blown-over and damaged trees, particularly in the west of the stand. Salvage of storm-damaged trees resulted in a 4 acre patch cut in 1999-2000 along the western boundary of the stand and the remainder of the stand was treated with single tree and small group selection harvest at the time.

Non-native Invasive Plants: No non-native invasive plants were observed in Area 5.

Tree/Forest Health: A number of balsam fir have died in the last five years in Area 5, probably from balsam wooly adelgid. The ground in much of the center of the stand is moist to wet, resulting in reduced growth rates. Wood, Massachusetts, sensitive and cinnamon fern are present at varying densities in the stand and have the potential to interfere with the establishment and growth of other plants.

Inventory Information: 4 plots, 10-factor prism, processed with NED-2 software. Data were collected in August 2019. All stand statistics are based only on trees in the overstory (intermediate canopy class and above).

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 5 – Management

LONG-RANGE OBJECTIVE AND SCHEDULED TREATMENT

Long-Range Objectives: Convert to an uneven-aged structure using single tree and small group selection harvests and a roughly 25 year cutting interval. Maintain as a predominantly softwood stand but increase the hardwood component in the drier areas. Favor the growth of red spruce, white pine, yellow birch and red maple and a mix of other species. Limit the amount of striped maple and ferns in the understory. Attempt to keep the stand free or nearly free of non-native invasive plants. Regenerate desirable species. Establish and maintain a diversity of age classes to improve structural diversity and enhance wildlife habitat. Grow and maintain some large diameter trees for seed source and wildlife habitat. Create and retain coarse woody debris on the forest floor and standing dead trees. Increase carbon stored in the forest, attempting to maximize carbon storage in long-term. Manage the composition and structure of the forest to increase its resiliency to climate change. Ensure there is soil stability and protect water quality, sensitive areas and special features during and after management activities. Promote high-quality sawlogs and veneer. Maximum diameter goals are 20” for white pine, hemlock and yellow birch, 18” for red spruce and red maple, 16” for black cherry and 14” for balsam fir and white birch.

Scheduled Treatment:

2020 Area 5 – Allow stand to grow.

Reference: Prescription 10 from Frank, R. M. and J. C. Bjorkbom. 1973. A silvicultural guide for spruce-fir in the northeast. USDA Forest Service General Technical Report – GTR-NE-6.

2030 Area 5 – Monitor for and control non-native invasive plants.

2030 All Areas - Update Use Value Appraisal forest management plan.

2034 Area 5 – Single tree and small group selection harvest if stocking is suitable.

2040 Area 5 – Monitor for and control non-native invasive plants.

2040 All Areas - Update Use Value Appraisal forest management plan.

ADDITIONAL MANAGEMENT CONSIDERATIONS

Recreation Considerations: There are no developed recreational features in Area 1.

Areas of Special Concern and Special Management Considerations:

- The ground in Area 5 is mostly flat to gradually sloped but machinery use should be well planned to avoid wet areas and roads on slopes should be water-barred according to Acceptable Management Practices (AMPs) guidelines to prevent erosion and sedimentation.
- Much of the center of Area 5 is moist to quite wet. This water consolidates into a small stream in the south of the stand. Machinery should be kept off wet ground and out of a 25 foot buffer on each side of the stream and limit cutting should be limited along the stream, allowing for only light single tree selection removals within a variable width buffer based on degree of slope of ground, as outlined in the AMP guidelines.

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 6

Area 6 – Description

Forest Type: plantation/former plantation

Acres: Area 6A – 1.7, Area 6B – 5.7 (mapped)

Composition: Area 6A – plantation: white spruce, Scotch pine, some white pine and balsam fir. Area 6B – scattered overstory trees, red maple, sugar maple, white pine and white ash with a mix of seedlings and saplings, balsam fir and some white pine, red maple, white ash and a few gray birch, sugar maple, striped maple, beech, pin cherry, red spruce and Scotch pine. Also pockets lacking tree regeneration, occupied by golden rod, berry bushes (*Rubus* species), ferns, asters, spiraea, and sedges.

Site Class: II (determined using the Rutland County Soil Survey and estimation)

Predominant Soil Series: Windsor Loamy Sand and Sheepscot Fine Sandy Loam

Access Distance: 0.5 to 0.7 miles (straight line distance to landing)

Age Structure: even-aged

Stand Diameter: Area 6A: 4-10", Area 6B: ¼-4" with some overstory trees 8 to 10"

Merchantable Volumes:

Sawtimber grade material volume: low

Primary species of acceptable growing stock: red maple, sugar maple, white pine

Pulp/firewood grade material volume: low

Coarse Woody Debris Density: 0 (out of 5, 5 being high)

Standing Dead Tree Density: 0 (out of 5, 5 being high)

Regeneration:

Area 6A

overall: very light

red spruce (¼ to 1" diameter) – very light

balsam fir (¼ to 1" dia.) – very light

Area 6B

overall: very light to moderate density

balsam fir (½ to 4" diameter) – light to moderate

red maple (¼ to 1" dia.) – light

few gray birch, sugar maple, striped maple, beech, pin cherry, red spruce and Scotch pine (¼ to 2" dia.)

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USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 6 – Description (continued)

Stand History: The forest was cleared and used for sheep pasture in the early-mid 1800s. Pasture use continued through the early 1900s, dairy cows eventually replacing sheep. Most of the area was planted to Scotch pine in the 1930s but several small pockets between the plantations regenerated naturally in the 1960s and 70s. Area 6A was cleared in the 1980s and replanted to white spruce, Scotch pine and white pine. Some pruning and light thinning has occurred since in that portion of the stand. Wind damage occurred in Area 6B from storms in 1999 (Hurricane Floyd) and 2005. Following these wind events, the planted stems in Area 6B were cut. It is reported that during this operation, special attention was made to minimize damage to hardwoods, quality white pine and advance regeneration.

Non-native Invasive Plants: No non-native invasive plants were observed in Area 6.

Tree/Forest Health: No tree health issues were observed. Some moist to wet ground limits productivity and pockets of Massachusetts fern and other herbaceous plants have the potential to interfere with the establishment and growth of native plant species.

Inventory Information: No quantitative inventory data were collected. Stand description based on a site visit and qualitative assessment in September 2019.

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 6 – Management

LONG-RANGE OBJECTIVE AND SCHEDULED TREATMENT

Long-Range Objectives: For Area 6A (northern unit), regenerate the stand through clearcutting. Following regeneration, allow stand to mature while promoting the growth of crop trees through non-commercial, timber stand improvement cutting when necessary. For Area 6B (southern unit), allow stand to mature. For both Areas 6A and 6B, promote the growth of crop trees through non-commercial, timber stand improvement cutting if conditions warrant (i.e., if stocking is too high to allow for vigorous growth). When conditions are suitable, begin conversion to an uneven-age structure through the use of small group and single-tree selection systems and a roughly 25 year cutting cycle. Favor the growth of white pine, red maple, sugar maple, white ash and balsam fir. Limit the amount of undesirable regeneration and ferns in the understory. Attempt to keep the stand free or nearly free of non-native invasive plants. Regenerate desirable species. Establish and maintain a diversity of age classes to improve structural diversity and enhance wildlife habitat. Grow and maintain some large diameter trees for seed source and wildlife habitat. Create and retain coarse woody debris on the forest floor and standing dead trees. Increase carbon stored in the forest, attempting to maximize carbon storage in long-term. Manage the composition and structure of the forest to increase its resiliency to climate change. Ensure there is soil stability and protect water quality, sensitive areas and special features during and after management activities. Promote high-quality sawlogs and veneer. For Area 6A: Rotation age – 45 years. Stand age – 40 years (2020). Maximum diameter goals are 22” for white pine, 20” for sugar maple and white ash, 18” for red spruce and red maple, 16” for black cherry and 14” for balsam fir and white birch.

Scheduled Treatment:

2025 Area 6A – Clearcut.

Prescription: Cut almost all overstory and understory trees within the stand. Vigorous white pine and balsam fir (mainly in the north of the stand) can be retained. Girdle and leave standing several of the larger trees per acre. If trees are to be removed from the site after cutting (for pulp, etc.), leave several of the larger trees on the ground in the unit for coarse woody debris.

Reference: Prescription 11 from Frank, R. M. and J. C. Bjorkbom. 1973. A silvicultural guide for spruce-fir in the northeast. USDA Forest Service General Technical Report – GTR-NE-6.

2030 Area 6 – Monitor for and control non-native invasive plants.

2030 All Areas - Update Use Value Appraisal forest management plan.

2035 Area 6B – Timber stand improvement thinning or crop tree release if stocking is suitable.

2040 Area 6 – Monitor for and control non-native invasive plants.

2040 All Areas - Update Use Value Appraisal forest management plan.

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 6 – Management (continued)

ADDITIONAL MANAGEMENT CONSIDERATIONS

Recreation Considerations: Several woods road in the stand receive recreational traffic. These roads should be closed-out appropriately following timber harvesting activities to allow for this continued use, while remaining stable. One of the woods road is utilized as a snowmobile trail (Trail 4/7A) as part of the Vermont Association of Snow Travelers (VAST) network. This trail, is maintained by the local snowmobile club, the Shrewsbury Sno-Birds, which is responsible for obtaining permission for snowmobile use of the property. Use of this trail for recreation by individuals other than the landowners or their guests should be limited to winter, as it traverses wet ground that is easily disturbed. Monitor use to ensure that no out of season activity is occurring and block trail and notify the snowmobile club is damage is occurring.

Areas of Special Concern and Special Management Considerations:

- Much of the ground in Area 6 is mostly flat to gradually sloped but there are some moderate slopes in the north. Machinery use should be well planned and roads should be water-barred according to Acceptable Management Practices (AMPs) guidelines to prevent erosion and sedimentation.
- Two small intermittent streams flows through t Area 6 and there are pockets of moist ground. Keep machinery away from wet ground and out of a 25 foot buffer on each side of the streams and limit cutting along the streams, allowing for only light single tree selection removals within a variable width buffer based on degree of slope of ground, as outlined in the AMP guidelines.

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 7

Area 7 – Description

Forest Type: red maple-white pine-popple

Acres: Area 7S – 3.2, Area 7N – 2.0 (mapped)

Composition: red maple (55%), white pine (18%), popple (10%), white ash (8%), black cherry (8%), white birch (3%), (by basal area of overstory trees)

Site Class: II (determined using the Rutland County Soil Survey and estimation)

Predominant Soil Series: Sheepscot Fine Sandy Loam

Access Distance: 0.4 to 0.6 miles (straight line distance to landing)

Age Structure: even-aged

Stem Density and Stocking Level: 230 trees/acre – above the A Line

Mean Stand Diameter: 10.3" (quadratic mean diameter) **q factor:** 1.24

Total BA: 133 ft²/acre **AGS BA:** 60 ft²/acre **UGS BA:** 73 ft²/acre **Cull BA:** 3 ft²/acre

Merchantable Volumes:

Sawtimber grade material volume: 2920 board feet/acre (bf/ac)

Primary species of acceptable growing stock: white pine (1440 bf/ac) and red maple (1030 bf/ac)

Pulp/firewood grade material volume: 27.6 cords/acre

Coarse Woody Debris Density: 0.7 (out of 5, 5 being high)

Standing Dead Tree Density: 0.3 (out of 5, 5 being high)

Regeneration:

overall: variable, light to heavy

beechn (¼ to 2" diameter) – light to moderate, present throughout stand

balsam fir (¼ to 3" dia.) – very light to moderate

red maple (½ to 4" dia.) – few, in limited places

few, in places, white ash (½ to 2" dia.), sugar maple, (½" dia.) beaked hazelnut (¼" dia.),

shadbush (½ to 2" dia.), black cherry (2 to 3 ft. tall)

Massachusetts fern – pockets of moderate to heavy

Stand History: The forest was cleared and used for sheep pasture in the early-mid 1800s. Pasture use continued into the 1960s, dairy cows replacing sheep. Forest returned in the 1960s and 70s after agricultural abandonment. Limited trees have been cut in the stand in the last few decades.

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 7 – Description (continued)

Non-native Invasive Plants: No non-native invasive plants were observed in Area 7.

Tree/Forest Health: Most of the popple in the stand is over-mature and declining in vigor. Massachusetts fern is present at varying densities in the stand and has the potential to interfere with the establishment and growth of other plants.

Inventory Information: 3 plots, 10-factor prism, processed with NED-2 software. Data were collected in August and September 2019. All stand statistics are based only on trees in the overstory (intermediate canopy class and above).

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 7 – Management

LONG-RANGE OBJECTIVE AND SCHEDULED TREATMENT

Long-Range Objectives: Convert to an uneven-aged structure using single tree and small group selection harvests and a roughly 25 year cutting interval. Maintain as a predominantly hardwood stand, favoring the growth of red maple, white ash and black cherry, while retaining a minor white pine component and increasing the percentage of other species. Limit the amount of beech and fern in the understory. Attempt to keep the stand free or nearly free of non-native invasive plants. Regenerate desirable species. Establish and maintain a diversity of age classes to improve structural diversity and enhance wildlife habitat. Grow and maintain some large diameter trees for seed source and wildlife habitat. Create and retain coarse woody debris on the forest floor and standing dead trees. Increase carbon stored in the forest, attempting to maximize carbon storage in long-term. Manage the composition and structure of the forest to increase its resiliency to climate change. Ensure there is soil stability and protect water quality, sensitive areas and special features during and after management activities. Promote high-quality sawlogs and veneer. Maximum diameter goals are 22” for white pine, 20” for white ash, 18” for red maple and black cherry and 14” for popple and white birch.

Scheduled Treatment:

2025

Area 7 – Single tree and small group selection improvement cut.

Note: This cutting will not produce much timber value and may have to be done a non-commercial activity.

Prescription: Focus single tree selection on unacceptable growing stock (UGS) and mature, at-risk, stagnant or suppressed acceptable growing stock (AGS). Benefit crop trees and existing desired regeneration with release during single tree and group selection.

Places small groups in pockets of low quality or mature timber or in places where desirable regeneration is established. Size group openings approximately 1/8 to 1/4 acre and regenerate 0.5 acres in the entry (in and out of groups).

Reduce stand basal area to 90-100 ft²/ac. Aim for a low residual q-factor (<1.2).

Remove a portion of the suppressed shade tolerant stems of undesired species (e.g., beech) less than 6” in diameter. Favor mature, seed-producing individuals of all species where applicable to increase species richness. Recruit through girdling, several dead standing trees (snags) (where this can be done safely) per acre and recruit through felling and leaving several trees to create coarse woody debris. The selection of trees to be left as snags should take into account the location of woods roads used for recreation and the safety of the users.

Ensure there is soil stability and protect water quality during and after management activities.

Reference: Prescription D from Leak, W. B., D. S. Solomon, and P. S. DeBald. 1987. Silvicultural guide for northern hardwood types in the Northeast, revised. USDA. Forest Service

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USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 7 – Management (continued)

- 2030 Area 7 – Monitor for and control non-native invasive plants.
- 2030 All Areas - Update Use Value Appraisal forest management plan.**
- 2040 Area 7 – Monitor for and control non-native invasive plants.
- 2040 All Areas - Update Use Value Appraisal forest management plan.**

ADDITIONAL MANAGEMENT CONSIDERATIONS

Recreation Considerations: Several woods road in the stand receive recreational traffic. These roads should be closed-out appropriately following timber harvesting activities to allow for this continued use, while remaining stable. One of the woods road is utilized as a snowmobile trail (Trail 4/7A) as part of the Vermont Association of Snow Travelers (VAST) network. This trail, is maintained by the local snowmobile club, the Shrewsbury Sno-Birds, which is responsible for obtaining permission for snowmobile use of the property. Use of this trail for recreation by individuals other than the landowners or their guests should be limited to winter, as it traverses wet ground that is easily disturbed. Monitor use to ensure that no out of season activity is occurring and block trail and notify the snowmobile club is damage is occurring.

Areas of Special Concern and Special Management Considerations:

- Much of the ground in Area 7 is mostly flat to gradually sloped but there are a few pockets of moderate slopes. Machinery use should be well planned and roads should be water-barred according to Acceptable Management Practices (AMPs) guidelines to prevent erosion and sedimentation.
- Three small intermittent streams flow through the stand and there are pockets of moist ground. Keep machinery away from wet ground and out of a 25 foot buffer on each side of the streams and limit cutting along the stream, allowing for only light single tree selection removals within a variable width buffer based on degree of slope of ground, as outlined in the AMP guidelines.

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 8

Area 8 – Description

Forest Type: white pine-red maple-mixedwood

Acres: 17 (mapped)

Composition: white pine (43%), red maple (20%), white birch (13%), red spruce (7%), sugar maple (3%), white ash (3%), tamarack (3%), black cherry (3%), apple (limited) (by basal area of overstory trees)

Site Class: II (determined using the Rutland County Soil Survey and estimation)

Predominant Soil Series: Sheepscot Fine Sandy Loam

Access Distance: 0.5 to 0.8 miles (straight line distance to landing)

Age Structure: even-aged

Stem Density and Stocking Level: 129 trees/acre – between the B and C Lines

Mean Stand Diameter: 11.9" (quadratic mean diameter) **q factor:** 1.15

Total BA: 100 ft²/acre **AGS BA:** 70 ft²/acre **UGS BA:** 30 ft²/acre **Cull BA:** 0 ft²/acre

Merchantable Volumes:

Sawtimber grade material volume: 5050 board feet/acre (bf/ac)

Primary species of acceptable growing stock: white pine (3610 bf/ac) and white birch (530 bf/ac)

Pulp/firewood grade material volume: 16.7 cords/acre

Coarse Woody Debris Density: 1 (out of 5, 5 being high)

Standing Dead Tree Density: 2 (out of 5, 5 being high)

Regeneration:

overall: light to moderate density. Two 1-acre group cuts (2005-06) – one group (in west) with moderate to heavy popple (1 to 3" diameter), with a few red maple, pin cherry, white pine, balsam fir, shadbush and white ash (1 to 2-3" dia.). One group (in east) with some white pine, popple, red maple and balsam fir and a few shadbush (½ to 3" dia.) with pockets of herbaceous plants and berry bushes (*Rubus* species).

balsam fir (¼ to 3" dia.) – light to moderate, present in most of stand

white pine (≤¼" dia.) – very light

red spruce (≤¼ to 3" dia.) – very light

red maple (≤¼ to 5" dia.) – few, larger stems stagnant

striped maple (¼" dia.) – few

few, in places, black cherry (1 to 2 ft. tall), shadbush (1 to 3 ft. tall), beaked hazelnut (¼ to ½" dia.)

Massachusetts fern – pockets of moderate to heavy

wood fern and cinnamon fern – light

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USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 8 – Description (continued)

Stand History: The forest was cleared and used for sheep pasture in the early-mid 1800s. Pasture use continued into the 1960s, dairy cows replacing sheep. Some trees established in the 1930-50s while pasturing occurred but most of the trees established in the 1960s and 70s, after agricultural abandonment. Two 1-acre small groups were cut in 2005-06. Very limited single tree selection cutting occurred at that time in the area surrounding the groups.

Non-native Invasive Plants: No non-native invasive plants were observed in Area 8.

Tree/Forest Health: No specific tree health issues were noted. Quite a bit of the popple regeneration in the small group cut in the west of the stand in 2005-06 was damaged (bent or knocked partially over) by a heavy, wet snow load in the last few years. Massachusetts, wood and cinnamon fern are present at varying densities and have the potential to interfere with the establishment and growth of other plants.

Inventory Information: 3 plots, 10-factor prism, processed with NED-2 software. Data were collected in August 2019. All stand statistics are based only on trees in the overstory (intermediate canopy class and above).

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 8 – Management

LONG-RANGE OBJECTIVE AND SCHEDULED TREATMENT

Long-Range Objectives: Continue conversion to an uneven-aged structure using single tree and small group selection harvests and a roughly 25 year cutting interval. Maintain as a mixedwood stand, favoring the growth of white pine, red maple, red spruce, sugar maple while encouraging a mix of other species. Limit the amount of striped maple and fern in the understory. Attempt to keep the stand free or nearly free of non-native invasive plants. Regenerate desirable species. Establish and maintain a diversity of age classes to improve structural diversity and enhance wildlife habitat. Grow and maintain some large diameter trees for seed source and wildlife habitat. Create and retain coarse woody debris on the forest floor and standing dead trees. Increase carbon stored in the forest, attempting to maximize carbon storage in long-term. Manage the composition and structure of the forest to increase its resiliency to climate change. Ensure there is soil stability and protect water quality, sensitive areas and special features during and after management activities. Promote high-quality sawlogs and veneer. Maximum diameter goals are 22” for white pine, 20” for white ash and sugar maple, 18” for red maple and black cherry, 16” for tamarack and 14” for white birch.

Scheduled Treatment:

- | | |
|-------------|--|
| 2020 | Area 8 – Explore stand and control other non-native invasive plants present. Minor populations of bittersweet, honeysuckle and multiflora rose are present in Area 9 to the south. Pay particular attention to the small groups cut in 2005-06. |
| 2023 | Area 8 – Release 10-15 apple trees as needed to maintain vigor. Many of these trees are already free to grow. For trees experiencing competition, cut or girdle competing trees whose crowns are within 15 feet the apple trees. Consider pruning apple trees to further improve fruit production. |
| 2030 | Area 8 – Monitor for and control non-native invasive plants. |
| 2030 | All Areas - Update Use Value Appraisal forest management plan. |
| 2035 | Area 8 – Release apple trees as needed to maintain vigor. |
| 2033 | Area 8 – Single tree and small group selection harvest if stocking is suitable. |
| 2040 | Area 8 – Monitor for and control non-native invasive plants. |
| 2040 | All Areas - Update Use Value Appraisal forest management plan. |

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USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 8 – Management (continued)

ADDITIONAL MANAGEMENT CONSIDERATIONS

Recreation Considerations: One main woods road in the stand receives recreational traffic. This road should be closed-out appropriately following timber harvesting activities to allow for this continued use, while remaining stable. The woods road is also utilized as a snowmobile trail (Trail 4/7A) as part of the Vermont Association of Snow Travelers (VAST) network. This trail, is maintained by the local snowmobile club, the Shrewsbury Sno-Birds, which is responsible for obtaining permission for snowmobile use of the property. Use of this trail for recreation by individuals other than the landowners or their guests should be limited to winter, as it traverses wet ground that is easily disturbed. Monitor use to ensure that no out of season activity is occurring and block trail and notify the snowmobile club if damage is occurring.

Areas of Special Concern and Special Management Considerations:

- Much of the ground in Area 8 is mostly flat to gradually sloped but machinery use should still be well planned and roads should be water-barred according to Acceptable Management Practices (AMPs) guidelines to prevent erosion and sedimentation.
- There are pockets of moist to wet ground and the formation of a small intermittent stream in the west-center of the stand. Keep machinery away from wet ground and out of a 25 foot buffer on each side of the stream and limit cutting along the stream, allowing for only light single tree selection removals within a variable width buffer based on degree of slope of ground, as outlined in the AMP guidelines.

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 9

Area 9 – Description

Forest Type: red spruce-balsam fir-mixedwood

Acres: 31 (mapped)

Composition: red spruce (53%), balsam fir (20%), red maple (13%), yellow birch (5%), white ash (5%), white pine (3%), sugar maple (1%), hemlock (1%), black cherry (1%) (by basal area of overstory trees)

Site Class: II/III (determined using the Rutland County Soil Survey and estimation)

Predominant Soil Series: Lyme Fine Sandy Loam, very stony and Sheepscot Fine Sandy Loam

Access Distance: 0.3 to 0.6 miles (straight line distance to landing)

Age Structure: even-aged

Stem Density and Stocking Level: 250 trees/acre – at the B Line

Mean Stand Diameter: 9.5" (quadratic mean diameter) **q factor:** 1.27

Total BA: 122 ft²/acre **AGS BA:** 91 ft²/acre **UGS BA:** 31 ft²/acre **Cull BA:** 1 ft²/acre

Merchantable Volumes:

Sawtimber grade material volume: 5180 board feet/acre (bf/ac)

Primary species of acceptable growing stock: red spruce (4030 bf/ac) and balsam fir (870 bf/ac)

Pulp/firewood grade material volume: 15.3 cords/acre

Coarse Woody Debris Density: 1.7 (out of 5, 5 being high)

Standing Dead Tree Density: 2.3 (out of 5, 5 being high)

Regeneration:

overall: light to light-moderate density. Three 0.5 acres group cuts (2005-06) and three 1 to 1.5 acre group cuts (2015). One 2005-06 group (north) with herbs and berry bushes (*Rubus* species) with a pocket of balsam fir and red spruce (½ to 2" diameter) and a few white ash (½ to 1" dia.). Two 2005-06 groups with moderate but patchy red spruce and balsam fir, with some popple and hemlock (all ½ to 2" dia.) and herbs and berry bushes (*Rubus* species). All three 2015 groups dominated by herbs and berry bushes (*Rubus* spp.) with limited red spruce, balsam fir, popple and hemlock (1 to 5 feet tall).

red spruce (≤¼ to 3" diameter) – light to moderate, patchy, present in much of stand

balsam fir (1 to 3 ft. tall) – light to light-moderate

few, in places, red maple (½ to 3" dia.), stagnant, yellow birch (¼ to 2" dia.), striped maple (¼ to 1" dia.), beech (≤¼ to 1" dia.), white ash (1 to 3 ft. tall), beaked hazelnut (¼ to 1" dia.)

Massachusetts fern – light to heavy, patchy

some pockets of moderate density sensitive fern, wood fern, long-beech fern, sedge and other herbs

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 9 – Description (continued)

Stand History: The forest was cleared and used for sheep pasture in the early-mid 1800s. Forest began to return in the early and mid-1900s but pasturing continued, as dairy cows replaced sheep. Two-thirds of the stand remained open or semi-open through the 1950s, with the northwest corner remaining completely open. Pasturing use ceased in the 1960s and the open land was reclaimed by forest. Three, approximately 0.5 acre small groups were cut in 2005-06 and three approximately 1 to 1.5 acre groups were cut in 2015. Very limited single tree selection cutting occurred at that time in the area surrounding these groups.

Non-native Invasive Plants: A few bittersweet, honeysuckle and multiflora rose plants were observed in Area 9. Most of these plants are generally small, with a few medium-sized individuals in pockets lacking an overstory.

Tree/Forest Health: No specific tree health issues were noted. Quite a few trees were blown over seemingly in one storm around 2016, caused by an east wind. Some other trees have also been blown over in other events. This wind damage is most prevalent in moist to wet areas, where rooting depths are shallow. Massachusetts fern, and to a lesser extent sensitive fern, wood fern, long-beech fern, sedge and other herbs are present in the stand and have the potential to interfere with the establishment and growth of other plants.

Inventory Information: 9 plots, 10-factor prism, processed with NED-2 software. Data were collected in August and September. All stand statistics are based only on trees in the overstory (intermediate canopy class and above).

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area 9 – Management

LONG-RANGE OBJECTIVE AND SCHEDULED TREATMENT

Long-Range Objectives: Continue conversion to an uneven-aged structure using single tree and small group selection harvests and a roughly 25 year cutting interval. Maintain as a mixedwood stand, favoring the growth of red spruce, red maple, yellow birch and a mix of other species. Limit the amount of striped maple, beech and fern in the understory. Control non-native invasive plants attempt to keep the stand free or nearly free of these plants. Regenerate desirable species. Establish and maintain a diversity of age classes to improve structural diversity and enhance wildlife habitat. Grow and maintain some large diameter trees for seed source and wildlife habitat. Create and retain coarse woody debris on the forest floor and standing dead trees. Increase carbon stored in the forest, attempting to maximize carbon storage in long-term. Manage the composition and structure of the forest to increase its resiliency to climate change. Ensure there is soil stability and protect water quality, sensitive areas and special features during and after management activities. Promote high-quality sawlogs and veneer. Maximum diameter goals are 20” for white pine, white ash, yellow birch, sugar maple and hemlock, 18” for red maple and black cherry and 14” for white birch.

Scheduled Treatment:

- | | |
|-------------|---|
| 2020 | Area 9 – Control known non-native invasive bittersweet, honeysuckle and multiflora rose plants present in the south-center of the stand. Explore remainder of stand and control other non-native invasive plants present. |
| 2025 | Area 9 – Monitor for and control non-native invasive plants. |
| 2030 | Area 9 – Monitor for and control non-native invasive plants. |
| 2030 | All Areas - Update Use Value Appraisal forest management plan. |
| 2035 | Area 9 – Monitor for and control non-native invasive plants. |
| 2036 | Area 9 – Single tree and small group selection harvest if stocking is suitable. |
| 2040 | Area 9 – Monitor for and control non-native invasive plants. |
| 2040 | All Areas - Update Use Value Appraisal forest management plan. |

ADDITIONAL MANAGEMENT CONSIDERATIONS

Recreation Considerations: There are no developed recreational features in Area 9.

Areas of Special Concern and Special Management Considerations:

- Much of the ground in Area 9 is mostly flat to gradually sloped but machinery use should still be well planned and roads should be water-barred according to Acceptable Management Practices (AMPs) guidelines to prevent erosion and sedimentation.
- There are two small intermittent streams and quite a bit of moist to wet ground in the stand. Keep machinery away from wet ground and out of a 25 foot buffer on each side of the streams and limit cutting along the streams, allowing for only light single tree selection removals within a variable width buffer based on degree of slope of ground, as outlined in the AMP guidelines.

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Area NP 1 – Description

Cover Type: streamside wetland

Acres: 1.4 (mapped)

Composition: mainly herbs and shrubs (willow and alder) with a few trees saplings and poles (tamarack, red maple, balsam fir)

Site Class: IV (determined using the Rutland County Soil Survey and estimation)

Predominant Soil Series: muck

Non-native Invasive Plants: No-non-native invasive shrubs have been observed in Area NP 1.

Area Health: Vegetation growth rates are slow due to saturated soils.

Area NP 1 – Management

LONG-RANGE OBJECTIVE AND SCHEDULED TREATMENT

Long-Range Objectives: Allow area to develop and exist without direct human involvement, unless non-native, invasive plants become established and there is interest and resources for control efforts.

Scheduled Treatment:

2030 Area NP 1 – Monitor for and control non-native invasive plants.

2030 All Areas - Update Use Value Appraisal forest management plan.

2040 Area NP 1 – Monitor for and control non-native invasive plants.

2040 All Areas - Update Use Value Appraisal forest management plan.

ADDITIONAL MANAGEMENT CONSIDERATIONS

Areas of Special Concern: The soil throughout the area is moist and in some places there is surface water at certain times of year. The soil is prone to disturbance and rutting leading to erosion and sedimentation. Machinery should not enter this area.

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Open A – Description

Cover Type: maintained open field

Acres: 0.6 (mapped)

Site Class: II (determined using the Rutland County Soil Survey and estimation)

Predominant Soil Series: Colton-Duxbury Complex, very stony

Area History: The land was cleared and used for pasture or hay starting in the early to mid-1800s and abandoned during the mid-late 1900s. It has remained open through periodic mowing.

Non-native Invasive Plants: No-non-native invasive shrubs have been observed in Open A.

Open A – Management

LONG-RANGE OBJECTIVE AND SCHEDULED TREATMENT

Long-Range Objectives: Maintain as an open field through periodic mowing.

Scheduled Treatment:

annually or
biennially

Open A – Mow field.

2030 **All Areas - Update Use Value Appraisal forest management plan.**

2040 **All Areas - Update Use Value Appraisal forest management plan.**

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Open B – Description

Cover Type: maintained open field

Acres: 0.6 (mapped)

Site Class: II (determined using the Rutland County Soil Survey and estimation)

Predominant Soil Series: Windsor Loamy Sand

Area History: The land was cleared and used for pasture or hay starting in the early to mid-1800s and abandoned during the mid-late 1900s. It has remained open through periodic mowing.

Non-native Invasive Plants: No-non-native invasive shrubs have been observed in Open B.

Open B – Management

LONG-RANGE OBJECTIVE AND SCHEDULED TREATMENT

Long-Range Objectives: Maintain as an open field through periodic mowing.

Scheduled Treatment:

annually or

biennially

Open B – Mow field. Consider mowing after August in order to lessen the impact on wildlife that uses the field for habitat during the summer.

2030 **All Areas - Update Use Value Appraisal forest management plan.**

2040 **All Areas - Update Use Value Appraisal forest management plan.**

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Open C – Description

Cover Type: maintained open field

Acres: 7.7 (mapped)

Site Class: II (determined using the Rutland County Soil Survey and estimation)

Predominant Soil Series: Colton-Duxbury Complex, very stony

Area History: The land was cleared and used for pasture or hay starting in the early to mid-1800s and abandoned during the mid-late 1900s. It has remained open through periodic mowing.

Non-native Invasive Plants: Goutweed, also known as bishop's weed, an invasive perennial herbaceous plant is present along Coldham Road, on the west side of Open C.

Open C – Management

LONG-RANGE OBJECTIVE AND SCHEDULED TREATMENT

Long-Range Objectives: Maintain as an open field through periodic mowing.

Scheduled Treatment:

annually or

biannually Open C – Mow field.

2020 Open C – Consider controlling goutweed along Coldham Road and Gould Brook.

2025 Open C – Monitor for and control non-native invasive plants.

2030 All Areas - Update Use Value Appraisal forest management plan.

2030 Open C – Monitor for and control non-native invasive plants.

2040 All Areas - Update Use Value Appraisal forest management plan.

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Open D – Description

Cover Type: maintained open field

Acres: 0.4 (mapped)

Site Class: II (determined using the Rutland County Soil Survey and estimation)

Predominant Soil Series: Sheepscot Fine Sandy Loam

Area History: The land was cleared and used for pasture starting in the early to mid-1800s and abandoned during the mid-late 1900s. It has remained open through periodic mowing.

Non-native Invasive Plants: No-non-native invasive shrubs have been observed in Open D.

Open D – Management

LONG-RANGE OBJECTIVE AND SCHEDULED TREATMENT

Long-Range Objectives: Maintain as an open field through periodic mowing.

Scheduled Treatment:

annually or

biennially

Open D – Mow field. Consider mowing after August in order to lessen the impact on wildlife that uses the field for habitat during the summer.

2030 **All Areas - Update Use Value Appraisal forest management plan.**

2040 **All Areas - Update Use Value Appraisal forest management plan.**

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Open E – Description

Cover Type: maintained open field

Acres: 5.7 (mapped)

Site Class: II (determined using the Rutland County Soil Survey and estimation)

Predominant Soil Series: Sheepscot Fine Sandy Loam

Area History: The land was cleared and used for pasture starting in the early to mid-1800s and abandoned during the mid-late 1900s. It has remained open through periodic mowing.

Non-native Invasive Plants: No-non-native invasive shrubs have been observed in Open E.

Open E – Management

LONG-RANGE OBJECTIVE AND SCHEDULED TREATMENT

Long-Range Objectives: Maintain as an open field through periodic mowing. Consider planting trees in a portion of the area, and/or ceasing mowing to allow the forest to return in order to increase the carbon stored on the acreage.

Scheduled Treatment:

annually or

biennially Open E – Mow field. Consider mowing after August in order to lessen the impact on wildlife that uses the field for habitat during the summer.

2023 Open E – Consider planting tree seedlings on a portion of the area. Choose species suited to the site, and that can handle a warming climate.

2030 **All Areas - Update Use Value Appraisal forest management plan.**

2040 **All Areas - Update Use Value Appraisal forest management plan.**

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

Open F – Description

Cover Type: maintained open field

Acres: 3.6 (mapped)

Site Class: II (determined using the Rutland County Soil Survey and estimation)

Predominant Soil Series: Sheepscot Fine Sandy Loam

Area History: The land was cleared and used for pasture starting in the early to mid-1800s and abandoned during the mid-late 1900s. It has remained open through periodic mowing.

Non-native Invasive Plants: No-non-native invasive shrubs have been observed in Open F.

Open F – Management

LONG-RANGE OBJECTIVE AND SCHEDULED TREATMENT

Long-Range Objectives: Maintain as an open field through periodic mowing.

Scheduled Treatment:

annually or

biennially Open F – Mow field. Consider mowing after August in order to lessen the impact on wildlife that uses the field for habitat during the summer.

2030 All Areas - Update Use Value Appraisal forest management plan.

2040 All Areas - Update Use Value Appraisal forest management plan.

USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

Jockey Hill Associates - 2020

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USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

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SUGGESTED READING

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Mollie Beattie, Charles Thompson and Lynn Levine. University Press of New England.

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Jan Albers. The MIT Press.

Reading the forested landscape: A natural history of New England. 2005.

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More than a woodlot: Getting the most from your family forest. 2012.

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USE VALUE APPRAISAL FOREST MANAGEMENT PLAN

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COMPOSITE SCHEDULE OF FOREST MANAGEMENT ACTIVITIES

Year	Area	Activity
yearly	Area 2	Tap maples to harvest maple sap.
2020	Area 2	Explore for and control non-native invasive plants. Pay particular attention to the land in the northeast where a small common buckthorn plant was observed in 2019.
2020	Area 8	Explore stand and control other non-native invasive plants present. Pay particular attention to the small groups cut in 2005-06.
2020	Open C	Consider controlling goutweed along Coldham Road and Gould Brook.
2020	Area 9	Control known non-native invasive bittersweet, honeysuckle and multiflora rose plants present in the south-center of the stand. Explore remainder of stand and control other non-native invasive plants present.
2023	Open E	Consider planting tree seedlings on a portion of the area.
2023	Area 8	Release 10-15 apple trees as needed to maintain vigor.
2024	Area 3	Single tree selection improvement cut.
2025	Area 6B	Clearcut.
2025	Area 7	Single tree and small group selection improvement cut.
2028	Area 2	Single tree and small group selection harvest.
2030	All Areas	Monitor for and control non-native invasive plants.
2030	All Areas	Update Use Value Appraisal forest management plan.
2030	All Areas	Monitor for and control non-native invasive plants.
2032	Area 1	Single tree and small group selection harvest if stocking is suitable.
2033	Area 8	Release 10-15 apple trees as needed to maintain vigor.
2034	Area 4	Single tree and small group selection harvest if stocking is suitable.
2034	Area 5	Single tree and small group selection harvest if stocking is suitable.
2035	Area 6B	Timber stand improvement thinning or crop tree release if stocking is suitable.
2036	Area 8	Single tree and small group selection harvest if stocking is suitable.
2036	Area 9	Single tree and small group selection harvest if stocking is suitable.
2040	All Areas	Monitor for and control non-native invasive plants.
2040	All Areas	Update Use Value Appraisal forest management plan.

Note: Activities, except management plan updates, can be carried out three years before or after the scheduled date.

Sugarbush Management Standards and Tapping Guidelines for Forestland in Use Value Appraisal

The purpose of this document is to describe the forest management standards on enrolled forestland with trees tapped for maple sap. At the end of this document are the tapping guidelines. The term “shall” is used for mandatory requirements and the term “should” is used when practices are recommended.

While production of a food product such as maple syrup is an agricultural activity in which the processing of sap to maple syrup occurs in the sugarhouse, management of a woodlot for sap production is a forestry activity. A sugarbush is not agricultural land but a forested ecosystem with multiple values, products and services and—like any forestland—should be managed with these products and services in mind, including water quality, biodiversity, wildlife habitat, and value-added forest products.

The following standards shall be followed in sugarbush management on stands enrolled in Forestland UVA:

- There should be long-term planning for the recruitment or retention of multiple age classes (uneven-aged management is recommended, though even-aged management may be allowed). When regenerating a forest stand, hybrid silvicultural systems are also possible including continuous cover, and shelterwood with reserves.
- Since the basis of any long-term forest-based management activity, such as sugaring, is a healthy forest, minimum residual stocking standards for sugarbush management shall be the same as the minimum residual stocking standards for northern hardwood stands managed for sawtimber. See appropriate guides in UVA Manual Appendix A.
- No single entry while tending the forest with intermediate treatments should reduce stocking by more than one-third basal area, and residual stocking shall be expected to consist of healthy, vigorous trees with sound structure. Harvesting more than one-third basal area in any entry may cause sunscald, windthrow, epicormic branching or susceptibility to drought.
- It is understood that emphasis in a sugarbush is on maple sap production and the species of principal interest will be sugar maple and/or red maple. To avoid a monoculture, landowners and managers shall retain a minimum of 25% of total basal area in a combination of non-sugar maple species. (Note: It is recommended that the most varied suite of species found in the forest community be maintained or encouraged. This could include “up to” 8-11 species.) A variance of the 25% may be approved by the county forester if the landowner justifies the change. In instances when the stand, prior to harvest, already has less than 25% non-sugar maple trees, the percent residual non-sugar maple stocking shall not be less than pre-treatment and the management plan shall address ways to increase these percentages over time.
- Sugarbush management often includes the maintenance of saplines which may include annual clearing of trees, saplings and woody material from under, above, and near lines. The amount of woody material removed while clearing lines should be minimized to keep negligible any effect on the basal area, and in most cases it should be left on the ground to enhance coarse woody material. Beyond cutting for line clearing any additional harvesting for fuelwood or salvage shall be quantified in the plan with either a basal area target, number of crop trees to be released, or by indicating the volume to be removed from any stand.

Appendix A

- For purposes of UVA, Acceptable Growing Stock (AGS) is based on timber quality of the merchantable stem; trees that are healthy, vigorous, and single stemmed with minimal defect from rot, wounds or branches. It is recognized that a good sap producing tree may not be an acceptable timber tree. However, the definitions for AGS and Unacceptable Growing Stock (UGS) will remain the same for enrolled forest land managed for maple sap production to prevent potential high-grading which would adversely affect forest management options in the future. *Note: Large diameter UGS may be retained for tapping purposes as long as the ratio of UGS to AGS is not higher post-harvest.*
- Conversion of a stand to sugarbush use may require special consideration in those natural communities where maple is an associate species of lesser abundance. Every stand should be managed with consideration of the natural community type, tapping the maples only as feasible. Examples of such types are Red Maple Swamps, Riparian Silver Maple Forests (both present problems with equipment and fragile soils), Hemlock-Northern Hardwood, Red Spruce-Northern Hardwood, and Sandplain Forests with oak and pine as dominants and red maple as an associate. While these forest communities can contain large numbers of maple they should not be managed toward any single species or converted to a maple monoculture by harvesting only the dominant oak, pine, spruce, tamarack or ash.
- Sugarbushes shall be mapped following the UVA mapping standards. The stand will be identified using Stand Type based on SAF Cover Type or Vermont's Natural Communities as per UVA guidelines. The UVA map shall also include the identification of those stands that are tapped or have plans to be tapped within the plan time frame.
- All taps shall be removed annually at the end of each sugaring season before full maple leaf out. Used tubing, mainlines and drop-lines should be removed from the woods, when replaced or when the sugarbush is no longer tapped.

The **UVA Tapping Guidelines** below shall be referenced in the forest management plan on a stand level where trees are tapped or are planned to be tapped within the time frame of the current plan and a copy of these Guidelines should be included in the landowner's copy of their forest management plan. Taps per tree should not exceed the number of taps in the table below (these are within 2-inch diameter classes). Droplines of 30-36 inches are recommended.

	<i>Standard Spout (5/16")</i>	<i>Large Spout (7/16")</i>
0 taps	Less than 10" diameter (less than 29" circumference)	Less than 12" diameter (less than 35" circumference)
1 tap	10-14" diameter (29-47" circumference)	12-18" diameter (35-60" circumference)
2 taps	16-20" diameter (47-66" circumference)	20" & over, diameter (60"+ circumference)
3 taps	22" & over, diameter (66" & over circumference)	Prohibited
4+ taps	Prohibited	Prohibited