USE VALUE PROGRAM
FOREST, FIELDS & WILDLIFE LAND STEWARDSHIP AND MANAGEMENT PLAN FOR

APPLICANT:
Foundation For A Sustainable Future
c/o Melissa Hoffman
410 Camels Hump Road
Huntington, Vermont 05462
802.434.7798

EMAIL:
melissa@livingfuture.org

SPAN #303-096-10765
PARCEL ID #024010

GRAND LIST ACREAGE: 1,296.1 acres

PROPERTY LOCATION:
Huntington, Chittenden County, Vermont

ORTHOPHOTOS USED TO MAKE MAP

Sheet Numbers: 112196,112200,116196,116200
Photo Scale: 1": 416’
Series: 5000, 2013

PLAN PERIOD: 2015 - 2030

THIS PLAN IS ACCEPTED AND WILL BE FOLLOWED BY:
FOUNDATION FOR A SUSTAINABLE FUTURE AND SHO FARM, LLC

Melissa Hoffman _____ Date 6-27-15
FSF, founder & co-director
SHO FARM, LLC, managing member

Shawn Smith _____ Date 06-27-2015
FSF, co-director
SHO FARM, LLC, managing member

PLAN PREPARATION WAS A COLLABORATIVE EFFORT OF:

BARTLETT FORESTRY & WILDLIFE LLC.
260 Greengate Rd, Woodstock, Vermont 05091 (802) 457-4315
forestrywildlife.com

Patrick Bartlett, TSP _____ Date 6-26-15

MORSE & MORSE FORESTRY AND WILDLIFE CONSULTANTS
Wolfrun - 55A Bentley Lane, Jericho, Vermont 05465 (802) 899-2023
keepingtrack.org

Susan C. Morse, Wildlife Biologist Susan C Morse Date 6/26/15

FOUNDATION FOR A SUSTAINABLE FUTURE AND SHO FARM, LLC
SHO Farm - 410 Camels Hump Road, Huntington, Vermont 05462 (802) 434-7798
facebook.com/leafarm.vermont; livingfuture.org (FSF's d/b/a); earthasset.com

Melissa Hoffman _____ Date 6-27-15
FSF, founder & co-director
SHO FARM, LLC, managing member
BA, Mount Holyoke College
Permaculture Design Cert, Geoff Lawton
Permaculture Research Institute -Australia

Shawn Smith _____ Date 06-27-2015
FSF, co-director
SHO FARM, LLC, managing member
BS, Iowa State University
JD + MSEL, Vermont Law School
Advanced Nutritarian Studies Cert, Dr. Joel Fuhrman
Nutritional Education Institute
Permaculture Design Cert, Geoff Lawton
Permaculture Research Institute-Australia
Certified General Real Estate Appraiser
Real Estate Broker

CERTIFIED BY
VERMONT COUNTY FORESTER

_____ Addison County Forester Date 1/28/16
Kelly Thompson, Chittenden County Forester
On behalf of Chittenden County Forester

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IMPORTANT USE VALUE PROGRAM REQUIREMENTS TO REMEMBER

Any land that is enrolled in this program must be actively managed to receive tax benefits. When you sign this plan it acknowledges that you have read and fully understand the contents of this plan. **Any cutting of trees on enrolled land contrary to this plan could result in being expelled from the program and loss of tax benefits.**

Bartlett Forestry & Wildlife LLC must be contacted if any meetings are scheduled through either the WHIP, Fish and Game or NRCS funding programs to ensure all management activities comply with Current Use requirements.

There is a Forest Management Activity Report that needs to be filed with the County Forester if any trees have been cut or harvested that year. You must contact him or me to obtain one of these reports and they are to be mailed to the County Forester by February 1 of each year. Failure to do so promptly will result in being expelled from the program.

Every ten years an updated plan is required by the State. They will mail you a notification.

The harvesting of trees is required by anyone in this program. Generally this work is done by loggers. Skidders or tractors, bulldozers and log trucks may be needed to accomplish this. Access will be needed for this large equipment. Failure to harvest trees as this plan calls for may also result in being expelled from the program.

If any acreage is sold or developed that has been enrolled in the program there may be a penalty. If more than twenty-five acres of forest land are sold after it has been enrolled in the Use Value Program, UVA benefits must be transferred to the new owner by filing two-forms and new map within 30 days of the transfer.

Any dates that are scheduled for work to be done have a six year window to get the work done. Three years prior or three years after is that time.

The Forest Management plan should be followed to remain in the program.

The State of Vermont website for Current Use Information is:

http:/www.vtfpr.org/resource/for_forres_useapp.cfm

GENERAL MANAGEMENT UNIT INFORMATION

Location & Enrolled Property Summary

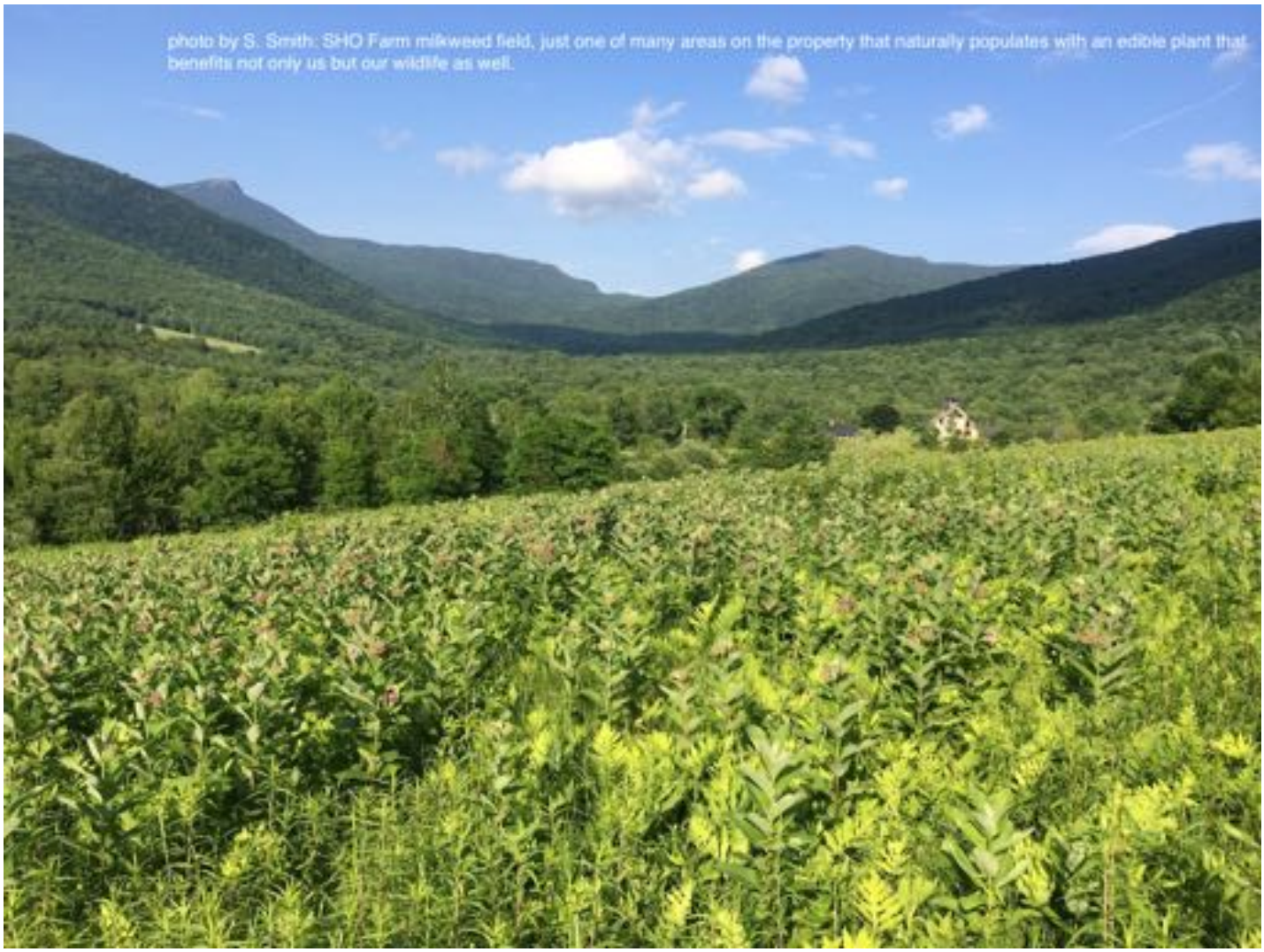
The Foundation For A Sustainable Future (hereinafter “FSF”) owns SHO Farm (historically Teal Farm), 1,296.1 acres and buildings located along Camels Hump and Trapp Roads in the Town of Huntington, Chittenden County. The enrolled property contains a total of 1,282.1 acres, with 853.8 acres of productive forest land, 313.3 acres of Ecologically Significant Treatment Areas (ESTA's), 116.1 acres of open/idle agricultural land, and 3.4 acres of non-productive land (ponds). There are 14 acres excluded from the program. Neighboring properties to the west are mainly farm land (except for Huntington Center which occupies a small portion of the western boundary). Aside from the 20,000 acre public park, Camel’s Hump State Park, to the east, the properties to the north, south and east are quite similar to FSF’s property — privately-owned and largely forested.

photo by B. Falk: in foreground, SHO Farm's north-central fields and 5 acre excluded area with buildings, upper/central fields, and surrounding forest viewed from Camel's Hump Mountain

Please note that the following changes have been made in connection with this 2015 update:

1. Land has been added to (6.1 acres) and withdrawn from (9.1 acres) the existing enrolled property: Under the previous plan there were 1,285.1 acres of enrolled land and 11 acres excluded (5 ac where the house and some accessory structures are located; 4 ac in the central portion of the property; and 2 ac off Trapp Road). The 2 and 4 acre areas have been added, while a new 2 acre area nearly adjoining the old 4 acre area and 7.1 acres adjoining the old 5 acre excluded area have been withdrawn, resulting in a total enrolled area of 1,282.1 acres, and a total excluded area of 14 acres.

2. Agricultural land has been reclassified: Under the previous plan there were 152 acres classified as agricultural land, which was a mixture of hayfields and grazing land. Through a lease with a local farmer the agricultural land was rotationally grazed and hayed. That lease ended in the 2014 season. Now, under the new lease with SHO FARM, LLC, those lands — which have been recalculated as part of this update to total 116.1 acres — are being designed and planned for in new ways. Permaculture design principles, agroforestry practices, wildlife habitat enhancement and broad-species considerations (pollinators, mammals, birds, amphibians, etc.), alongside research into nutrient-dense, climate-appropriate, emerging market crops is informing the future of the agricultural fields. We are also in the early stages of conversation with farm animal sanctuaries about partnering with them to make some of our grazing land available to their rescued animals. Our intention is that those acres will be a working landscape, and used in ways that are best described by Current Use as “agricultural land.” However, since the lease arrangement is new and it will take us some time to complete our design and planning work we have reclassified the agricultural land as “open/idle agricultural land” for the near term. We anticipate amending this plan within the next ten years to better reflect our future planned uses. In the interim, an example of what we believe is multi-functional best “agricultural” use of some of our fields is allowing milkweed to mature (rather than cut it) and support insect/pollinator species, does with their young, small mammals, and our own dietary needs.



3. Farm buildings have been added to the existing enrolled property: Under the previous plan there were no farm buildings enrolled. In connection with the new lease agreement between FSF and SHO FARM, LLC, FSF is applying for enrollment of 9 farm buildings, which are identified on the attached map and further described as follows:

a. Farm building #1- main barn located within 12 ac excluded area adjoining enrolled land.

b. Farm building #2-workshop located within 12 ac excluded area adjoining enrolled land.

c. Farm building #3-run-in/hay storage shed located on enrolled land in northern portion of the property.

d. Farm building #4-barn/shed located on enrolled land in northern portion of the property.

e. Farm building #5-tool/supply shed located within 12 ac excluded area adjoining enrolled land.

f. Farm building #6-greenhouse, attached to southern facade of house located within 12 ac excluded area adjoining enrolled land.

g. Farm building #7-solar kiln located on enrolled land in northern portion of the property in the farm's wood processing/storage area.

h. Farm building #8-lumber and kindling storage shed located on enrolled land in northern portion of the property in the farm's wood processing/storage area.

i. Farm building #9-firewood storage shed located on enrolled land in northern portion of the property in the farm's wood processing/storage area.

PROPERTY INFORMATION

Some of the following property information, including stand data, was gathered by Brendan Moore in 2005, and Allan Thompson during the winter of 2014-2015. FSF and Consulting Forester Bartlett Forestry & Wildlife LLC (hereinafter "BF&W") agreed to use general property information and more specific stand data in this update to the extent it is still accurate and relevant.

Land Use History

FSF's property consists of 1,296.1 acres, representing the former holdings of Swannie (556.1 acres) and Cavanaugh (740 acres located just south of Swannie). The Swannie parcel was acquired in 2003 and the Cavanaugh parcel was acquired in 2004. The historical use of the property was agricultural; much of the western half of the property was formerly cleared for crop and pasture lands. The lands to the west that were not cleared were used for timber products such as firewood and maple syrup production. This entire property was formerly owned by the Teal family, and known as Tunturi. There are several stonewalls and one old foundation located near the northeast corner of the property which was the former site of the Hallock Farm. Similarly, there are stonewalls, stone piles, and old foundations in the southern part of the property. Although the majority of the property has reverted to forestland following agricultural use abandonment, there are 116.1 acres of open land remaining. The current owner has planted fruit, nut, and fuelwood trees on some of the open acres making them active agricultural lands again. In June 2015, FSF entered into a lease agreement with SHO FARM, LLC for the entire property.

Property Access

The FSF's property has very good access. The woodlot can be accessed from the existing town roads on the north, Camels Hump Road, and south, Trapp Road, ends of the property. These roads are shown on the map with yellow dotted lines and they have been used for logging and recreational access in the past. There are some erosion issues that need to be addressed on interior access roads in Areas 5, 6, 7, 8, 12, 13, 15 and 18. Water bars and/or culverts will be needed to fix these problems, as well as grading the tire ruts out of the roads. A mid-sized excavator with a blade is the best machine for doing this work. Conservation mix grass or winter rye seed should be spread immediately after any work is done to help hold the soil. The log landing areas have been marked on

the map with an orange dot. There is also a green dot in ESTA 1 along Camels Hump Road, which represents the site of a town road/bridge relocation project scheduled to begin some time in the first half of 2016. As part of the project, the town has requested an expansion of the existing right-of-way which requires FSF to grant the town an easement on 0.19 acres (8,276.4 square feet) of ESTA lands. Trees cut, and any chips made, in connection with the project are expected to be delivered to FSF and used for firewood and orchard management.

Boundary Lines

The property's boundary lines are in fairly good condition. The northern boundary follows the path of Brush Brook. The southern boundary follows Cobb Brook. Camels Hump State Forest borders nearly one mile of the eastern border and is marked with paint and blazes. The east and west boundary lines need work, however the majority of corner points were found and plotted on the map with a Rhino 650 GPS with an accuracy of 10 feet +/-. Some sections are clear with old fences and pins marking corners, but some need to be located and marked before any scheduled activity occurs. In the coming years all the corners will be located with a GPS and downloaded on to the Current Use map.

Topography, Geology, and Surface Water

The property stretches from the village of Huntington Center, approximately two miles east to Camel's Hump State Forest. The property lies on the west slopes of the main range of the Green Mountains, southwest of Camel's Hump Mountain. There are excellent views of the mountain from many locations on the property. The peak of Camel's Hump is approximately two miles northeast from the northeast corner of the property. The elevations range from 700 feet in the village of Huntington Center to over 1,900 feet on the east side of the property. At lower elevations the property varies from flat to gently rolling land. East of the home site the land rises rapidly with some very steep slopes and rock outcroppings.

Bedrock geology of the lands consist of several schist-phylitte formations that are characteristic of the western Green Mountains. A few examples are Hazen's Notch, Fayston and Underhill formations. On the west side of the property are locations underlain by greenstones.

There are several seasonal streams and one year-round stream that course through the property. These tributaries drain into either Brush Brook or Cobb Brook, which are major drainages of the western portions of the Camel's Hump watershed. Brush Brook forms a good portion of the northern boundary, and eventually drains into the Huntington River. Cobb Brook forms the southern boundary of this parcel and likewise drains into the Huntington River.

Natural Communities

The natural communities of the property have been mapped and described in a separate report prepared in 2005 by Marc Lapin and Brett Engstrom; a copy can be made available upon request. Northern hardwood forest is the predominant natural community; a number of different types of northern hardwood forest occur on the property. The typical northern hardwood forest (sugar maple, beech & yellow birch) occupies the greatest acreage. Moderately enriched hardwood forests (sugar maple, ash & jack-in-the-pulpit northern hardwood forest) are also extensive on the land. Hemlock - northern hardwood forest occur in scattered pockets and strips along the brooks and seeps. Two montane forest types - montane spruce-fir forest and montane yellow birch, sugar maple, red spruce forest - occur in the high elevations on the east side of the property. These areas comprise ESTA 2 and 3, respectively. Additionally, there are numerous locations of seeps and northern hardwood seepage forests, as well as wet-mesic forest types, a portion of which comprise the property's ESTA 4 forested wetland area. Overall, the property consists of a diversity of forest types with a prominent matrix of northern hardwoods and rich and moderately rich northern hardwood forest. This

ecosystem diversity provides a varied natural landscape on which to achieve the management goals of FSF.

Rare and Threatened & Endangered Species

The rare and Threatened and Endangered Species on the property were also described in the Lapin and Engstrom report. In short, only one rare plant species was discovered — summer sedge (Carex aestivalis). Summer sedge is very rare in Vermont (state rank S1). It was seen in two subpopulations in Semi-rich Northern Hardwood Forest.

Past Management

In the past ten years one patch cut was done in Area 8 and one in Area 13. The size and location is shown on the map with a blue circle. In addition, the caretaker has been harvesting 30-40 cords of firewood for FSF on an annual basis from Areas 5, 6, 7, 10, 11, 18 and 21. FSF has planted fruit and nut trees to supplement its food needs.

LANDOWNER'S VISION, PHILOSOPHY, OBJECTIVES, STRATEGIES AND PRINCIPLES

FSF owns SHO Farm, a nearly 1,300 acre mixed forested and agricultural landholding with several buildings. In June 2015, FSF leased the entire property to SHO FARM, LLC.

SHO Farm is a land, food, and health institute, a "do no harm, wildlife-assisted field and forest permaculture farm" committed to an austere and monastic manner of living.

SHO Farm's purpose is to demonstrate the interconnectedness of land-food-health, and the basis for new economic opportunities at their intersection.

SHO Farm is a collaborative project of FSF, SHO FARM, LLC, and Earth Asset Partnership, LP, the goal of which is to provide a tangible model for agricultural and forest land stewardship that is ethics-based, science-supported, does no harm, advances the health and diversity of the natural assets, builds resiliency, supports regeneration, and contributes to multi-faceted security — food, drought, flood, peak-oil, health, financial. We hope to inspire land stewardship practices, crop selection, and nutrient-protective conversion of raw crops to value-added plant-based healthful cuisine and beverages that do not harm or commoditize sentient beings. Our approach is to observe, mimic, and support the natural synergies of field and forest ecology so that our nearly 1,300 acre landholding exemplifies the optimal existence and productivity of a thriving, whole biological system — not "just forest land" or "just agricultural land".

An institute is "a organization having a particular object or common factor, especially a scientific, educational, or social one." We consider our farm more than just a forest or agricultural food production center, which is why we describe it as an institute. We believe one cannot meaningfully address land, food, and health discretely from one another, they are inextricably connected and demand consideration in an integrated manner. We are research and science-based. We and our growing group of professional experts educate each other and greater society about socially relevant land, food, and health issues.

We are a farm integrating forest and fields, and land food and health, for social security in the forms of producing health-advancing, disease preventing foods; protection against flood and drought; alternatives to oil; supporting wildlife diversity; and promoting living wages recognizing the true cost of providing real food in an ethical, resilient, regenerative way.

photo by M. Hoffman: SHO Farm's upper/central fields enfolded in SHO forestland. Extensive field-forest edge, with year-round pond (enrolled) and excellent southern exposure. The uninhabitable old farmhouse is expected to be demolished in the next few years.

We believe, like many before us as well as many around the world today, that forest land is as much a part of agriculture as open fields. However, despite their ability to support the growth of valuable non-timber forest products, like food and medicine, forest land is excluded from the idea—never mind regulatory definition—of agricultural land in most states around the USA, Vermont included. Even more, while social and ecological drivers may seek to reduce the use of wild food and medicine, their importance will grow as pressure on agricultural productivity increases. And as that happens those who treat their forests as part of the agricultural landscape, those who understand the need for sensible and thoughtful wild edible-and-medicinal management techniques and harvest parameters, and those who create a well-functioning body to oversee that these irreplaceable natural assets are not destroyed, will be well ahead of societies that were too short-sighted to accept the naturally-occurring, synergistic relationship between forest and fields.

We want to support Vermont, through the Current Use program, blend, as opposed to separate, its working landscape to position itself, landowners, and the natural environment in the best position possible for long-term resilience, regeneration and economic security. We do not see a distinction between forest and fields that justifies separate land type classifications and vastly different management practices. Instead, we see the line between the two as the area of greatest opportunity-diversity-productivity. Our land stewardship philosophy is grounded in this view, and our land design and stewardship practices seek to support and advance the benefits of managing mixed landscapes as interconnected, whole systems as opposed to separate and discrete islands.

Photo by P. Bartlett. Melissa Hoffman (l) and Shawn Smith (r), with their East German Shepherd, Pharma. Melissa and Shawn are the founders/owners behind FSF, SHO FARM, LLC, and Farm Asset Partnership, LP. They live and work at SHO Farm.

Our forest use and management influences and is influenced by our adjoining fields, and our field use and management influences and is influenced by our adjoining forest land. The common threads between the two are soil nutrients, wildlife and water, and for us they are three of the most precious and high-performing contributors to the health of our landscape.

According to the Vermont Department of Forest, Parks and Recreation, Agency of Natural Resources, Forests and Forestry, Working Landscape website page, “Vermont’s forest-based businesses are an important part of the state’s rural economy. The forest-based industry (forest products, maple syrup products, and christmas trees) contributes $861 million in sales to the state economy annually and provides direct employment for about 6,600 people.” While noteworthy, this is a very restrictive idea of what the forest offers, it is all about timber. Current Use mandates the harvesting of timber in order to comply and remain in the program. We think this is unnecessarily limiting, and can undermine the long-term health of our landscape.

According to the Director of Forests, Department of Forests, Parks and Recreation, Steve Sinclair's introduction to "The Economic Importance of Vermont's Forest Based Economy 2013, prepared by the North East State Foresters Association," "managing forests sustainably involves a recognition of the ecological, social, and economic systems necessary to maintain forest health while providing benefits for this and future generations." We couldn't agree more. He goes on to state "The economic importance of Vermont's working forest has seen considerable attention of late. This recognition has seen a renaissance in the "Buy Local" movement extending from food to forests. from firewood to lumber, biomass to fine furniture, carbon sequestration to clean water, our forests have value." Again, we couldn't agree more. Finally, he writes "Vermont has a well-deserved reputation for its agricultural products, so it might come as a surprise that its land base is mostly forest." This is why we believe the policy and law of Current Use needs to be retooled, so that landowners can maintain their properties as working landscapes in ways that actually advance the practice of designing and managing forests as part of an agricultural landscape — a farm that is not just fields, a farm that is forest and fields. We want to optimize the diverse, mixed landscape so that we can sustainably harvest timber and non-timber forest (agricultural) products. It's a necessary paradigm shift for long-term forest, food, flood, drought, peak-oil, and economic security.

In that same report, Steve writes, "Vermont's forest covers 4,591,281 acres of land. That's 78% of the State, a level which has stayed steady since the 1980s. The northern hardwood mix of beech, birch, and maple dominates Vermont's forests, accounting for 71% of the forest cover." We ask "what non-timber forest products are naturally occurring in these stand types, or are best cultivated through management activities other than silviculture?" For example, chaga grows on all three tree types, but especially birch. Managing for chaga is not the same, necessarily, as managing for

photo by S. Smith: Melissa with freshly harvested SHO Farm wild chaga.

photo by S. Smith: Sue Morse and SHO Farm bear-scratched beech.

highest board feet yields. And beech are important to bear, so how do we manage the health of beech for bear not sawmill prices?" Our thinking moves us away from purely stumpage value consideration and towards the intrinsic value of a healthy ecosystem as well as the market value — local, regional and global — of forest-based wild edibles and medicinals.

According to Steve, "Individuals and families own more than 80% of the forest." Imagine what the heath of our landscape and economy would look like if we expanded our view of the potential of our forested acreage, if we provided private landowners with more design and management ideas and tools, even supported their integration of alternative, non-silvicultural practices. The future is very bright under this scenario.

Steve wraps up the report by writing,"This report provides a brief overview of the value of one of Vermont's greatest assets, and I hope will add to your understanding of Vermont's forest and its economic contribution to the state." The information is helpful, but it's very one dimensional, it's forest products focused - timber, firewood, fine furniture - just think how much is missing. Imagine what the forested landscape would like like, and the overall health of our forests and fields and farmland and watersheds and waterways and wildlife habitat if Current Use supported, permitted, even advocated for stewarding working landscapes with an eye toward non-timber forest products and decided as a matter of policy and law that society would value the ecosystem services Steve mentioned despite the fact that the market has not, and may never, place a dollar value on them. In some ways, not monetizing inherently valuable natural assets is the surest way to protect them far into the future. There is much to be said about a society that codifies the inherent value of nature and does not require it be monetized to appreciate or protect it by policy and law.

We appreciate the societal and cultural importance of working landscape programs like Vermont's Use Value appraisal program. The simple acknowledgment of the value of such landscapes through legislation is not to be overlooked. We applaud and thank the State of Vermont — residents and government officials alike — for the continuation of Current Use. We also challenge lawmakers to ensure that the program evolves in a timely and sensible way to assure that the best and greatest number of opportunities are afforded to landowners in their pursuit of responsible and affordable long-term forest and agricultural land stewardship — unified as opposed to separated. We have included some of our ideas in this plan (though we have many more) for how to equip Current Use to best support Vermont's landowners, natural resources, and economy well into the future.

Working Forests: Food, Medicine & the Future of the Vermont Economy

We observe food system development expanding outside conventional definitions of agriculture into perennial agroforestry systems, for carbon-saving, perennial yields. The rise of foraging in world-class culinary establishments alongside the deliberate cultivation of the forest canopy for food and medicinal products demonstrate new frontiers for food system stability, human health, and both new and revived cultural traditions--all linked to opportunities to steward forest lands for the greatest systemic benefit.

Our own forest-specific goals are to combine timber, firewood, and mushroom-log harvesting with growing food-medicines within the forest canopy, especially mushrooms, wood nettles, acorns (later), and ramps. Food-medicines with exceptional nutrient density increasingly form the backbone of both agricultural and health systems in the marketplace. Thus, forest products such as wood-grown fungi, and perennial leafy greens like wood nettle and ramps, offer exceptional opportunities for non-timber yields. [fact: daily consumption of even one mushroom reduces incidence of breast cancer by 20%].

photo by S. Smith: SHO Farm wild turkey tail growing on downed and decaying tree in our forest.

Medicinal yields from fungi found in Vermont forests may some day surpass the value of timber products. Dried, ground chaga (grown on birch), for example, commands $5/oz in local Vermont markets. Dried turkey tail (grown on dead/dying hardwoods) sells for $60 a bottle. Chaga extract for $37 per bottle. Dried reishi (grown on dead hemlock) for $60 per bottle. As these items gain market share, the demand for high quality and responsibly-harvested products will favor “Vermont Forest-Grown.”

Rising medical costs combined with reliable and accessible clinical data [see nutritionfacts.org] are driving consumers towards the preventive and lifestyle behaviors anchored in a high-quality diet-styles, favoring nutrient-dense plants and fungi found in both field and forest. The value of these products will only appreciate as our understanding of their health benefits deepens.

Food tourism combined with Vermont’s goal of maintaining an ecologically-sound working landscape can expand beyond cheese, spirits, maple, and meat to favor a nuanced and health-based palate of offerings. Fruits, nuts, mushrooms, herbs, vegetables, foraged plants and their value-adds like fermentation, creative preservation, health tonics, mushroom stocks, and high-quality staples from acorns can all combine to create a vital place-based cultural expression foundational to a long-term regional economy.

photo by S. Smith: SHO Farm wild chaga on birch.

Keeping required woody biomass on site for mushroom production adds to the nutrient value of forest soils. Mushrooms and nettles are easily dried for later conversion to a number of food and medicinal staples.

"Conscious Foraging"--keeping forest product management under sophisticated oversight via an ecologically-sensitive management plan--guards against over-harvesting, and provides opportunities for assisted propagation through conducive timber stand and forest ecology improvements.

We aim to specifically steward our forest as wildlife refuge, leveraging opportunities for enhancing and holding nutrients in the whole farm ecosystem for mutual benefit. Wildlife biologist Sue Morse and forester/wildlife consultant Pat Bartlett have contributed their immense knowledge in helping to shape strategies that safeguard and enhance wildlife habitat on our property.

For us, the forest is not seen in isolation from adjacent fields and water bodies. For example, in upland pasture-orchards we work with wildlife browse, transit patterns, and natural hydrology to harness wildlife nutrients. For example, we can, by design, harvest forest runoff into shallow edge ponds that can feed our on-contour orchards. When we prune field edges in winter, we can place prunings above orchard contours for deer and moose to browse. Additionally, heavy rain and flooding events in Vermont can become opportunities for retaining "liquid fertilizer", holding nutrients as long as possible in the landscape.

Our forest management plan will increasingly design for these kinds of pulsed rain events, which are predicted to increase in the Northeast as the climate shifts. Thus, the forest can be seen as a kind of 'nutrient bank', enriched by management strategies that support food and highest density habitat for animals, build soil by supplying fungi with woody biomass, and build mineral diversity through the life processes of a maximum diversity of creatures. We regard the forest habitat as a vital element with intrinsic value, and as an essential part of a resilient agricultural system that will play an important role in Vermont's future.

Linking forests in ecologically meaningful relationships with as many elements as possible (birds, pollinators, amphibians, mammals, hydrology, decomposition, mycelium) protects their health and ours, ours, and is a central aim of this plan.

Specific Strategies

<u>Cultivate edge opportunities for both wildlife and human food sources</u>
1. Edge coppicing: using large root masses to generate pole wood for mushrooms. Good for firewood also, eliminating need for splitting. Do this along field edges and pre-existing and widened roadways.

2. Encourage serviceberry, chokecherry, pin cherry, beaked hazelnut, nannyberry, and elderberry along field and trail edges.

3. Improve select roads to include edge grow-zones for elderberry, brambles, serviceberry, hazelnut, willow, wild apple. “Wild apples” are a major harvest for us, as we convert to cider, and apple balsamic vinegar.

4. Create glades along major woods roads, installing small tank ponds for wildlife and mushroom log forcing, and forest edge gardens with elderberry, black raspberry, serviceberry, and hazelnut. Maintain these glades as food sources for wildlife.

Anticipate climate change

1. Assist natural succession by planting red oaks as maple and beech retreat due to climate change, disease and pest pressure. As maple and beech and ash in decline, encourage red oak, hickory, walnut, chestnut, and other emerging species.

2. As trees weaken under stress due to climate change, disease, and predation, increase the biomass kept within the forest in order to build soils that can support stronger tree health. Shift some timber harvests to mushroom harvests, which require wood to stay in the forest.

Manage field edges

Cutting pole-wood on 5-year rotations to maintain multiple age-class growth for grouse and small mammal habitat.

photo by Susan C. Morse: Fledgling waxwing carbo-loading on nannyberries at Wolfrun pre-migration.

Manage for pollinator, bird, and rodent habitat in fields and edges

1. Mowing regimes will support both pollinator and bird habitat.

2. Rotting logs near field edges supply bees with mycelial nectar they need which is central to their strong immune function.

Improve Roads

All roads within a tree canopy carry much potential as harvesting and 'farming' corridors through thoughtful management. Long driveways into rural areas can become growing opportunities for wild berries, perennial leaf crops (like basswood and mulberry), apples, and coppice fuelwood. With smart engineering, roads can also help slow, sink and spread water from large rain events by over-building ditches into planted swales, directing runoff not into the fastest pathway towards lowland streams, but into small holding ponds on slope contours with edge plantings that retain nutrients. There is much potential to be explored, especially when the creative installation of new roads can reduce long-term maintenance costs and downstream damage, as well as keeping nutrient-filled water on-site and soaking into the soil for as long as possible.

Create small forest glades/patch cuts along certain trails

As mentioned throughout this document, patch cuts establish wildlife browse and strategic planting of black raspberries, elderberries, and hazelnuts.

Cultivate non-timber forest products

1. Fungi follow footfall. Leave whole logs near the sides of logging roads. These are perfect substrates for wild mushrooms. Both humans and wildlife use these trails, spreading mushroom spore and promoting ideal harvest corridors.

2. Logging roads and openings are ideal for wood nettles.

3. Cut old poplars high, leaving girdled trunks for oyster mushroom propagation.

4. Tap yellow birch and maple close to access roads using a bucket method. Monitor birch wounds for chaga conk development.

5. Continue to develop a variety of mushroom stocks using a variety of wild and cultivated fungi.

6. Continue to harvest pine pollen from low branches. And harvest pine needles for use in making health tonics and for culinary herbs.

7. Continue season-long harvest of wood nettles as a staple leafy green, used in a similar manner to spinach.

8. Continue harvesting young basswood leaves along field and road edges for use as a perennial staple green.

9. Continue ramp leaf harvest as a perennial staple green—both cooked and fermented for preservation and later consumption.

10. Pay special attention to fast water runoff along trails, correcting by channeling road runoff to treed areas where soakage can occur at a slower rate in small swales, small ponds, or tree stands, with the intention of retaining nutrients on-site for as long as possible. Use on-contour access roads and downed woody debris as opportunities to slow the downhill transit of nutrients.

11. Mow open fields after grass-nesting birds have fledged in late July. Mow before mid-August to assure sufficient re-growth for pre-migration carb-loading by birds and winter protection of rodents. Let milkweed stands fully mature before mowing. Harvest and preserve milkweed buds as a major winter vegetable.

photo by S. Smith: Grass-nesting bird nest safely tucked away to on one of SHO Farm's fields left untouched until late July

12. Plant sprouted red acorns in sunny locations under brush to establish these mast trees in the area as beech and maple die out or migrate northward.

photo by M. Hoffman: Forester Patrick Bartlett demonstrates best practices for planting sprouted red acorns at SHO Farm.

Build a “Forest Gastronomy”

Stocks, sauces, and fermented products (like soy sauce) made from a diversity of mushrooms can easily replace animal products and create compelling flavors in new gastronomic practices that merge human health enhancement and disease-reversal with new/old culinary traditions. Tree saps, beech and linden leaves, foraged mast, woodland herbs and tubers…all are ripe for experimentation and integration into a region specific food system. A few examples follow.

Wood Nettle as Leaf Protein source plus medicinal, plus edible green

Wood nettle can be harvested for iron-rich greens and seeds over a long period of time in the season. One root system can provide ongoing harvests that replenish annually without soil disturbance. Wood nettle flavor far surpasses conventional nettle and grows abundantly in FSF’s forest. Encouraging this key perennial leafy green for both culinary and medicinal use is a goal of our management.


photo by M. Hoffman: SHO Farm wood nettles.

Wild apple

Given disease and pest pressures on popular cultivars, wild apples and their offspring constitute a potential backbone for cider, storage, and fresh eating. Genetics from these species are invaluable for their site specific adaptability, and heritage as choice species for various uses--cooking, cider, fresh eating, wildlife food.

photo by S. Smith: SHO Farm wild apples and hand-pressed juice.

photo by M. Hoffman: SHO Farm's new manual fruit press, perfect for our wild apple crop

photo by M. Hoffman: SHO Farm's wild apples barreled and aged for apple balsamic vinegar production

Sugaring

FSF's property is rich with sugar maple and legacy trees on steep slopes, with old sugarhouse remnants scattered throughout its western flanks. Birch is also plentiful on the property, and produces an equally delicious syrup as maple. In fact, birch syrup is quite trendy — an emerging new product. The supply is quite low, with interest and demand at the ready to purchase what becomes available. We tapped 10 birch in the spring of 2015 as an experiment, and were pleased with the amount collected. Interestingly, chaga tend to grow on the injured parts of birch, so we plan to monitor the tap holes to see how the trees recover, or if perhaps the wounds will become the site of a new chaga. Use the existing trail and road network to gather sap using a small bucket operation, combined with snowmobile-trailer housing a small sap tank. Boil tree saps for year-round storage and use.


photo by M. Hoffman SHO Farm birch tree taps

Acorns

A staple in Korean cuisine, acorns are a valuable human food source, re-emerging as a replacement staple along with hazelnut and chestnut for annual soybeans and grains in perennial food system design.


photo by M. Hoffman SHO Farm's food lab creation featuring locally harvested acorns made into a Korean cuisine staple known as dotorimuk.

Cultivated mushrooms

Harvesting 4-6" diameter hardwoods and softwoods for propagation of shiitake, oyster, and lion's mane in a mushroom nursery. Simultaneously inoculate pollarded in-forest species well-suited for mushroom cultivation doing so in combination with other goals achieved by such a treatment.

photo by M. Hoffman: SHO Farm's cultivated mushroom nursery located in the Food Lab 'mushroom-port' (formerly a carport).

photo by M. Hoffman: SHO Farm mushroom logs and cultivated shiitake mushrooms in the Food Lab 'mushroom-port'.

photo by S. Smith: SHO Farm mushroom logs and cultivated oyster mushrooms in the Food Lab 'mushroom-port'.

Foraged and woodland managed mushrooms

Turkey tail (high medicinal value in breast cancer prevention and treatment)
Birch polypore
Amadou
Artist conk
Red belted polypore
Chaga --white and yellow birch stand management and cultivation (extraordinary medicinal value)
Oyster
Reishi (growing on hemlock, extraordinary medicinal value)
Chanterelle
Bolete
Puffball
Lobster
Morel

Many of these products are being developed in the SHO Farm Permaculture Food Lab to demonstrate the feasibility and desirability of a year-round, place-based perennial, medicinal cuisine. Fundraisers will be hosted from time to time where these products will be made available to participants.

photo by Susan C. Morse: wild turkey tail.

photo by S. Smith: SHQ Farm's in-forest cultivated mushroom nursery with beautiful shiitakes.

photo by M. Hoffman: SHO Farm wild dryad's saddle, commonly known as pheasant's back mushroom.

photo by S. Smith: SHO Farm wild oyster off main woods road.

photo by M. Hoffman: SHO Farm forest elixir, featuring ingredients mostly harvested from the property. Created by SHO Farm's Food Lab.


photo by M. Hoffman: SHO Farm chaga extract.

photo by S. Smith: SHO Farm wild apple chips drying in farm's solar kiln.

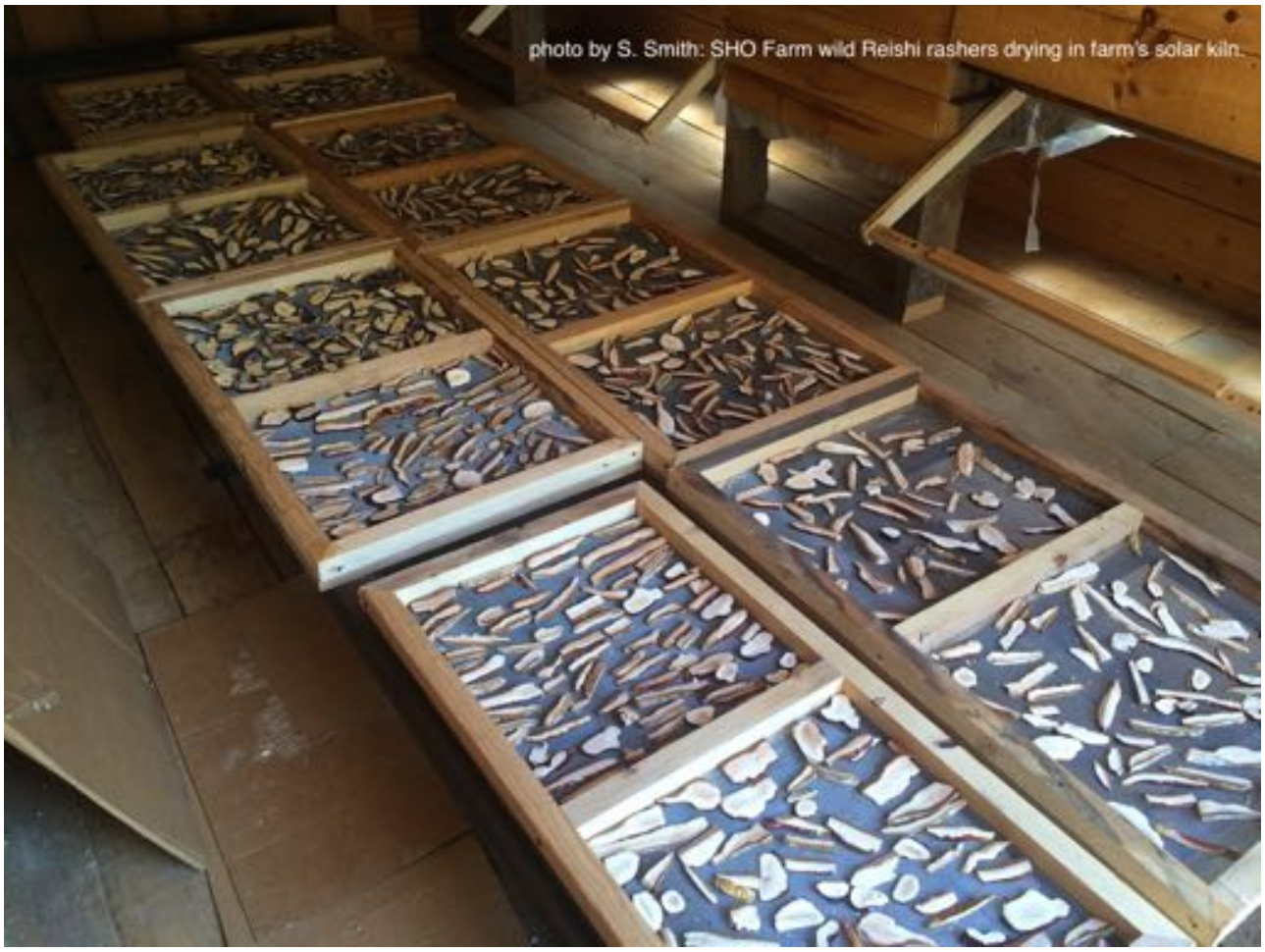


photo by S. Smith: SHO Farm wild Reishi rashers drying in farm's solar kiln.

photo by M. Hoffman: SHO Farm at sunset. Heading back to the Food Lab (red/gray barn in forefront) from the solar kiln with a load of dried Reishi along the woods road between the 5 acre excluded area and wood processing area.

photo by S. Smith: SHO Farm west-facing, steep hillside nurturing healthy ramp population.

Supporting Material

Farming the Woods: An Integrated Permaculture Approach to Growing Food and Medicinals in Temperate Forests, by Steve Gabriel and Ken Mudge, 2014. Chelsea Green Press

Mycelium Running: How Mushrooms Can Help Save the World, by Paul Stamets, 2005. 10 Speed Press

Growing Gourmet and Medicinal Mushrooms, by Paul Stamets (2011-07-13). Potter/TenSpeed/ Harmony

Eating on the Wild Side: The Missing Link to Optimum Health, by Jo Robinson, 2013. Little, Brown and Company

The Roles and Values of Wild Foods in Agricultural Systems, by Zareen Bharucha and Jules Pretty, 2010. US National Library of Medicine National Institutes of Health and The Royal Society Publishing

Eat To Live, by Dr. Joel Fuhrman, 2003 & 2011. Little, Brown

Super Immunity, by Dr. Joel Fuhrman, 2011. HarperOne

Fasting and Eating For Health, by Dr. Joel Fuhrman, 1995. St. Martin's Griffin

Disease-Proof Your Child: Feeding Kids Right, by Dr. Joel Fuhrman, 2005. St. Martin's Griffin

Nutritional Sciences: From Fundamentals to Food, 3rd edition, by Michelle McGuire and Kathy A. Beerman, 2013. Wadsworth Cengage Learning

An Evidence-based Approach to Phytochemicals and Other Dietary Factors, 2nd edition, by Jane Higdon and Victoria J. Drake, 2013. Thieme

The Intrinsic Value of Nature, by Leena Vilkka, 1997. Rodopi

Permaculture Design Certification Course, by Geoff Lawton, 2013/Shawn Smith and 2014/Melissa Hoffman. Permaculture Research Institute-Australia

Harvesting Water The Permaculture Way, by Geoff Lawton, 2008. Permaculture Research Institute-Australia

Establishing A Food Forest The Permaculture Way, by Geoff Lawton, 2008. Permaculture Research Institute-Australia

Permaculture Soils: Realigning with Nature's Plan for Sustainable Abundance, by Geoff Lawton, 2010. Ecofilms Australia

North Jersey Doctor To Grow 'Food as Medicine' Practice on Morris County Farm, by Susan Livio, 2014. www.nj.com/politics/index.ssf/2014/08/hudson_county_physician_open_farm-based_practice_in_long_valley.html

Inside the Intensely Secretive, Ultracompetitive World of Restaurant Foragers, by Edna Ishayik, 2015. www.grubstreet.com/2015/06/secrecy-of-the-foraging-economy.html

Forest Stewardship Principles

Timber management and harvests, as well as the overall stewardship of the forest ecosystem, shall demonstrate the following principles which represent the agreement of FSF, wildlife biologist Susan C. Morse, and forester Pat Bartlett:

1. Optimal health of the entire forest ecosystem including soils, understory species, trees, wildlife and waterways.
2. Timber management is one aspect of landscape design and stewardship objectives. Thus, FSF's forest management activities are embedded in a larger landscape-stewardship context that includes productive non-forest systems such as the human built environment, fields, and aquatic systems.
3. Human intervention creates new habitats and can supply humans with food, fiber and livelihood (e.g., roadways and trails are cultivated as new wildlife habitats, water and nutrient management opportunities, preferred travel routes, and forage and harvest corridors).
4. Timber harvesting goals will focus on quality, not volume.
5. Extraction of resources contributes to regional health self-sufficiency for both forest timber *and* non-timber forest products (NTFP's).
6. Manage a portion of the property to become an old-growth forest where there is some harvest of trees by a single-tree selection silvicultural system. Old growth features begin to develop at a stand age of 180-200 years for live tree characteristics and 275-300 years for dead-wood characteristics.
7. Utilize intensive management where appropriate to enhance wildlife habitat and forage, and preserve existing micro-habitats and micro-climates.
8. Develop and practice cultivation and harvesting plans that extend beyond timber to include NTFP's in various layers of the forest from the rhizosphere to the canopy. This will emphasize strategic retention of whole trees and woody debris within the forest as feedstock for medicinal and edible mushrooms.
9. Demonstrate value-added methods for utilizing the forest system as a whole to support a thriving forested-landscape economy. These include but are not limited to: understory crop cultivation such as shittake, maitake, chanterelle, and morel mushrooms, ramps, nettles, other herbs for foods and neutraceuticals; maple and birch sugaring; possible ethyl-alcohol distillation; coppice cropping of especially useful woods such as *Quercus, Juglans,* beech, and other species. Emphasis will center on converting relatively tiny amounts of biomass into large amounts of economic value.
10. Reserve a portion of the forest to be untouched/wilderness.
11. Given that New England forests act as a global CO_2 sink, timber management should work to maximize the forest's sequestration capacity. To this end, much of the biomass would be reserved for CO_2 sequestration, wildlife structure/habitat, mushroom feedstock, and other global/local ecosystem services.
12. Manage the forest-field edge using permaculture and agro-forestry techniques to use this zone's unique ability to support a long-term thriving forest and field economy. Agro-forestry practices will involve production of small fruits, nuts, and coppice woods, and will contribute to wildlife habitat diversity. Permaculture practices will involve staking functions, mimicking natural patterns, managing water, and capitalizing on treeline wind protection of field-based crops, to name a few.
13. Plantings of non-native species will be monitored to document their invasive character, and adaptive management will be used when considering how to manage non-natives that appear to be invasive.
14. Refrain from cutting trees that exhibit disease resistance and trees of exceptional wildlife value. To allow such trees to thrive, crown release will be done to remove competition from surrounding trees.

15. Creating and periodically cutting irregularly shaped “patch cuts” or glades will offer an abundance of early successional grass, shrub and sapling growth. Horizontal diversity within the forest will be increased, thus improving and perpetuating structural features and foraging opportunities that dozens of bird, mammal, and insect species depend upon.
16. Recreational use of the forest will be limited to 1) winter usage of the Catamount Trail for cross-country skiing by the public, and 2) hiking, walking, trail running, snowshoeing, back-country skiing, photography, and bird/wildlife watching by occupants of FSF and/or SHO FARM, LLC.
17. Hunting, trapping or any other intentional killing of animals on the land will not be permitted, given the land stewardship philosophy of “do no harm”, as well as the goal of establishing a vibrant wildlife preserve.

WILDLIFE HABITAT MANAGEMENT RECOMMENDATIONS

by Susan C. Morse, Morse and Morse Wildlife and Forestry Consultants

Introduction

On behalf of Morse and Morse Forestry and Wildlife Consultants, I have prepared a portion of the wildlife habitat management recommendations for this plan. My contribution provides a scientific basis for the application of traditional forest management practices, as well as agroforestry and permaculture management options, as they relate to wildlife habitat management recommendations. Of course, continuing field work that we plan to undertake will help us elucidate future specific management prescriptions and assure their compatibility with, and support of, FSF’s multi-disciplinary land stewardship goals and practices.

photo by Susan C. Morse: Bobcat hunting in an old field thicket.

The following stewardship goals and management objectives outline both primary and secondary expectations of all management:

1. Forest management will strive for exemplary practices, including the appropriate inventory and protection of sensitive habitats, plants, and plant community types. Unusual, rare, and Threatened or Endangered species of certain flora and fauna may also significantly influence management activities, now and in the future.

2. Water quality and fragile soils will be protected at all times, and enhanced where possible.

3. The primary objective of FSF's management plan will be the ongoing stewardship of the forest for optimal ecological health, with periodic extraction of traditional forest products, including fuelwood and high quality saw logs, less traditional products such as mushroom logs, and an assortment of non-timber forest products, including wild mushrooms and conks, and wild green perennials such as ramps and nettles. Our goal is to assist with the integration of all such activities -- in full support of FSF's natural resource stewardship philosophy, innovative food systems development, and educational mission. In this capacity it is expected that traditional forest and wildlife habitat management prescriptions will complement the various permaculture and agroforestry projects, including natural hydrology and nutrient banking, as well as the cultivation of a variety of planted orchards and forest farming harvests. I support FSF's stated vision: "We regard the forest habitat as a vital element with intrinsic value, and as an essential part of a resilient agricultural system that will play an important role in Vermont's future."

4. Wildlife habitat will be enhanced through specific silvicultural practices, while in other settings management operations will be withheld in order to protect sensitive habitat amenities and/or wildlife refugia therein. Careful attention should be directed towards inventorying a variety of possible wildlife refugia for the purpose of delineating these habitats and minimizing human access and activities within them. For example, research has demonstrated that human recreation and pets can seriously degrade and even fragment wildlife habitat, causing wild animals to abandon optimal habitats for nesting, denning and foraging. Critical wildlife energy budgets are often compromised as well -- resulting in reduced reproductive and recruitment success.

5. Healthy functioning ecosystems have been seriously damaged as a consequence of widespread habitat loss and fragmentation, invasive species and the cumulative impacts of acid precipitation and climate change. FSF'S primary goal is to research and demonstrate alternative approaches for extracting food and fiber that leave forest soils, waters and the natural community in better condition. A significant goal will be to shift FSF's forest management activities to deliberately feature three kinds of forest growth that are believed to support biodiversity, carbon sequestration as well as species and ecosystem resilience in the face of climate change stresses. FSF is committed to serving biodiversity through the ethical stewardship of its vast forest holding. In addition, enhancement of increased carbon sequestration and biodiversity protection will be achieved by three different regimes of forest management:

    a) Lengthening the harvest interval on some stands will reduce the amount of wood removed, with the result that more carbon will be stored and mature forest conditions will be increased and perpetuated. "Old growth" characteristics will feature quantitatively more compositional diversity, structural diversity, complexity and habitat heterogeneity.

b) A combination of different management practices in other stands will seek to increase the stored carbon of selected trees that have been "released" and are able to grow faster and better as a consequence. Silviculture will improve the growing conditions of selected "legacy" trees and stands, as well as certain declining species, such as American beech, black cherry and possibly red spruce in the future. These and other species are known for their important wildlife food and cover attributes.

c) In still other portions of FSF's property the designation of wilderness status will significantly add to both the local and landscape scale mosaic of forest ages and cover types -- thereby increasing the representation of a greater number of species, genetic variability and habitat niches.

photo by S. Smith: ESTA 2, near the property's eastern height of land. Rich habitat for a diversity of wildlife.

Recommended practices for "Ecosystem Management"

- Conduct timber harvesting as well as wildlife habitat enhancements during the winter when the ground is frozen. Certain harvesting operations may occur during the driest months of summer; however, your consulting forester should help you make this judgment.
- Allow for the retention and maintenance of a variety of forest structures, including den trees, snags, cull trees for structure recruitment purposes, and fine and coarse woody debris on the ground. A minimum of six to ten cavity trees and snags should be retained per acre. This is particularly harmonious with fungi harvests, and most sought species require standing or downed dead trees. (More information on these recommendations will follow).

- Seek to identify and protect any unique habitats and plant species that are part of the overall biological richness and genetic legacy of the forest.

The Larger Context

FSF's forest's position within the larger matrix of many thousands of contiguous forested acres is noteworthy and precious. The beauty and ecological importance of this still vast landscape of public and private forest parcels is of increasing ecological and social value to all residents of Vermont and the region. Including the Green Mountain uplands, Lake Champlain's diverse valley habitats, the forested hills between them, as well as the riparian corridors that help link these wildlife habitats with one another, SHO FARM plays an important role in this regional landscape of core and connective habitats.

Selected mammal species present on SHO FARM are recognized as "focal species". Such species, including black bear, bobcat and moose, are useful animals for defining effective landscape-scale conservation goals because their life-history requirements dictate that they utilize larger home ranges involving more than one property. In addition to residential populations of these species, other wide ranging and migrating species are also known to pass through your forest and field habitats, making them all the more important in the regional distribution and support of an even greater number of insect and animal species.

What Is Biodiversity?

"The diversity of life forms, so numerous that we have yet to identify most of them, is the greatest wonder of this planet. The biosphere is an intricate tapestry of interwoven life forms."

E. O. Wilson

Proportionate to our exponential human population growth and consumption of natural resources, a deadly one-two punch of habitat destruction and fragmentation has resulted in a much damaged and beleaguered planet; life as we know it is now seriously threatened in incalculable ways. Today, the consequences of human impacts, including the largest mass extinction in 65 million years, are calculated to be up to 1,000 times greater than natural rates extrapolated from fossil records. Each and every loss compromises life as a whole, affecting surviving species as well as whole ecosystems in ways scientists are just now beginning to comprehend. Birds, for example, face serious threats. According to the American Bird Conservancy, more than one third of the 650 bird species that breed in the U.S. have declining populations or face serious threats due to habitat loss or degradation.

Many people believe that biodiversity is adequately represented and safeguarded in protected parklands and wilderness preserves. This is not the case. Throughout the world, the greatest diversity of species is found within the millions of acres of private forests that are **not protected** with park status--habitats much like those found within FSF's property. An understanding of what habitats remain within these ecosystems, coupled with what connectivity remains to facilitate species and genetic exchange, is today's most urgent conservation need. This is the very goal that is at the heart of each state's recently completed Comprehensive Wildlife Conservation Strategy (called Wildlife Action Plan in Vermont) which can be accessed at: www.vtfishandwildlife.com

Biodiversity is not just a myriad of organisms in life's community, ranging from single-celled bacteria to multi-cellular fungi plants and animals. Biodiversity also includes genetic diversity, encompassing individuals and populations as well as the geographically separate populations of each and all species. **Ecosystem diversity** is also considered in the full meaning of the term, biodiversity. An ecosystem comprises a multitude of complex interrelationships involving bedrock geology, soil, climate and biota (including plants, insects, animals, fungi and microbes). Interactive networks of species profoundly influence and are influenced by the structure and functions of the ecosystems upon which they depend.

photo by Susan C. Morse: Eastern spotted newts surrounding wood frog egg mass in one of SHO Farm's enrolled ponds.

Stewards of biodiversity must be evermore knowledgeable and respectful of the various ways in which an environment physically and chemically interacts with communities of species that in turn respond to and influence the habitat and each other. Terms like "resistance", "resilience", "process" and "integrity" are measures of living species' complex influences upon their habitats, as well as their responses to change and challenges in the environment. Indeed, the very process of evolution itself is biodiversity's ongoing and miraculous legacy--the opportunity for living entities to adapt and survive life's tough challenges and grace the future with their successful progeny. More disturbance and fragmentation of our region's larger core habitats puts these vital natural processes and ecosystem functions at risk. Conservation biologists emphasize the need to preserve intact and connected habitats worldwide, because unnatural and profound changes caused by global climate change will severely threaten life as we know it today.

Some people are skeptical about the importance of biodiversity, “What benefit is all of this to me?”, an individual may ask. Consider the vast numbers of small mammals, for example, which reside throughout your forest and larger region. Woodchucks, voles, mice, shrews, chipmunks, squirrels, weasels and bats--these creatures play essential roles in the maintenance of healthy and diverse ecosystems. Many consume huge quantities of vegetation, seeds and invertebrates, and as such, contribute to valuable nutrient cycling, as they in turn are consumed by predators and scavengers. Their wanderings near and far provide a grand way for plant seeds and mycorrhizal fungi to become dispersed throughout the environment via their feces and food-caching activities, resulting in increased plant and fungal species diversity and productivity. Even the tunnels and subterranean dens of small mammals serve to aerate, fertilize and improve moisture retention of the soil. In many ways, FSF’s management activities - that support perennial agroforestry systems and carbon-saving cultivation of the forest canopy for food and medicinal products – will secure and complement forest biodiversity.

No attempt to ponder the significance of biodiversity should conclude without some attempt to learn about and appreciate the wonder of it all, at the same time that we mourn the losses. Indeed, throughout much of the developed northeast, as well as so many places throughout the planet, E. O. Wilson’s “intricate tapestry of life” is at risk. Frayed in places, in complete disarray in others, remaining natural habitats must be studied, conserved and even restored wherever possible by the one and only species that can do these things!

photo by Susan C. Morse: Spotted salamander eggs in one of SHO Farm’s enrolled ponds.

Wildlife Habitat and Stewardship Considerations

What do we mean by *habitat*? **Habitat** is simply home - - the physical space where wildlife live according to each species' needs. Habitat is as complex as the myriad influences that function and make it whole. Habitat requirements vary, yet for all species they include food, water, cover, and space. Wildlife select habitats by optimizing these needs against the thermal and security risks they encounter in their daily lives. The best habitat for most wildlife enables them to reproduce and meet their energy needs while offering a minimum of challenges. A species' home range - - the amount of space a given individual uses - - may span 20-60 acres for an ermine, 2-10 square miles for a moose, 15-30 square miles for a bobcat, or as much as 50 square miles for a black bear living in less productive mountain habitats.

Hazards associated with lots of human activity, including development, roads, traffic, pets, pollution, and introduced invasive species, all cause wildlife habitat to be less suitable and productive. It is essential that habitat resources be recognized and conserved so they may be available and safely accessed by wildlife now and through time.

A habitat is simply a unit of space within an ecosystem. Any appreciation for how we can conserve and perhaps improve wildlife habitat productivity depends on learning which species are using which habitats within FSF's forest and field habitats as well as neighboring wildlands. We need to answer questions like, how does FSF's forest fit into the regional scheme of things? Are there thousands of acres surrounding this forested property that are part of the larger home range of a wide-ranging species like black bear or bobcat? A regional map shows there are indeed many thousands of acres of private and public forest lands connected on a landscape scale. A bear could easily travel unimpeded from the nearby Camel's Hump State Park, eat serviceberries or black cherries and beechnuts throughout your property, and throughout the growing season. Our bear could then travel and feed within the entire length of the Huntington River Valley through a matrix of contiguous woodlot, wetland and agriculture edge habitats, then to return and den within the thick softwood cover found within FSF's montane spruce-fir forest at the property's highest elevation. FSF's designation of this portion of the property (among others) as wilderness will certainly serve resident bear, moose and other species well, insofar as remoteness and lack of human disturbance of any kind are key elements supporting their well-being.

Given the complexity of what wildlife habitat means, we must focus on more than the "featured species," (i.e., game species) that received all our attention in the past. Knowledge gained about the presence and habitat uses of wide-ranging mammals will help us develop goals that acknowledge and seek to secure FSF's forest's physical connectivity with surrounding wildlands. Conservation biologists are increasingly stressing that the preservation of biodiversity and all its necessary ecosystem variety and processes, depends upon region-wide planning and conservation initiatives. The biodiversity value of the FSF property is both local and regional. It is *local* for the natural beauty and biodiversity that clearly exists here; and it is *regional* for the intact and connected diversity of surrounding additional habitats that enrich and sustain the larger ecoregion - - much as FSF's forest contributes to the integrity and diversity of the surrounding ecosystem.

A growing number of conservation biologists are alarmed about fragmentation irreversibly damaging healthy ecological functions. Removing more forest and inviting more roads and human access into an otherwise unfragmented habitat dramatically increases disturbance and wildlife mortality losses. Necessary security habitat becomes degraded and wildlife recruitment is compromised, threatening the long term viability of populations. Acre by acre, disruptions and disappearing habitats represent incremental and cumulative losses.

Similar to thousands of acres of neighboring forested wildlands, the FSF forest's diversity of plant community types and habitats is impressive. Physiography, soils, aspect, and climate, as well as a variety of anthropogenic influences all have set the stage for a diversity of plant successional stages and community types that contribute in innumerable ways to the necessary seasonal abundance and distribution of food and cover resources required by wildlife.

Forested Wetlands

Spring is an excellent time of year to explore the forest thoroughly for the presence of seeps and vernal pools. ***Seeps*** are cool moist habitats sought by species such as the red-back, northern two-lined and dusky salamanders, as well as wood frog, American woodcock, and common snipe. A seep may serve as a critical seed catchment and source of winter foods for ruffed grouse, wild turkey, striped skunk, raccoon and numerous other birds and mammals. Seeps in winter are less inclined to remain frozen over (especially in early and late winter), and thus offer food and water when such resources are otherwise unavailable. For example, remote forestland seeps, filled with spring's meltwater and cold groundwater, provide a "green up" of tender digestible sedges and forbs that supply black bears with important spring foods as well as thermal relief.

Vernal pools are contained basins that collect spring's snowmelt and rain. They are ephemeral pools and are usually dry by mid-to late summer. Drying of the pools is vital to their contribution to the breeding habitat of numerous species including wood frog, spotted salamander, fairy shrimp and other pool-dependent biota. Pools that dry up by summer prevent their use by fish that would otherwise prey upon the deposited eggs and developing young amphibians. Logging in or near vernal pools is known to destroy the pools, as well as disrupt surrounding downed woody materials and other recesses in which adult and migratory young amphibians seek necessary cover.

Furthermore, the opening of pool surfaces to more sunlight (by removing adjacent trees) hastens their evaporation, and possibly introduces harmful effects of increased UV radiation (affecting eggs and developing amphibians). More research on the latter issue is needed; in the meantime, forestry operations in or around these fragile habitats should be discouraged altogether, and appropriate no cut buffers must be delineated before any cutting operation is executed.

Though I have not observed any vernal pools while afield on FSF's land, I recommend that a thorough inventory of all seep and vernal pool habitats be done, with the purpose of identifying and mapping these wetlands. Furthermore, creating new vernal pools is something to consider as well! The Vermont Coverts document entitled "Restoring and Improving Wetlands Habitat" is a good resource for this: http://www.vtcoverts.org/VTCfiles/August%202009%20Insert%20Restoring%20and%20Improving%20Wetlands%20Habitat.pdf**.** In addition to serving the needs of amphibians and other above-mentioned animals, such wetlands could be created in conjunction with FSF's permaculture and agroforestry goals, including hydrology and nutrient cycling projects that endeavor to collect and utilize runoff, much of which contains valuable wildlife waste.

Forest Wetland and Vernal Pool Management Recommendations

- Conduct field investigations to identify all vernal pools and seeps on the property. For information on the Vermont Vernal Pool Mapping Project see literature provided with this document and visit the following link: **http://www.vtecostudies.org/VPMP/**

- Maintain coarse and fine woody debris adjacent to and within vernal pools. Woody debris not only provides essential "upland" protective habitat for amphibians, its abundance on the landscape provides a natural and vital reservoir for various species of fungi whose food and medicinal values will be cultivated in the context of the overall FSF plan.

- Maintain at least 60-75% canopy closure around pools. Closed canopy cover enhances and perpetuates the functions of forested wetlands. In addition, the moist soils associated with these wetlands also benefits perennial leafy greens like wood nettle, wild ginger and ramps -- three forest foods of increasing nutrient and economic value to human consumers.

- No harvesting equipment, skidding, or cutting should be permitted within 100 feet of vernal pools.

- Additional "**amphibian life zone**" protection requires that the following restrictions be upheld within a minimum buffer distance of 500 feet, to protect amphibian "upland habitat", which may be defined as all forested habitat immediately surrounding the pool environment. Such habitat provides both young and mature salamanders with woody debris, moist leaf litter and access to small mammal subterranean burrows. Amphibians retreat to these environments seeking moisture and safety during the summer months and frost-free protection from deep cold during the winter. While vernal pools get a lot of press for their importance to selected amphibians, the upland habitats surrounding them is actually where these animals spend most of their time!

    a. Winter logging on a deep snowpack is preferred over summer harvests to minimize disturbance to amphibians within their upland subnivian habitats.
    b. Maintain at least 50% crown closure.
    c. For the benefit of amphibians utilizing cover in nearby "upland habitat", silvicultural prescriptions should guarantee the retention and perpetuation of coarse woody debris within the adjacent forest area harvested.
    d. No pesticides or herbicides will be used.

(A definitive text entitled *Science and Conservation of Vernal Pools in Northeastern North America* by Aram Calhoun and Phillip deMaynadier offers the most comprehensive and useful resource to date on the subject. Another outstanding text is *Habitat Management Guidelines for Amphibians and Reptiles of the Northeastern United States* published by Partners in Amphibian and Reptile Conservation – PARC. Finally, another excellent resource is *Developing Vernal Pool Conservation Plans At The Local Level Using Citizen-Scientists* by Damon B. Oscarson and Aram J. K. Calhoun, published in WETLANDS, Vol. 27. No. 1, March 2007.)

Floodplain forests are home to a diversity of wildlife. Periodic flooding of even small streams creates saturated soils where persisting dampness provides rich insect and amphibian breeding and foraging habitats. These organisms comprise an important spring prey base for all sorts of fauna including woodcock, barred owl, raccoon, mink, river otter, coyote, red fox and black bear. Whitetail deer and bears eagerly seek out these habitats for the flush of "spring green-up" -- the newly emerging growth of edible sedges, grasses, and forbs.

A forb is an herbaceous (non-woody) plant *other than* those in the Graminaceae (true grasses), Cyperaceae (sedges), or Juncaceae (rushes) families. In addition to providing an abundance and diversity of digestible foods, ruminants like whitetail deer benefit tremendously from the forbs' provision of calcium, phosphorous, and protein. Such nutrients have been linked to a doe's successful reproduction, lactation, and the subsequent proper growth and development of her young fawns.

Common forbs of importance to wildlife as diverse as snowshoe hare, turkey, whitetail deer, porcupine, and black bear include: white and red clover, wild strawberry, jewelweed, jack-in-the-pulpit, wild aster, dandelion and goldenrod. In more open settings such as glades or wetland edge habitats, forbs also provide critical vegetative cover, which conceals predators and prey alike. For example, insects seek out these lush areas of herbaceous green growth, thus offering growing wild turkey poults an abundance of digestible insect protein. And bobcats, coyotes, fishers and red fox also enjoy an abundance of protein if they can successfully prey on turkeys! In conjunction with FSF's non-timber forest yields, the identification and cultivation of abundant and diverse forb environments can also help us pinpoint where various wildlife are concentrating their foraging activities - resulting in increased opportunities for animal nutrient cycling and collection.

Critical Wildlife Foods: Nuts, Berries and Drupes

I observed many hard and soft mast-producing tree and shrub species during field trips within FSF's forest, including: American beech, mountain ash, black cherry, pin cherry, chokecherry, hawthorn, wild apple and skunk currant, as well as beaked hazelnut, raspberry, blackberry, serviceberry, dogwood, and viburnum species, as well as red elderberry. Seed-mast producers, including maples, birch species, staghorn sumac, eastern hophornbeam, American hornbeam, white ash, hemlock, white pine, balsam fir and red spruce, also contribute inestimably to the year-round forage of dozens of birds and mammals.

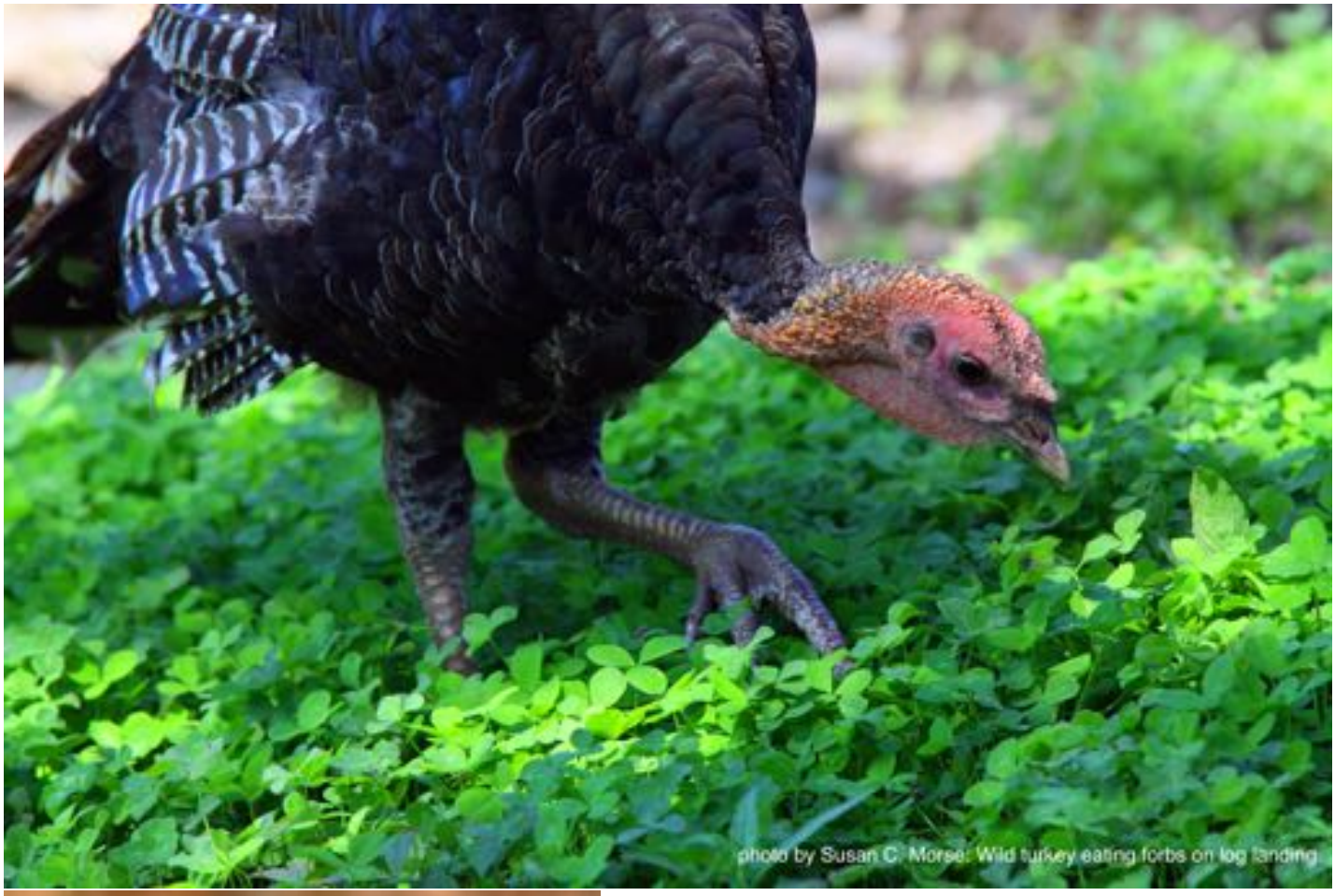


photo by Susan C. Morse: Wild turkey eating forbs on log landing

photo by Susan C. Morse: Steghorn sumac fruit with seeds.

Of all the hard and soft mast foods found throughout FSF's forest and field habitats, the fruit of American beech is critically important for wildlife. Numerous bird and mammal species depend upon the nutmeats produced by beech trees, although the abundance of this vital resource is intermittent at best. Droughts, hard spring frosts killing flower sets, and the natural variability of annual fruit production often combine to severely limit the year-to-year availability of beechnuts. When abundant, however, countless birds and mammals eagerly partake of the harvest.

The following wildlife species depend on beechnuts: wild turkey, blue jay, ruffed grouse, whitetail deer, fisher, gray, red and flying squirrels, chipmunks, mice and black bears. Beechnuts enable these birds and mammals to store extra fat for the rigors of migration, hibernation, or the day-to-day stresses of inadequate nutrition during winter's lean months. More than any other local hard mast species, including acorns, butternuts or hazelnuts, beechnuts contain nearly 20% protein and up to 50% fat. We

have enjoyed discovering “bear nests” and claw scars on the trunks of beeches throughout FSF’s forest. I recommend that all stands of healthy beech be classified and protected as ESTA wildlife habitats within FSF’s UVA plan. To learn more about this opportunity consult the chapter on Ecologically Significant Treatment Areas contained within the following document called “Communty Strategies for Vermont’s Forests and Wildlife: A Guide for Local Action: **www.vnrc.org/programs/forests-wildlife/guide/**

The abundance of cherry species on FSF’s property is also invaluable to wildlife. Black cherry, in particular, is widely regarded as northern New England’s most important soft mast species, and is known to benefit black bears, all large and small carnivores, many other small mammal species and more than two dozen species of birds. I recommend that all cherry species be “released” and that selected neighboring trees competing with them for crown space in the sun be removed. Such cull trees may be utilized for fuelwood, mushroom logs or other timber products. The long term productivity and health of FSF’s cherry trees and shrubs will be dramatically improved as a result.

Managing Your Forest To Improve Mast Abundance

Targeted logging operations throughout much of FSF’s forested land can actually stimulate species and age class diversity and thus considerably improve habitat options for wildlife. Where possible, I recommend the use of small group selection cuts to stimulate habitat values provided by small, early successional “glades”. In addition, the small openings can be created to deliberately increase the crown space needed by remaining mast-producing trees and shrubs. Tons upon tons of fruit are

harvested by wildlife from the following trees and shrubs found on your property: beaked hazelnut, dogwood, viburnum, hawthorn, serviceberry and cherry species, as well as red elderberry, black and red raspberry, staghorn sumac and American beech. These trees and shrubs provide an annual bounty of foods that are vital to dozens of species of birds and mammals as they prepare for the hardships of winter. “Releasing” the crown space of these desirable plants will significantly increase their productivity and longevity.

Managing Your Forest to Improve Mast Species Diversity and Productivity

Seed mast production and volume is greatest in large and medium-sized open-to-the-sun crowns of hardwood trees like American beech, black cherry, pin cherry, serviceberry, wild apple and hawthorn--justifying the forestry prescription to “release” these trees. However, it is equally important to compensate for the poor “mast years” that these species periodically experience. We can powerfully make up for occasional food shortage by seizing every opportunity possible, during every harvest operation, to invest in the forest’s wildlife wellbeing by providing for an **abundance and diversity** of additional soft mast tree and shrub producers. The goal should be to assure that the nuts, berries, and drupes of all these species provide a bounty of foods throughout *all seasons*. For example, serviceberry, wild strawberry, pin cherry and elderberry provide fruit in early summer. Throughout the rest of the summer chokecherries, raspberries, blackberries, viburnum fruits, hazelnuts, black cherries, beech and wild apple all become available by fall. Still other viburnum species, as well as staghorn sumac, hold their fruit for birds and mammals throughout late fall and well into winter and spring. Though ignored during the winter such foods are invaluable for early spring’s returning songbirds.

Silviculture For Regeneration of Aspen Stands

Logging operations throughout much of FSF's forested land can actually stimulate species and age class diversity and thus considerably improve habitat options for plants, fungi and wildlife. For example, I am a big advocate of "aspen regeneration cutting" which can dramatically increase the abundance and age class diversity of quaking and big toothed aspens. Our goal will be to create and maintain a diversity of growing environments in which aspen and birch stands will be able to grow. The removal of cankered and dying older trees, and the opening to full sun of the forest floor beneath them, will stimulate the plentiful regrowth of many hundreds of young aspens as they respond to the increased availability of sunlight. These seedlings regenerate clonally, growing from the parent trees' roots. The wildlife beneficiaries of aspen regeneration projects include porcupine, beaver, moose, snowshoe hare, and occasionally black bear. Aspen buds and early catkin flowers offer vital winter and spring foods for ruffed grouse; and what benefits grouse, likewise benefits predators of grouse, including bobcat, fisher, red fox, and coyote. Black bear are known to relish the spring catkins of all poplar species as well. An additional goal will be to deliberately leave abundant log-dimension woody debris, as well as standing snags throughout these varying age classes of aspen and birch stands. Such snags and woody debris are invaluable for wildlife, and also provide tremendous opportunities for in-canopy forest mushroom growth. These managed stands will need to be accessed more frequently in order to cut trees and provide for optimal growth and regeneration of these desirable species.

A network of small roads and trails accessing these stands should be regarded as excellent transit lanes which facilitate the dispersal of fungal spores by wildlife and human visitors. Knowing this, we should deliberately create and leave logs and woody debris along the edges of all roads and trails. Furthermore, the periodic "daylighting" of selected trailside locations can be opened in order to provide optimal growing conditions for beaked hazelnut, elderberry, serviceberry, pin cherry, chokecherry, and other sun-loving species.

Forest Structures

Forest structures importantly influences the abundance and diversity of plant and animal habitats. Structural features - including canopy height, canopy closure, tree and shrub density, stand composition, woody debris, snags, ground cover, stem density, and species and age class diversity - all contribute invaluably to wildlife species richness and sustainability.

Appreciation is growing for the tremendous benefits gained by properly managing forest stands, not only to improve timber values but to enhance and guarantee a suitable diversity of physical habitat structures and wildlife foraging opportunities. For example, in our eco-region, over 40 species of birds and mammals rely upon standing snags and tree cavities--seeking food, roosting perches, thermal and denning habitats. Similarly, coarse and fine woody debris on the forest floor provides critical foraging, escape, thermal relief, and denning habitat for dozens of species from salamanders to black bear.

Standing dead trees, for example, are a natural and vital part of most forest ecosystems whether they are considered "old growth" or not. An overall goal of maintaining a minimum of 6 to 10 wildlife den trees and snags per acre is essential for the well-being of numerous species of insects, birds, and mammals. The protection and perpetuation of available dead snags, cavity trees, recruitment trees (cull trees that will eventually become cavity trees and snags) and coarse and fine woody debris on the ground will immeasurably enhance the wildlife habitat values of your forest—with the added benefit of increasing fungal species' growing environment.
Vertical diversity describes the variety and complexity of vegetation layers from the ground up. Including short herbaceous plants, taller herbaceous plants, woody shrubs, understory trees and their canopy, *vertical diversity* measures the abundance of foliage layering and stem density. Throughout temperate forests in North America numerous species of birds and mammals are known to prefer habitats offering greater vertical diversity. For example, dozens of bird and selected bat species demonstrate individual preferences for specific canopy heights, foliage, fruit or insect prey availability, flying maneuverability, and suitable roosting and nesting habitats.

Horizontal diversity measures the mix of different habitat types across a given landscape. A mosaic or patchwork of multiple habitats is more valuable and meets more needs of more species of wildlife than one or two types of habitat alone.

Plant Species and Age Class Diversity

Silvicultural practices over the natural variety of terrain and plant community types can improve upon species and age class diversity. Logging roads and small landings can be seeded and managed to significantly increase the availability of nutritious grasses and forbs, benefiting deer, wild turkey, grouse, and dozens of other bird, mammal and insect species. Be sure to use clean seed mixtures with hardy species and inoculated clover.

Insist that loggers prevent the introduction of any invasive plants! Unfortunately, not far from FSF's property, buckthorn species, honeysuckle, Japanese barberry, bittersweet and Japanese knotweed have become established, and this problem is expected to increase in a warming climate. Perhaps you can enlist the help of volunteers who could be called upon to annually look for possible

colonization of these and other invasive plants. Should any invasive plants be discovered, immediate action is called for. Consult the most up-to-date literature on how best to eradicate these non-native invaders of our natural habitats.

Thickets and Glades

The periodic cutting and maintenance of small forest edge openings and thickets offering an abundance of early-successional, grassy, herbaceous, shrub, and sapling growth, will improve and perpetuate the structural and foraging opportunities that dozens of species of birds, mammals, and insects depend upon. By contrast, the decision to cut and maintain *permanent* meadows and other small patch cuts can provide still more variety of your land's early successional growth. **The key will be to map out the physical perimeters of a variety of meadow and successional growth areas that may be cut with greater or lesser frequency, and at different times, to maintain a diversity of habitat opportunities over space and time.** For example, all along existing field edge and logging road openings, you should seek to periodically improve upon and sustain a greater diversity of herbaceous and shrub habitats simply by following a cutting schedule which treats a variety of management units differently.

Small scale mowing and/or brush hogging schedules should be spaced to occur at 3, 10, 15 and 20 year intervals. This will ensure a temporal diversity of plant responses to management, resulting in a dramatic increase of plant cover diversity as well as foods available to wildlife. For the human visitor seeking beauty and wonder in the natural world, this practice also increases attractions associated with a greater variety of herbaceous and woody vegetation's foliage, bark, blossoms, colors and textures. Obviously, the above-mentioned plant species' diversity will also feature enhanced opportunities for encountering and appreciating a corresponding diversity of insects, birds and mammals.

To summarize, your overall goal should be to create and cultivate a mosaic of varying age classes and species mixes of vegetation, including sedges and grasses; clovers and other forbs; larger stemmed grasses and other herbaceous plants including goldenrod and milkweed, as well as all of the aforementioned sun-loving shrubs and trees.

In addition to the above objectives you should supervise the proper management of brush and woody debris. In some cases, these materials will need to be removed from the glade or meadow interior and placed on the side. Proper construction of **wildlife brush piles** provides yet another invaluable habitat asset. In addition, I recommend that you also provide for suitable **snags**, **perches** and **den trees** which will be even more valuable if located at the edge of your open meadow and glade habitats. Finally, you may also seek to identify **wet swales** alongside skid trails and landings. These habitats support willow and alder thickets that can be periodically cut to stimulate age-class diversity and the subsequent vigorous re-growth of these valuable species. Such practices over time will perpetuate wildlife food and cover opportunities, as well as providing an abundant supply of logs useful for inoculation and cultivation of mushrooms.

Early successional habitats are in decline throughout much of New England, especially to the south. Standardized Breeding Bird Surveys have revealed that 12 of 16 eastern bird species known to rely on shrublands or grasslands or both, are in decline. The monarch butterfly, as well as many other insect species are also at risk. Without sufficient spacing and recurrence of early-successional patches of vegetation many locations in New England are less and less able to support the needs of many species of wildlife.

"Daylighting" existing forest roads and maintaining open landings and small clearings around FSF's wild mast and cultivated orchards is also very beneficial. Immediately following the clearing or

mowing activity, crows, hawks, owls, foxes, and coyotes will access an abundance of vulnerable prey. However, this seemingly positive practice can be damaging (not just to the vulnerable rodents and small mammals). Countless amphibians, snakes, nesting birds, turtles, and white-tailed deer fawns may be killed or horribly injured during mowing. Adjusting the cutting blade height to 6" or more automatically results in far less mortality; and the simple practice of avoiding mowing between April and mid-July allows ground-nesting birds the opportunity to incubate, hatch, and rear their young successfully. Mowing log landings, as well as any smaller wild orchards, should not be conducted after early August so food gathering, nest construction, and occupancy by shrews, voles, and moles can occur naturally. Such populations are a vital part of furbearer and avian predators' winter sustenance.

photo by Susan C. Morse; SHO Farm field day, with Mia (l) and Shawn admiring a full scrape sequence.

These small openings should be cut once every 5-10 years. More frequent cutting is not necessary and may actually damage the habitat values you are seeking to create. I recommend that all mowing be done during the last week of July, or the first week of August. Again, cutting prior to, or after, these weeks seriously disrupts bird nesting activities, creates mortality threats to nesting birds and young fledglings, and prevents the necessary regrowth of grass and forb stems that are critical cover for over-wintering small mammals.

In addition, we should also seek to create an irregular, undulating boundary between the edge of the forest and any adjacent field edge habitat. Our goal will be to break up and establish less of a straight-line "edge" by cutting "bays", which are deeper openings that reach into the forest, and "peninsulas"—a term I use to describe a deliberate encouragement of extensions of young forest and shrubby cover reaching into the field habitat. Research has demonstrated that diversifying plant growth adjacent to

open habitats dramatically enhances their attractiveness to bird and mammal visitors, and improves their safe access to food and cover resources found therein. As part of these boundary management treatments, a secondary goal will be to “release” and increase all tree and shrub species that provide flower and mast foods for wildlife and insects.

According to the National Academy of Sciences, nearly 75% of the flowering plants on earth rely upon pollinators in order to set seeds and fruit. In the face of recent bee population declines in particular, we must be committed to promoting the availability and diversity of tree, shrub and forb species whose blossoms – and the pollination of same – are of inestimable importance. Field-edge habitats and glades reaching into the adjacent forest, along the irregular forest edge, will support numerous flowering plants that are attractive and critical for the well-being of dozens of species of bees, wasps, butterflies, moths, flies and beetle pollinators. These plants include: willow, cherry, hawthorn, serviceberry, elm, poplar and apple species, as well as American basswood, and mountain ash. Wildflower and forb species include: lupine, joe pye weed, steeplebush, meadowsweet, aster, cosmos, bee balm, mint, milkweed, goldenrod, daisy, coneflower, wild geranium, selfheal and clover species.

Early Successional Habitats

Hereafter referred to as Young Forest Habitat (YFH), these management units will be dedicated to allowing for the natural regrowth of habitats that are characterized by few or no mature trees, a diverse mix of native shrubs, tree seedlings and saplings – interspersed with glades in which wild flowers, grasses and sedge species will thrive. This kind of habitat is critically important to many species of resident and migratory wildlife. Population declines of nearly 90% of bird, mammal and reptile species dependent upon this habitat have been attributed to the wide-spread loss of YFH throughout the region. In New England and the mid-Atlantic region two thirds of YFH dependent avian species have experienced population declines during the past 50 years—during which time much of this critical habitat has been lost to mature forest growth and urban development. Indeed, Wildlife Action Plans for all 13 northeastern states have stressed the need to recreate and maintain in perpetuity more YFH in order to secure the future of many bird and mammal species. In addition, the presence of early successional and YFH habitats adjacent to mature forests is now recognized to significantly contribute to the well-being of even interior forest songbirds. Research has recently revealed that YFH provides an abundance of insects and fruit not found within older forests. Such additional foraging opportunities importantly help newly fledged birds acquire necessary size and energy reserves that are essential for successful fall migration. No doubt, the following YFH dependent bird species utilize suitable habitats throughout FSF’s land – including American woodcock, common snipe, American bittern, ruffed grouse, chestnut-sided warbler and veery.

Distinct YFH stands should be treated separately over time, with a goal of creating permanent regenerating forest habitats of varying age classes and species assemblages. In the years to come we should carefully think about which of the units will best respond to longer-term cutting rotations (0 to 40 years), benefitting grouse for example, or shorter-term cutting treatments of 10 to 15 years that will benefit chestnut-sided warblers for example. Opportunities for aspen regeneration treatment areas, as well as possible bobolink late-summer foraging habitat, should also be considered and delineated.

Additional Recommended Resources

1. *The Audubon Vermont Responsibility Bird Species List and Vermont's Forest Bird Initiative*, Audubon Vermont

2. New England Wildlife: *Management in Forested Habitat*, DeGraaf, Yamasaki, Leak, Lanier. To download this document go to: http://www.nrs.fs.fed.us/pubs/6348

3. *Special Forest Products on the Green Mountain and Finger Lakes National Forests: A Research-Based Approach to Management*, USFS General Technical Report NRS – 131, April 2014

4. *The Vermont Reptile and Amphibian Atlas* - James S. Andrews, 2013 Print Update; Digital Edition 2010, http://vtherpatlas.org/

5. *Changing Climate, Changing Forests: The Impacts of Climate Change on Forests of the Northeastern United States and Eastern Canada*, USFS General Technical Report NRS – 99, July 2012

6. Morse, Susan C., *Soft Serve: Autumn's Unheralded Mast Species*, Northern Woodlands Magazine, Autumn 2014, Corinth, Vermont

7. *Wildlands and Woodlands: A Vision for the New England Landscape*, Harvard Forest, Harvard University, Petersham, MA, May 2010

8. *Effects of Clearcutting, Patch Cutting and Low-density Shelterwoods on Breeding Birds and Tree Regeneration in New Hampshire Northern Hardwoods*, Mariko Yamasaki, Christine A. Costello and William B. Leak; USFS Northern Research Station paper, NRS-26, August 2014

9. *Living in Harmony with Streams: A Citizen's Handbook to How Streams Work*, published in collaboration with other watershed organizations by Friends of The Winooski River and The White River Natural Resource Conservation District, 2012

10. *Farming the Woods: An Integrated Permaculture Approach to Growing Food and Medicinals in Temperate Forests* by Ken Mudge and Steve Gabriel, Chelsea Green Publishing, White River Junction, VT, 2014

11. *Mycelium Running: How Mushrooms Can Help Save the World* by Paul Stamets, published by Ten Speed Press, Berkley, CA, 2005

12. National Woodlands Magazine: Vol. 38, No. 2, Spring 2015. Three articles addressing special forest products, including, *Cultivating Ramps (Wild Leeks)*, pp 11-13; *Ginseng, Anyone?*, pp 14-16; *Using Your Woodlot Resources to Cultivate Specialty Mushrooms*, pp 17-19.

13. Forest Guild Publications: Can be viewed online at the Forest Guild website: http://www.forestguild.org/Publications.html. Six articles can be obtained at this website:
    - **a)** Carbon Sequestration and Storage in Forests
    - **b)** Regarding "Citizen's Call for Ecological Forest Restoration: Forest Restoration Principles and Criteria"
    - **c)** Distant Thunder: The Real Value of Healthy Forests
    - **d)** Ecology of Dead Wood in the Northeast
    - **e)** Forests Biomass Retention and Harvesting Guidelines for the Northeast
    - **f)** Climate Change, Carbon, and the Forests of the Northeast

14. *Foresters for the Birds Took Kit*: A joint publication of Audubon Vermont and the Vermont Department of Forest Parks and Recreation
    a) Forest Bird Habitat Assessment: A Guide to Integrating Bird Habitat Data into a Vermont Forest Inventory
    b) Birds with Silviculture in Mind: Birder's Dozen Pocket Guide for Vermont Foresters
    c) Silviculture with Birds in Mind: Options for Integrating Timber and Songbird Habitat Management in Northern Hardwood Stands in Vermont

FSF'S NATURAL RESOURCES INFORMATION

Wildlife Habitat

Some of the most productive wildlife habitat is in the areas surrounding the open land. Areas 12 and 16 are good examples of dense young growth which provides cover near good food sources and water. Very little small game sign was noted on the property due to the small percentage of young growth on property.

Areas 8 and 13 were logged in 2008. These two patch cuts provide significant wildlife habitat that benefitted almost all wildlife, especially deer, bear, moose, grouse and forest song and game birds. The structural diversity is important to support many different forest bird habitats, from nesting to breading and feeding. Larger mammals also take advantage of this dense undergrowth for feeding and protection. Deer wintering in Area 2 was noted in 2015. Dense softwood cover should be maintained in this area if possible.

The most bear and moose sign was noted in ESTA 2 - Montane Spruce - Fir Forest. This is where they bed down during the day. Moose have peeled striped maple in this ESTA also. Bear clawed beech trees were seen in Area 9, ESTA 1 and ESTA 3. The power line that runs through Areas 9 and 10 has been and will continue to be used by bear, deer, grouse, song birds and turkeys as a feeding area. The berry bushes produce the food and cover that all of these species need in the summer. Porcupine dens were noted in the ledges in Area 9 between GPS points 10 and 11.

Larger cavity trees in Areas 3 and 9 also provide shelter and habitat for a variety of animals and forest birds such as fisher, porcupines, owls, mice and squirrels. These large cavity trees also provide structural diversity and a place for bats to roost under larger flakes of bark that peel up like shingles.

Areas 9 and 13 have quite a few beech that provide hard mast that many animals feed on. Bear tracks were seen on the beech trees in these areas. Most all wildlife in the forest feed on beech nuts.

Deer Wintering Areas

Deer use the northern portion of the property along the Brush Brook as a deer wintering area. In March of 2015 only a few deer had left sign of using this area as their winter home. Deer numbers are down state wide. Coyote, fox, turkey and mink tracks were also seen in the snow during this cruise. Hemlocks in this area prevent abundant amounts of snow from reaching the forest floor and help reduce snow depths, making easier for deer to travel from food and water sources. There are some springs that begins here and do not freeze in the winter. Vermont Fish and Game Department guidelines for managing deer wintering areas should be referenced if and when cutting is done in this area. The soils here are shallow with a clay hardpan only 12" down in the top soil. There are numerous blow downs on the North side of the driveway. Deer drink water along Brush Brook in the winter making this area key to their survival.

Important Natural Features

There are important natural scenic areas and views throughout FSF's property.

Recreational & Aesthetic Values

The landowner is very interested in repairing some the woods roads and trails to use for recreational purposes including running, hiking, and foraging for food and mushrooms. The owner would also like to develop new trails and fix erosion problems on the existing trails. Aesthetic are important to them and they also understand the huge benefit of leaving tree tops in the forest during any harvesting operation. Most tops will be left whole to protect young hardwood seedlings from deer browse.

Riparian Areas & Wet Lands

The property has an abundance of riparian areas, including three primary areas identified as part of ESTA 1. The property also features several scattered forested wetlands, which are collectively part of ESTA 4. The man-made pond is listed as a wetland by the State of Vermont, and is one of two ponds that comprise the non-productive area.

Topography

The majority of this property slopes gradually to the west. The contours lines on the map show the steeper sections. The interval between the contours are 50 feet.

Invasive Plants

Barberry bushes were seen in Areas 1, 2 & 16. Japanese Knotweed was seen in open land around the house and in riparian ESTA 1 along Camels Hump Road.

Removing this bush is recommended by the state of Vermont Forest & Parks. Michael Bald (chooswiselyvt@gmail.com) from Royalton has a business that works with landowners to eradicate invasive.

FSF'S FOREST HEALTH

The health of a forest varies depending on which species one looks at. Overall, the majority of FSF's trees are doing fine. Problems observed are as follows.

A small insect known as the white pine weevil (Pissodes strobi) has deformed some of the pines in Area 2. This insect lives in the grasslands but feeds on pines. This forest pest feeds on the succulent terminal branch of the pine tree causing mortality only to this "leader" section. Once this occurs, a lateral branch must assume vertical height growth, which will cause a permanent crook in the tree. This insect does not harm the tree but rather causes potential sawlog loss due to excessive crookedness. Recent studies indicate that the weevil is on the decline due the loss of grasslands in Vermont.

Paper birch tops are dying in Area 8. This is mainly due to old age. Many of the trees are over 45 years old and this when they typically begin to decline in health.

The red spruce in Areas 1 and 2 are showing signs of red rot. Pitch dripping from the branch stubs and conks indicate rot. Red Rot is a wood-decay disease of inner wood stems on living conifers. It is caused by the fungus Porodaedalea (Phellinus) pine.

Phellinus tremulae, one of the many causes of internal rot in trees, is affecting the quaking aspen trees in Area 5. The fruiting body of Phellinus tremulae are conks at or near old branch stubs and is black to brown with a corky texture.

Ash yellows disease is effecting some of the white ash (F. Americana) in Areas 3 and 7. It is caused by wall-less microbes called mycoplasma-like organisms, which invade the trees systemically through phlomen sieve tubes. It has not been proven what carries the disease, but insects such as leaf hoppers are suspected. Trees infected will exhibit slow growth, dieback in the tops, and small chlorotic leaves growing in tufts at the end of the branches. Also, the bark may split open near the trunk and sucker sprouts may appear from the stump and along the main trunk. To date there is no treatment for this disease. My personal observation is that it takes 10 to 15 years to kill the tree. Ash on drier sites and near meadows tend to be more susceptible to the disease. Some ash appear to be resistant to it, these trees should not be harvested. Ash on FSF's land shows signs of ash yellows, and will likely die or loose value in the next 10 years.

I did see some Hypoxylon cankers on some aspen trees in Area 5. These cankers are caused by the fungus hypoxylon mammatum. They indicate decaying wood on the inside of the tree. Generally these trees will either break off or die from this decaying process.

Beech tops are declining rapidly in Area 3 and 7. This is due to the beech bark disease or nectria fungus. This disease is an insect-fungus "complex" that kills or injures American beech. Disease results when a species of Nectria infects the bark of the trunk though feeding wounds made by the scale insects cryptococcus fagisuga and xylococculus betulae. Within the range of the disease, few large beeches escape injury. Most of these trees will die from it eventually, but it takes ten to twenty years for them to die. In the mean time they will still produce beechnuts and many species of wildlife will feed on them. I have witnessed many of the mature beech in this region succumbing to this disease in the past few years so this is not uncommon. There are some beech that are not showing any signs of the disease. They may be resistant and should not be harvested in future harvesting operations. Declining beech can also host turkey tail and oyster mushrooms, fungi of high food and medicinal value.

Armillaria is one of the most common fungi in forest soil. Signs of it were seen in Areas 2 and 15. It lives as a parasite on a living host tissue or as a saprophyte on dead woody material. As parasites, the fungi cause mortality, wood decay and growth reduction. They quite often attack trees weaken by others factors.They live on the coarse roots and lower stems of conifers and broad-leaved trees. Armillaria is not a soil inhabitant and must survive as mycelia or rhizomorphs on large root and stem pieces. The fungus may remain alive for years on these roots and stems, spreading as roots intertwine beneath the soil. This fungus can live as a parasite on living host tissue or as saprophytes on dead woody material. The fungi cause mortality, wood decay, and growth reduction.

Oxyporus populinus cankers were seen on the trunks of sugar maples in Areas 7, 8 and 14. The fruiting bodies are irregularly shaped white spongy conks no larger than 6 inches. They quite often have green moss growing on the upper surface. Like other decay organisims, infection occurs from injuries to the outer bark. The decay seldom extends more than 3 feet up the tree.

Some of the sugar maples in Areas 7, 8, 9, 13 and 14 have been damaged by the sugar maple borer, Glycobius speciosus. This is a long horn wood boring beetle.The galary or tunnel that is gouged into the tree by their larva can be easily seen after the bark falls off. Some trees will fail at this wound site several years after the insects leave the tree.

Basswood is also found here and should not be harvested because the leaves provide large amounts of nitrogen and calcium that is put back into the soil after leaf fall. They also provide edible leaves and a modest amount will be a harvested as a perennial vegetable by the owner.

VERMONT FOREST FACTS

The Current Use Program has created more forestry related jobs for working Vermonters than any other program or business in the State's history. There are literally thousands of loggers, foresters, farmers, truckers, saw mills workers, firewood dealers, sugar makers, mushroom harvesters, tree farmers(Christmas) and furniture makers in this state that obtain work directly from the land enrolled in the Current Use Program. Enrolled property will help the economic viability of the state of Vermont and its residents if its forestry plan is followed. Along with the economic benefits, many species of wildlife are now increasing in numbers due to the new growth habitat that emerges soon after sustainable timber harvesting methods.

Vermont's land area is 5.92 million acres. Seventy-five percent or 4.46 million acres, is forested. The USDA Forest Service classifies 4.36 million acres as timber land or land that is fertile and accessible enough to produce wood as a crop and is not withdrawn from timber harvesting by statute or regulation.

Total Land Area	Forest Land	Timberland
5,919,702	4,462,835	4,352,855

The majority of timberland in Vermont is privately owned (4.0 million acres or 81%) by family forest owners or business concerns. Local, State and Federal government owns just over 18.7% or 919,440 acres of Vermont forest.

Highlights

ª The annual contribution of forest-based manufacturing and forest-related recreation and tourism to the Vermont economy is over 1.5 billion.

ª Forest-based manufacturing contributes $1.0 billion in value of shipments to the economy in 2005 or 9.3% of Vermont's total manufacturing sales.

ª The forest based recreation and tourism provides employment for over 6,300 people and generates payrolls of $93 million.

ª Revenues from forest-related recreation and tourism activities totals $485 million in 2005.

ª Vermont landowners received estimated stumpage revenue in 2005 of $31.5 million.

ª The sale of Christmas trees, wreaths, and maple syrup contributed approximately $22 million in 2005.

ª Wood provides the energy for approximately 6% of electrical and heating use in Vermont.

ª Each 1,000 acres of forest land in Vermont supports 1.4 forest-based manufacturing, forestry, and logging jobs and 1.4 forest related tourism and recreation jobs.

WHY THE CURRENT USE PROGRAM EXISTS

The reason this program was created was to lower property taxes to discourage land fragmentation and promote professional forestry & agriculture practices that will supply forest products and agriculture crops for the State's economy. The forest products industry is huge part of

the Vermont economy (see page 8). The trees and plants that will be growing here in the future will create jobs and multiple food sources. FSF's forests will provide value-add forest products such as firewood, woodland herbs such as stinging nettles and ramps, and dozens of species of mushrooms converted for food and medicine such as chaga and turkey tail.

The Current Use program is something like a state wide co-op, where everyone enrolled in the program harvests forest products for the good of Vermont's forests, wildlife and economy. In return the owners get rewarded annually with a tax break. Tax saving will then provide landowners extra funds to do a variety things to improve their land such as liming & fertilizing agriculture land, releasing wild apple trees and controlling invasive plants.

STATE OF VERMONT FOREST, PARKS AND RECREATION SUGAR BUSH GUIDELINES FOR UVA

Currently there are no plans to establish a large-scale sugaring system. A mobile, bucket system tapping both maple and yellow birch began in 2015 and is expected to continue over areas of the property, rotating stands every several years to conserve tree health.

For sap harvesting, either even-age or uneven-age silviculture systems can be used. It is however recommended that uneven-age management model is the most natural management model for an active sugar bush. The FPR Dept. does highly recommend the maintenance of at least 20% non-maple species to support forest health in a sugar bush. When converting a hardwood stand to a sugar bush the minimum acceptable basal area would be 65 sq.ft. When converting a mixed wood stand the minimum acceptable basal area is 80 sq.ft. Drop lines should be 24" - 36" in length to allow the staggering of tapping holes.

Tapping guidelines -	Health Spouts (5/16")	Standard Spouts(7/16)
1 tap -	10-14" d.b.h.	12-18" d.b.h
2 taps -	16-20" d.b.h.	20" & over d.b.h
3 taps -	22"-over d.b.h.	Prohibited
4 taps -	Prohibited	Prohibited

HARMFUL PLANTS AND INSECTS IN VERMONT

The State of Vermont highways mowing crews are now spreading a dangerous plant called "Poison Parsnip." Any contact between its resin bare skin combined with sun exposure will result in serious blisters and scars. It generally grows within 20 feet of a highway but it can and will spread into meadows. However, its roots are identical to the parsnips used for food, and can be carefully dug in the spring or fall for human food, as long as care is taken not to get the sap on one's skin or clothing.

In the past 10 years the ticks that carry Lyme disease have spread Statewide. One may come in contact with them from April - November but they seem to be most active in April-June and September - October. Spraying clothes with tick repellent is recommended while in the woods now. Special tick spoons with V notch should be used to remove them, not tweezers It is important not to twist the tick body upon removal, but to it rock from side to side in an attempt to remove the head intact without compressing the body.

Suggested Reading & Resource List for Landowners
Working With Your Woodland: A. Landowners Guide, 1993
Hands on Land; A History of the Vermont Landscape, by Jan Albers. MIT Press 2000

Landowners Guide to Wildlife Habitat: Forest Management For the New England Region 2005
Tracking and the Art of Seeing: How to Read Animal Tracks and Signs, by Paul Rezendes. 1999

VERMONT'S WILDLIFE HISTORY

I like to give all of my clients a bit of Vermont's wildlife history. Following is a brief rundown of what has happened in the past two hundred years.

Many species of Vermont wildlife once in decline have made a dramatic comeback during the past century, due largely to a dramatic change in the state's forest cover. Whitetail deer, black bear, moose, coyote, bobcat, wild turkey, fisher and beaver are some of the more notable species, but many other wildlife that depends on forested habitats could be included.

Before the 1700s, Vermont was entirely forested except for marshes, rocky areas and burned-over sections. Open areas along the Connecticut River were used by Native Americans for growing corn. White pines grew to a height of up to 250 feet and 6 feet in diameter in the Champlain and Connecticut River Valleys. Red oak was abundant in the Champlain Valley. Higher elevations were covered with balsam fir and red spruce. Along the hillsides, birch, beech and maple trees were intermixed with spruce, hemlock, ash, elm, bass, butternut, cherry and hornbeam.

Forest-dwelling wildlife, including timber wolves, mountain lions and many of the species mentioned above existed in healthy numbers. Species that need open areas, young forest stands and forest edges, such as woodcock, ruffed grouse, cottontail rabbits and meadow larks, would not have been found in great numbers due to a shortage of habitat.

As Vermont became more heavily settled, the forested nature of the state changed rapidly. The state's forest land shrank from 91 percent in 1700 to 30 percent in 1860. Farms were almost everywhere, with sheep and cattle pastured even on high-elevation hillsides.

Forest-dwelling wildlife had very little habitat, and only a few laws existed to control hunting. Many species nearly disappeared; some were wiped out. For example, from the early 1800s until 1878, when they were reintroduced, only a few deer lived here, with most of them in Essex County or on Mount Mansfield. In 1878, several citizens bought 17 deer from an Adirondack preserve and released them in Rutland and Bennington Counties.

Several unsuccessful attempts to stock turkeys were made by hunters in Bennington, Windsor and Washington Counties as early as the 1920s. The wild turkeys we have in Vermont today originated from 31 wild turkeys brought in from southwestern New York in 1969 and 1970. They were stocked in Pawlet and Castleton. By then, there was sufficient mature oak in southwestern Vermont to provide plenty of acorns, which is an important staple in the diet of wild turkeys. The turkeys we see around here today have adapted to live off of a large variety of seeds and buds in the winter. Hophornbeam seeds, beech nuts, barberry berries and acorns are their favorite winter foods. Deep powder snow is their worst enemy because they can't walk in it to forage for food. You can thank hunters and fishermen for the turkeys that you see here today. Money from their licenses and taxes on equipment paid for the stocking program.

Between 1959 and 1967 a total of 125 fishers were brought into the state from Maine to reestablish this once native forest-dwelling Vermonter. The fisher is the only predator that regularly preys on porcupines. They were reintroduced to the state to help control the over population of porcupines the state was experiencing. Porcupines feed on the twigs and bark of the white pine,

hemlock and sugar maple. In doing so they can cause serious defects or kill these valuable trees. The porcupine population is now in check and fisher tracks can be seen state wide.

The Eastern coyote is a new subspecies that evolved from the western coyote crossing with the eastern timber wolves of Canada. The eastern coyote (coywolf) will sometimes be born with the pure red or black coats of their wolf ancestors but most are gray with black trim on their shoulders. They weigh around forty pounds which is fifteen to twenty pounds more than their western cousin and have filled the niche that the timber wolf once had in the East. These animals are rarely seen and are on the top of the food chain. Their diet varies from berries to whitetail deer and will feed upon anything in between. They moved into Vermont in the 1940s and now exist statewide. Google Coywolf for more information.

Ravens, considered rare just thirty years ago, have repopulated the state. Beavers abound, creating temporary wetlands that provide habitat for many other species.

Moose have moved back to Vermont and can be found statewide. Most came in from New Hampshire and Canada. When people picture moose they think of moose feeding in a lake, which is common in Maine. Chittenden county is very different from Maine. The moose that live here spend much of their lives at high elevations. There are some small wetlands at these high elevations and the moose will feed on the vegetation around them during the spring and summer months. The moose is a very large animal but depends on the small twigs and buds of young trees as its main food source. A full grown moose requires twenty to thirty pounds of buds and twigs per day. In the winter, they will also peel the bark from red maple and striped maple for food. Chew marks on trees six to twelve feet high are common in moose wintering areas. Clear-cuts five to twenty-five acres in size produce thousands of saplings. The first fifteen years of growth in these clear-cuts provide the desired feeding grounds for moose. The number one reason why moose live in Vermont today is that actively managed woodlots have produced enough young growth to sustain a moose herd. Moose can and will overpopulate an area just as the whitetail deer do. Starvation in the winter will result when their population exceeds what the land can produce for food. A limited hunting season takes place every fall in the areas of high moose numbers. This is to help prevent overpopulation. Moose populations are on the increase in our area and sighting them will be more common in the years to come. Currently the highest populations are at the highest elevations in Chittenden County. The ice storm of 1998 created acres of new growth and food for the moose.

Overpopulation is the whitetail deer's worst enemy now because they are so successful at living close to humans where hunting isn't allowed. The forests with high deer populations suffer. Deer love the taste of the more valuable maple, ash, oak, and birch buds. Constant browsing on these species allows the less desirable regeneration and less valuable beech, hornbeam, and striped maple to thrive. Leaving tops of harvested trees whole in the woods during a logging operation will provide a barrier and help protect seedlings from browsing deer.

All the fish and game stocking programs are paid for by hunters, trappers and fishermen indirectly through taxes on their equipment and license fees.

There is a non-game fund on the Vermont State tax return whereby anyone can donate money to the stocking of non-game species. Loon, osprey and peregrine falcon are a few of the species that benefit from this program.

Today, 77% of Vermont is again covered by forest. We have more wildlife habitat, many more species of wildlife and larger populations than we have had in more than 150 years.

WATER QUALITY REGULATIONS

The state of Vermont has some regulations concerning logging and they are called Acceptable Management Practices or (AMP), which should followed during any logging operation.

IMPORTANT WETLAND INFORMATION

We have not mapped or located any vernal pools in the forest yet (Lapin has mapped some) but woodland pond near Area 14 is being used by many amphibians as if it where a vernal pool and breeding here. Vernal pools found throughout Vermont's forests are essential to the survival of many aquatic species. The definition of a vernal pool is a small seasonal wetland, that does not contain fish, that generally dries up by the end of the summer. These pools generally occur in areas of depression where water can collect and persist for at least 2 months in order for species to be able to successfully reproduce in them.

The importance of a vernal pool is to provide an area where amphibians and other aquatic species can breed and reproduce. Some species that use these pools are the spotted salamander, wood frog, fairy shrimp, fingernail clams, eastern newts, green frogs, snails and spring peepers. The fact that these pools do dry up at certain times of the year prevent fish from being able to survive. This protects the larva that is growing in these pools and highly increases survival rates.

These highly productive ecosystems need to, and will be protected in order for them to continue to benefit aquatic species. The change of sunlight, amounts of leaf fall and the amount of woody debris that end up in these pools can alter their chemistry to the point where they will no longer produce the benefits they currently are now. If you want to help out these aquatic species, adding coarse woody debris such as 10' branches with small limbs to these areas. These will provide a place for eggs to be laid onto. Suspended eggs are much more likely to survive compared to eggs laying on the bottom of the pool. Care should be taken to not disturb the pools when eggs are developing. As I stated before we have not mapped any to this date but if one is found while working here in the future it will be mapped with a GPS and added to the map.

FSF'S FOREST MANAGEMENT GUIDELINES

To achieve FSF's goals, the following timber management guidelines are recommended.

1. Before any harvest activities, the planned operation will be assessed concerning the conformance of the above goals and principles.

2. Timber harvesting will be conducted during the winter months when the ground is frozen. There may be a few cases when soil scarification is desired to initiate regeneration of target species. In these cases logging will occur in the driest period of the summer.

3. Silvicultural systems will include 1) small to medium-scale, all-aged management (utilizing single tree and group selection harvest methods), 2) cutting cycles of 15-20 years as well as extended rotations with cycles of 30 years or more. *3) rotations of 80-100 or more years for most hardwoods, hemlocks and spruce, 30-50 years for aspen, paper birch and red maple.* 4) maintain stocking levels at or above the B line according to stocking guides.

4. Efforts should be made to retain at least 6-10 cavities and or snag trees per acre and retain at least 2-5 large(>12" d.b.h.) downed trees per acre.

5. A no-cut buffer along banks of Brush and Cobb brooks and permanent tributaries will be maintained *for wildlife corridors and erosion control.*

6. Seeps, vernal pools and both year-round and intermittent streams will be protected during all operation. State of Vermont AMP's must followed for all properties enrolled in the Current Use Program.

Harvest Planning

Before all timber harvesting activities the following planning steps will be taken:

1. Review and complete harvest objectives with landowner and/or owner's designees.

2. Determine harvest boundaries, silviculture objectives, and major access routes (including haul roads and landing sites).

3. Identify and flag seeps, vernal pools, and intermittent streams as they may not be visible in winter and need to be identified as fragile and therefore protected from machinery.

4. Evaluate wildlife habitat conditions and incorporate wildlife concerns into both marking guidelines and on-the ground marking. [see above recommendations by wildlife biologist Susan C. Morse]

5. Evaluate non-timber forest product use in the harvest area and ensure that complements and conflicts in timber and non-timber uses are consciously considered.

6. Mark timber, determine harvest volumes, develop schedules, select harvesting contractor, and prepare timber sale contract if logs and/or pulpwood will be sold rather than used onsite.

7. In the early stage of the harvest, the forester, landowners, and/or designees should inspect the harvest area, including all major skid trails, roads and landings, to ensure that objectives of the harvest are being met.

8. Final inspection of the harvest, the forester, landowner, and/or designees should inspect the harvest area, including all major skid trails, roads and landings, to ensure that objectives have been satisfactorily met.

9. Knowledge gained from each harvest should be used to inform future management activities.

Recreational Management

Recreational use of the forest will be limited to 1) winter usage of the Catamount Trail for cross-country skiing by the public, and 2) hiking, walking, trail running, snowshoeing, back-country skiing,photography, and bird/wildlife watching by occupants of FSF and/or SHO FARM, LLC.

Hunting, trapping or any other intentional killing of animals on the land will not be permitted, given the land stewardship philosophy of "do no harm", as well as the goal of establishing a vibrant wildlife preserve.

Wildlife Management

The property currently provides a variety of wildlife habitat, including cover, food and water resources. Besides the deciduous and mixed forest habitats that cover the bulk of the lands, habitats include dense softwood cover, aspen and paper birch thickets, a substantial amount of field and field

edge, large beech trees, and brushy openings with apple and hawthorn trees. Formal faunal surveys have been conducted for birds and dragonflies, but certainly has not been conducted for all groups. It is known that deer, bear, moose, bobcat, snowshoe hare, coyote, fox, fisher, mink, red squirrels, barred owl, grouse, turkey, a variety of mice and voles, a variety of song birds and a variety of insects can be found on this property at various times of the year. There is a limited amount of early successional wildlife habitat on this property. This forest type is known to provide the most food and cover for more species of wildlife that currently exists on this property. Patch or glade-cutting practices can increase this type of habitat and wildlife numbers.

To manage for wildlife and wildlife habitat diversity, forestry activities will include in appropriate locations the creation, maintenance and perhaps expansion of small openings, and retention of beech (especially stems showing past bear use), snag and cavity trees. The release of food-producing trees, such as beech, apple, shadbush and hawthorn, will provide a valuable food source for a number of wildlife species. Black raspberries and berries are an early successional food source that are used by most wildlife on the property. Insects pollinate the flowers, song birds eat the pollinators. The berries are eaten by bear, raccoons, birds, fisher, fox, coyote, and skunks. The leaves and buds of the berry bushes are eaten by deer, moose, rabbits and grouse. Specific management techniques will be used to ensure that berry bushes in key locations are not overtaken by trees.

Silvicultural Principles

Specific silvicultural recommendations for each stand are included later in this plan. Following is a list of general silvicultural principles and objectives to be followed by FSF, SHO FARM, LLC as lessee, owner and lessee employees, consulting forester and loggers:

1. It is fundamental to all silvicultural practices to maintain ecological health and integrity, to protect site productivity and water quality, to maintain native biological diversity, and to protect rare and uncommon species.
2. Silviculture systems and harvest activities will incorporate practices that maintain the structure and function of forest, shrub land, or field ecosystem.
3. Annual harvests of firewood, averaged over time, will not exceed 75% of net annual growth.
4. There will be no whole tree harvesting.
5. Cutting cycles will be 15-20 years or longer. Extended rotation times will be be implemented.
6. Using Natural Dynamics Silviculture or similar methods, harvesting will be done in such a way as to resemble natural patterns to the greatest extent possible, except in areas that are maintained as early successional habitat.
7. Single tree and group selection harvest methods will be used to regenerate stands and to gradually convert from even-age to an all-aged stand structure. Canopy openings will not generally exceed .25 acres except in areas managed for early successional habitat.
8. Residual basal area will average 80-100 sq.ft./acre.
9. Any individual tree with any characteristics will be retained:
    a) Extremely large (over 30” DBH), with little commercial value.
    b) Important seed source for regenerating the stand.
    c) Contain cavities (snag/den trees).
10. Acceptable Management Practices for maintaining water quality on logging jobs in Vermont, will be followed as a minimum standard.
11. Herbicides and other pesticides will not be used unless the landowner finds that it is desirable to use them to aid in the control of invasive - exotic species.
12. Important cultural heritage sites will be protected during logging operations. These features include old cellar holes, foundations, stonewalls, and spring houses.

Patch/glade Wildlife Regeneration Cutting Practice

A patch cut is described as a defined area where all the trees are cut. The patch cuts I prescribe on any property are generally 1/4 to 2 acres in size where trees are usually mature or declining in health. There are a few pockets of aspens where this is happening on FSF's property. The many important reasons for prescribing these cuts are listed below.

Wildlife need water, food, and cover to survive. Blackberry and raspberry bushes are the native plants that provide both food and cover for wildlife. These plants need direct sunlight to flourish. Once an opening (patch cut) is created in the forest, birds and animals will visit these new openings and transport berry seeds in their droppings. Within one year, berry bushes will begin to grow. For the next ten years, berries will dominate the site. Many species of song birds will nest and feed in these patch cuts for the following fifteen years. FSF may wish to leverage this kind of succession to deliberately plant black raspberries and elderberries in the springtime following winter patch cuts. The dense cover of brush and twigs prevents hawks and owls from catching young birds that cannot fly. Deer, moose, turkey, grouse, coyote, fox, raccoon, fisher, squirrels, and bear will come to these areas to feed on the berries, bushes and young trees. Landowners quite often pick these delicious berries also. After 15 years, the berries get shaded out and die. The trees soon will be too tall for even the long-legged moose to feed on. Wildlife use of the property will begin to subside. By scheduling new patch cuts at 15 - 20 year intervals, the wildlife will have a continuous supply of food and cover on FSF's property.

Our forests consist of many tree species. Some are more valuable than others. Sugar maple, white ash and yellow birch are the most valuable trees in terms of longevity, lumber value and firewood value and are often out-competed by beech, hophornbeam, and striped maple when tree tops are cut in small pieces on the forest floor after cutting. Sugar maple, white ash and yellow birch can live up to 150 years but many will begin to decline in health and value after 100 years. An important aspect of forest management is growing new trees. Different cutting practices will promote different tree species. The more valuable trees tend to need more sunlight and protection from deer browse than the less valuable trees. Using patch cuts is one forestry practice that will allow enough sunlight to reach the ground to regenerate the most valuable trees. Leaving entire tops of harvested trees in the woods may be unsightly to some folks for a few years, but they are proven to be good for the forest and its inhabitants. The tree tops will act as a barrier and protect young valuable tree seedlings from browsing deer. They also provide nesting habitat for many birds and will eventually rot down to ground level in less than 8 years. Amphibians live under the branches that touch the ground. They feed on the many insects that break the wood down. I recommend planting sprouted red oak acorns in the brush piles the following spring after the harvest. I generally have a supply of these in April and provide them free to clients who wish to plant some themselves. Brush piles also provide nesting cover for many bird species.

FSF'S TIMBER INVENTORY

The property was examined in August 2005, winter of 2014-2015, and early spring 2015 to evaluate the forest and past management activities, collect current stand data, and develop silvicultural prescriptions for the next ten years (2015-2025). BF&W reviewed the data from Brendan Moore's 2005 cruise, as well as Alan Thompson's 2014-2015 cruise, and is using it in this plan. The cruise design consists of variable radius, 10 BAF prism points systematically located on an 8 chain by 10 chain grid covering the entire tract. In total 148 points where established on 1,083 acres for Brendan Moore, which translates into 1 sample point for every 7.3 acres. For each tree tallied in each sample point, variables measured included 1) tree species, 2) diameter of tree at breast height (DBH), 3) classification of tree as acceptable (AGS) or unacceptable (UGS), 4) type and number if merchantable products of each tree in 8 foot sections, and 5) merchantable top

diameter of the tree. Sample points were collected through a handheld computer, and processed using Assisi Software, which is a timber inventory processing program. In addition to timber volumes, the 2005 inventory sampled coarse woody debris (CWD) (minimum 5" diameter and 3" long), standing snag trees, cavity trees, and regeneration (trees less that 4.5" diameter). At each cruise point, CWD was measured using a 10 BAF prism, and regeneration was sampled using 1/100th acre plot/quadrants.

This tract is dominated by hardwood species, the most common being sugar maple, which represents 35% of the total standing volume. Other hardwoods present include red maple, white ash, white birch, yellow birch, American beech, aspen, and black cherry. Softwood species including white pine, red spruce, and hemlock, represent a small portion of the total volume (15%). Total standing volume (sawlogs and pulpwood) averaged 14.6 per acre.

In total, there are 3,406,397 board feet of sawlog grade material on this tract of land, including veneer, sawlogs, boltwood, and pallet logs. Over 42% of the total sawlog volume is sugar maple (1,457,320 bd.ft.) Other species that represent a significant portion of the total saw logs volume are white ash (437,372 bd.ft.), yellow birch (265,469 bd.ft.) and hemlock (273,100 bd.ft.).

The following percentages show the break down of species composition as Percentage of Total Volume. Sugar Maple 35%, Red Maple 9%, Yellow Birch 10%, White Ash 9%, White Birch 8%, American Beech 7%, Hemlock 7%, Aspen 3%, White Pine 3%.

Coarse Woody Debris

Woody debris was tallied in each plot by Brendan Moore in 2005. The majority of it was under 12" d.b.h. with 2 pieces per acre being solid, 11 pieces per acre being moderately punky, and 5 pieces per acre being punky throughout.

The next size class 12"-18" d.b.h. had only 0.5 pieces per acre being solid, 0.5 pieces per acre of moderately punky, and 2 pieces per acre being punky throughout.

The next size class was greater than 18" d.b.h. and there was only 0.2 sound material per acre in this size class.

This material is very important to FSF's goal of growing and harvesting different types of mushrooms on the property, as well as building soil health.

Snag Tree Summary

The Snag trees were tallied in each plot by Brendan Moore in 2005 and summarized by averaging of the data collected on the property. The majority of the snag trees tallied were less than 12" d.b.h. There 15.5 hardwood trees per acre and 5 softwood trees per acre in this category. In the 12"-18" d.b.h. class there was 4 hardwood trees and 1 softwood tree per acre. In the 18" and greater size category there was only 1 hardwood tree.

Regeneration Summary

The regeneration was tallied in each plot by Brendan Moore in 2005 and summarized by averaging of the data collected on the property. 46% was under-stocked or not established, 19% was sugar maple, 13% was beech, 5% was red spruce, 5% white ash, 5% yellow birch, 4% red maple, 3% ironwood.

FSF'S FOREST STAND ANALYSIS

Designation of Management Units

For management purposes, the property has been divided into 21 forest areas/stands, 4 ESTA's, open/idle agricultural land, and 2 non-productive pond areas. Each unit is described in the following pages, and future management recommendations are outlined. A schedule of forestry activities lists these recommendations in order of proposed implementation by year, for the ten-year duration of this plan.

Multi-Management Unit Applicable Recommendations

Below is a core group of management recommendations that apply to management units when one or more of the stated conditions exist. They are presented here, rather than repetitiously in each area description. However, they should be considered an integral part of the management recommendations for each relevant management unit.

Primary Objectives: The primary objectives for managing the 16 units that call for uneven-age management (Areas 3-10, 12-13, 15-17, 19-21) are: (1) development of old-growth forest features for mushroom production; (2) wildlife habitat enhancement; and (3) timber management for firewood production for personal use, and high-quality sawtimber production.

The primary objectives for managing the 5 units that call for even-age management (Areas 1-2, 11,14,18), as well as the 4 ESTA's, are very similar, but have been slightly modified to reflect the resources and operating conditions of these areas, and as such have been set forth below in the relevant area analyses.

Management: All timber harvests will be conducted under the supervision of the forester to ensure that the plan is being followed.

When there is any type of cut: Leave tree tops of whole harvested trees in the woods to, among other things: (1) protect valuable hardwood regeneration from animal browse; (2) provide mushroom propagation sites; (3) put nutrients back into the soil through decomposition to build soil health; (4) sequester carbon to keep our atmosphere clean; (5) provide nesting habitat for birds and other small animals; and (6) protect rare and uncommon plant species.

When there is a group selection or patch cut: Large cull logs will be left on the ground for wildlife habitat, including but not limited to, providing male ruffed grouse safe drumming perches during the breeding season, and mushroom production. Also, sprouted red oak acorns may be planted in the spring under brush piles following a cut.

When there are beech trees: No healthy and/or bear-scratched beech trees will be cut, as they provide valuable food and habitat for wildlife.

When there are aspen trees: Mature and over-mature aspens will be left to achieve a density of 4-5 per acre, as they provide a valuable winter food source for wildlife, such as ruffed grouse.

When there are cherry trees: Black cherries will be released as they are a valuable resource for wildlife. Pin and choke cherries will also be released along field edges.

When there are den and snag trees: Allow for the retention and maintenance of a variety of forest structures, including den trees, snags, cull trees for structure recruitment purposes, and fine and coarse woody debris on the ground. A minimum of six to ten cavity trees and snags will be

retained per acre. This is particularly harmonious with fungi harvests, an most sought species require standing or downed dead trees.

Disclosures: (1) I, Pat Bartlett, referred to following publications on the reference page which is located on the last page of this plan; #1, #5, #6, #7 & #9; (2) I, Pat Bartlett, used Allan Thompson's stand data collected during the winter of 2014-2015.

AREA 1

General Description: This area is located in the northwestern portion of the property, on the south side of the driveway. It is dominated by mixed softwoods, especially red spruce and birch. This site will grow oyster mushrooms on dead hardwoods, chanterelle around softwoods, reishi on hemlocks, chaga on birches, and turkey tail mushrooms on any deadwood, all of which FSF intends to steward and consciously harvest. There are many spring seeps with a clay hardpan. Access is good from the driveway. The operability is fair due to the wet soils and clay hardpan, and should only be accessed under frozen conditions. The form of the trees is fair to poor. The average age is 50 - 60 years. The land slopes gradually to the north. Even-age management will be used here due to the clay hardpan, wet soils and history of wind damage.

Forest Type: Red Spruce **Plots Taken** - 7 **Trees/Acre**: 295

Natural Community Type: "Northern Hardwood Forest" by Lapin & Engstrom in 2005

Tree Species Composition: Red spruce 42%, yellow birch 22%, eastern hemlock 10%, white ash 7%. Sugar maple, beech, red maple, striped maple and white pine make up the remaining 19%.

Acres: 18.5 **Access Distance**: +/-1/4 mile **Stocking**: Just above B line

Total BA/AC: 88 **Acceptable BA/AC**: 50 **Mean Stand Diameter**: 8.2 "

Site Class: I & II **Stand Age**: Two-aged

Soils: Cabot silt loam, Peru, and Marlow **Site Index** - 55-60

Saw timber Volumes/acre: 3,138 bd.ft./acre **Cordwood Volume/acre:** 20 cords/acre

Mushroom-Conk Production: The site should produce an average amount.

Stand History: Formerly cleared pasture, some trees harvested 30 years ago, apple trees released.

Insects and Disease: Red rot on spruce

Wildlife Habitat: The fact that this borders the open/idle agricultural land makes it very good habitat for wild turkeys, fisher, owls, deer and song birds. There are a few apple trees that should be released so they are not shaded. Deer winter here, so the softwood cover should be maintained in travel corridors. There is very little low cover and browse for the deer, which patch cuts will improve.

Boundaries: Stonewall

Regeneration: Adequate and free to grow. Yellow birch, ash and maples.

Primary Objectives: The primary objectives for managing this area are: (1) development of old-growth forest features for mushroom production; (2) wildlife habitat enhancement; and (3) timber management to begin a new generation of trees.

Management:
-Even-age management
-Group selection or patch cuts; no cutting between patches
-Rotation age of 100 years

Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2018 - Release apple trees by cutting or girdling trees shading them. Medium priority.
No timber harvesting during this time due to age of stand.

Species favored for retention and regeneration: Red maple, yellow birch, red spruce

AREA 2

General Description: This area is located in the northwestern portion of the property, on north side of the driveway. It is dominated by hemlock, red spruce and white pine. The average age of the trees in this area is 65 years. Much of the land slopes gradually to the north. This site will grow oyster mushrooms on dead hardwoods, chanterelle around softwoods, reishi on hemlocks, chaga on birches, and turkey tail mushrooms on any deadwood, all of which FSF intends to steward and consciously harvest. The operability is poor in most parts of the stand due to the clay hard pan and spring seeps. The access to this area is good from the driveway. Machines or horses should only access this area in the winter or dry summer months because of its wetness. No logging has occurred in this stand for at least 30 years. Even-age management will be used here due to the clay hardpan, wet soils and history of wind damage.

Forest Type: Mixed Woods **Plots Taken** - 6 **Trees/Acre**: 324

Natural Community Type: “Northern Hardwood Forest” by Lapin & Engstrom in 2005

Species Composition: Hemlock 22%, red spruce 17%, white pine 13%, red maple 16%, sugar maple 8%, yellow birch 8%, paper birch 7%. American elm, black cherry and white ash make up the remaining 4%.

Acres: 25.7 **Access Distance**: +/-1/4 mile **Stocking**: Just below A line

Total BA/AC: 155 **Acceptable BA/AC**: 83 **Mean Stand Diameter**: 8.2”

Site Class: I & II **Stand Age**: Even-aged

Soils: Cabot loam and Peru extremely stony loam **Site Index** - 50-60

Saw timber Volumes/acre: 3,138 bd.ft./acre **Cordwood Volume/acre:** 20 cords/acre

Mushroom-Conk Production: The site should produce a high amount.

Stand History: This was pastureland 60 years ago. Some softwoods have been harvested. Wind blew over +/-20,000 bd.ft. of white pine in 2012 just out of sight of the road.

Insects and Disease: Some wind-thrown pine trees. Red rot disease has infected some spruce trees. Pitch dripping from branch stubs indicates this is happening inside the tree.

Wildlife Habitat: This old pasture land makes good habitat for most of the species of wildlife that live on the property. Deer winter here. All the uprooted pines make excellent wildlife cover for birds and mammals. Maintain the solid groups of softwoods where the deer have their travel corridor. Many wood boring insects breaking down the dead white pine trees. These insect attract many species of woodpeckers.

Regeneration: Established in pockets where wind damage occurred. Spruce, beech and striped maple.

Primary Objectives: The primary objectives for managing this area are: (1) development of old-growth forest features for mushroom production; (2) wildlife habitat enhancement; and (3) timber management to grow trees and edible forest herbs.

Management:
-Even-age management
-Patch cuts; no cutting between patches
-Rotation age of 100 years

Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business. 2019 - Release apple trees by cutting or girdling trees shading them. Medium priority.

Species favored for retention and regeneration: Hemlock, spruce and yellow birch

AREA 3

General Description: This area is located in the northwestern portion of the property, on the north and south sides of the driveway. It is dominated by sugar maple, beech and yellow birch. This site will grow oyster, turkey tail and morels mushrooms, all of which FSF intends to steward and consciously harvest. The average age of the trees in this area is 120 years. Much of the land slopes to the north. The operability is good in most parts of the stand. Access is good from the driveway. The maples here were tapped in the past and sugar equipment was seen on the site. Many of the large maples have low sawtimber value, but high wildlife, sugaring, and mushroom production value. The beech dying from beech bark disease are also growing valuable turkey tail mushrooms that FSF plans to harvest.

Forest Type: Northern Hardwoods **Plots Taken** - 6 **Trees/Acre**: 132

Natural Community Type: “Northern Hardwood Forest” by Lapin & Engstrom in 2005

Species Composition: Sugar maple 53%, beech 25%, yellow birch 16%. Paper birch, eastern white pine, hophornbeam and red maple make up the remaining 6%.

Acres: 23.1 **Access Distance**: +/-1/4 mile **Stocking**: Between A & B line

Total BA/AC: 113 **Acceptable BA/AC**: 68 **Mean Stand Diameter**: 12.5”

Site Class: I - II **Stand Age**: Two-aged

Soils: Cabot silt loam and Peru extremely stoney loam **Site Index** - 55

Saw timber Volumes/acre: 4,568 bd.ft./acre **Cordwood Volume/acre:** 18 cords/acre

Mushroom-Conk Production: The site has potential to produce a good amount.

Stand History: This was pasture land also in the early 1900's. The sugar maples were saved in the land clearing era for sugaring and shade in the pastures. Old sugaring equipment was found in the woods where the land drops off. The younger hardwoods filled in after the cows were removed from the site in the 1940's -50's.

Insects and Disease: Beech bark disease is the most serious problem here.

Wildlife Habitat: There are many large sugar maples that should remain in the forest since they have cavities and loose bark that are providing dens for many species of rodents, bats and song birds.

Regeneration: Beech, maple and ash established and free to grow in pockets.

Primary Objectives: See Multi-Management Unit Applicable Recommendations, "Primary objectives" on page 62.

Management:
-Uneven-age management
-Single tree and group selection
-Group size will vary from 1/4 to 1/2 acre, and no more than 10% of the area will be harvested as groups. Maintain at 80 sq. ft. of basal area between groups.
-Cutting cycle of 20 years
- Cutting diameter objective 24" d.b.h. for hardwoods
- The openings will help regeneration get established. The goal of this work is to have a variety of sapling, pole and saw log size trees in this stand.

Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2016 - Blaze and paint property lines. High Priority
2021 - Single tree and group selection system to remove low-quality firewood trees and high-quality sawtimber that meets diameter objectives. Reduce basal back to +/-80 sq. ft. Medium priority.

Diameter Distribution

Diameter Range (2-inch D. class)	Current Total Basal Area(ft/acre)	Current Acceptable Basal Area (ft/acre)	Target Total Residual Basal Area (ft/acre)
6-10 inch	25 sq. ft.	15 sq. ft.	18 sq. ft.
12-14 inch	42 sq. ft.	25 sq. ft.	30 sq. ft.
16 inch plus	46 sq. ft.	28 sq. ft.	32 sq. ft.

AREA 4

General Description: This area is located in the northwestern portion of the property, on the northern edge of the open/idle agricultural land near the 12 acre excluded area. It is dominated by hardwoods and hemlocks. The average age of the trees in this area is 45 years. The area has many spring seeps with a clay hardpan. Access is good from the driveway. The operability is only fair due to the wet soils and clay hardpan. This area can only be accessed under frozen conditions. The form of the trees, on average, is good. There are some stressed trees near the wet seeps. The land slopes gradually to the north. No treatment has occurred in this stand.

Forest Type: Mixed Hardwoods **Plots Taken** - 2 **Trees/Acre**: 268

Natural Community Type: “Northern Hardwood Forest” by Lapin & Engstrom in 2005

Species Composition: Beech 36%, sugar maple 18%, eastern hemlock 14%, American elm 9%, white ash 9%, American basswood 9%, hophornbeam 5%, and yellow birch 5%.

Acres: 6.0 **Access Distance**: +/-1/4 mile **Stocking**: Just below A line

Total BA/AC: 110 **Acceptable BA/AC**: 90 **Mean Stand Diameter**: 8.6”

Site Class: I-II **Stand Age**: Two-aged

Soils: Cabot silt loam and Peru and Marlow stoney loam **Site Index** - 55

Saw timber Volumes/acre: 2,969 bd.ft./acre **Cordwood Volume/acre:** 16 cords/acre

Mushroom-Conk Production: The site should produce an average amount.

Stand History: Old pasture lands that have been slowly growing in for the past 70 years.

Insects and Disease: Some stressed trees around seeps and springs.

Wildlife Habitat: Very good edge habitat for deer, grouse, woodcock, turkey, song birds. This is an important wildlife corridor and should be maintained as such.

Boundaries: N/A

Regeneration: Maple, ash, & beech established and free to grow in places.

Primary Objectives: See Multi-Management Unit Applicable Recommendations, “Primary objectives” on page 62.

Management:
-Uneven-age management
-Single tree and group selection
-Group size will vary from 1/4 to 1/2 acre, and no more than 10% of the area will be harvested as groups. Maintain at 80 sq. ft. of basal area between groups.
-Cutting cycle of 20 years
- Cutting diameter objective 24” d.b.h. for hardwoods and hemlocks
- The openings will help regeneration get established. The goal of this work is to have a variety of sapling, pole and saw log size trees in this stand.

Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business. 2022 - Single tree and group selection system to remove low-quality firewood trees and hiqh-quality sawtimber that meets the diameter objectives. Reduce basal back to +/-80 sq. ft. Medium priority.

Residual Basal Area after cut: 80 sq. ft.

Species favored for retention and regeneration: Sugar maple and hemlock

Diameter Distribution

Diameter Range (2-inch D. class)	Current Total Basal Area(ft/acre)	Current Acceptable Basal Area (ft/acre)	Target Total Residual Basal Area (ft/acre)
6-10 inch	55 sq. ft.	45 sq. ft.	40 sq. ft.
12-14 inch	45 sq. ft.	37 sq. ft.	32 sq. ft.
16 inch plus	10 sq. ft.	8 sq. ft.	8 sq. ft.

AREA 5

General Description: This area is located in the north central portion of the property, to the southeast of the 12 acre excluded area. It is dominated by hardwoods and red spruce. The average age of the trees in this area is 85 years. Access is good from the woodshed area and airfield. The operability is only fair due to the wet soils. This area can only be accessed under frozen or dry summer conditions. The form of the trees varies. The spruce have poor form with many large branches, the hardwoods have average form. This site will grow oyster, chanterelle, and turkey tail mushrooms, all of which FSF intends to steward and consciously harvest. There are some stressed trees near the wet seeps. The land slopes gradually to the north and west.

Forest Type: Mixed Hardwoods **Plots Taken** - 12 **Trees/Acre**: 308

Natural Community Type: "Northern Hardwood Forest" by Lapin & Engstrom in 2005

Species Composition: White ash 20%, yellow birch 16%, red spruce 13%, red maple 11%, sugar maple 11%, aspen 9%, paper birch 9%, black cherry 4%. Elm, beech, hemlock and pine make up the remaining 9%.

Acres: 45.8 **Access Distance**: +/-1/3 mile **Stocking**: Just above A line

Total BA/AC: 126 **Acceptable BA/AC**: 78 **Mean Stand Diameter**: 8.6"

Site Class: I-II **Stand Age**: Two-aged

Soils: Peru - Marlow loam **Site Index** - 55

Saw timber Volumes/acre: 3,976 bd.ft./acre **Cordwood Volume/acre:** 20 cords/acre

Mushroom-Conk Production: The site should produce an average amount.

Stand History: Old pasture lands that have been slowly growing in for the past 70 years. Some evidence of harvesting of firewood tree 30 - 40 years ago.

Insects and Disease: Some stressed trees around seeps and springs.

Wildlife Habitat: Limited edge habitat for deer, grouse, woodcock, turkey, song birds. This is an important wildlife corridor and should be maintained as such on critical runways.

Boundaries: N/A

Regeneration: Red spruce and hophornbeam established but not free to grow.

Primary Objectives: See Multi-Management Unit Applicable Recommendations, "Primary objectives" on page 62.

Management:
-Uneven-age management
-Single tree and group selection
-Group size will vary from 1/4 to 1/2 acre, and no more than 10% of the area will be harvested as groups. Maintain at 80 sq. ft. of basal area between groups.
-Cutting cycle of 20 years
- Cutting diameter objective 24" d.b.h. for sugar maple, 14" d.b.h. for spruce, red maple and aspen
- The openings will help regeneration get established. The goal of this work is to have a variety of sapling, pole and saw log size trees in this stand.

Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business. 2023 - Single tree and group selection system to remove low-quality firewood trees and high-quality sawtimber that meets the diameter objectives. Reduce basal back to +/-80 sq. ft. Medium priority.

Residual Basal Area after cut: +/- 80 sq. ft.

Species favored for retention and regeneration: Yellow birch, white ash and sugar maple

Diameter Distribution

Diameter Range (2-inch D. class)	Current Total Basal Area(ft/acre)	Current Acceptable Basal Area (ft/acre)	Target Total Residual Basal Area (ft/acre)
6-10 inch	63 sq. ft.	39 sq. ft.	38 sq. ft.
12-14 inch	40 sq. ft.	24 sq. ft.	27 sq. ft.
16 inch plus	23 sq. ft.	15 sq. ft.	15 sq. ft.

AREA 6

General Description: This area is dominated by mixed hardwoods and is located in the northeast corner of the property. This site will grow oyster mushrooms on dead hardwoods, chanterelle around softwoods, reishi on hemlocks, chaga on birches and turkey tail mushrooms on any deadwood, all of which FSF intends to steward and consciously harvest. The average age of the trees varies from 25 - 75 years. Access is good from the existing woods road. The operability is good. This area should only be accessed under frozen or dry summer conditions. The form of the trees is good, with the best trees growing on the west side. There are some stressed trees near the wet seeps. The land slopes gradually to the north and west.

Forest Type: Mixed Hardwoods **Plots Taken** - 14 **Trees/Acre**: 224

Natural Community Type: "Northern Hardwood Forest" by Lapin & Engstrom in 2005

Species Composition: Red maple 22%, sugar maple 18%, yellow birch 14%, white ash 13%, beech 7%, paper birch 7%, black cherry 6%, aspen 5%. Hemlock, white pine, basswood, striped maple and spruce make up the remaining 8%.

Acres: 57.0 **Access Distance**: +/-1/4 mile **Stocking**: Just above A line

Total BA/AC: 129 **Acceptable BA/AC**: 77 **Mean Stand Diameter**: 10.2"

Site Class: I **Stand Age**: Two-aged

Soils: Peru - Marlow loam **Site Index** - 55

Saw timber Volumes/acre: 1,728 bd.ft./acre **Cordwood Volume/acre:** 5.3 cords/acre

Mushroom-Conk Production: The site should produce a good amount of mushrooms.

Stand History: The eastern portion had a harvest roughly 40 years ago. Firewood has been harvested by FSF in the past 10 years.

Insects and Disease: Some stressed trees around seeps and springs, ash yellows just beginning.

Wildlife Habitat: Very good edge habitat for deer, grouse, woodcock, turkey, song birds. This is an important wildlife corridor and good cover should be maintained around established runways. There are some old apple trees east of the log landing site, which is an old house site. They should be released when cutting firewood in this area.

Boundaries: Pink Flags and old blazes

Regeneration: Red Spruce and hophornbeam established in pockets but not free to grow.

Primary Objectives: See Multi-Management Unit Applicable Recommendations, “Primary objectives” on page 62.

Management:
-Uneven-age management
-Single tree and group selection
-Group size will vary from 1/4 to 1/2 acre, and no more than 10% of the area will be harvested as groups. Maintain at 80 sq. ft. of basal area between groups.
-Cutting cycle of 20 years
- Cutting diameter objective 24” d.b.h. for sugar maple, 14” d.b.h. for spruce, red maple and aspen
- The openings will help regeneration get established. The goal of this work is to have a variety of sapling, pole and saw log size trees in this stand.

Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2016 - Blaze and paint property lines. High Priority
2018 - Single tree and group selection system to remove low-quality firewood trees and high-quality sawtimber that meets diameter objectives. Reduce basal back to +/-80 sq. ft. Medium priority.

Residual Basal Area after cut: 80 sq. ft.

Species favored for retention and regeneration: Sugar maple, yellow birch and hemlock

Diameter Distribution

Diameter Range (2-inch D. class)	Current Total Basal Area(ft/acre)	Current Acceptable Basal Area (ft/acre)	Target Total Residual Basal Area (ft/acre)
6-10 inch	48 sq. ft.	29 sq. ft.	30 sq. ft.
12-14 inch	48 sq. ft.	29 sq. ft.	30 sq. ft.
16 inch plus	33 sq. ft.	19 sq. ft.	20 sq. ft.

AREA 7

General Description: This area is dominated by high quality northern hardwoods and is located in the central portion of the property. It lies at the base of a steep slope with deep, fertile soils due to decades of leaf litter falling onto this plateau. The average age of the trees in this area is 85 years. Access is good from the existing woods road to the wood sheds or Camels Hump Road. There are some drainage issues on the access roads that need to be fixed soon. The operability is good. The form of the trees is very good. The land slopes gradually to the west. This site will grow oyster, morel, bears head on beech, chicken of the woods on ash and turkey tail mushrooms, all of which FSF intends to steward and consciously harvest. This area should only be accessed under frozen or dry summer conditions with heavy equipment.

Forest Type: Northern Hardwoods **Plots Taken** - 18 **Trees/Acre**: 258

Natural Community Type: "Northern Hardwood Forest" by Lapin & Engstrom in 2005

Species Composition: Sugar maple 30%, white ash 17%, beech 16%, yellow birch 16%, paper birch 5%, black cherry 5%, red maple 4%.

Acres: 64.7 **Access Distance**: +/-1/4 mile **Stocking**: Just above A line

Total BA/AC: 117 **Acceptable BA/AC**: 69 **Mean Stand Diameter**: 9"

Site Class: I **Stand Age**: Two-aged

Soils: Peru - Marlow loam **Site Index** - 60

Saw timber Volumes/acre: 4,288 bd.ft./acre **Cordwood Volume/acre:** 22 cords/acre

Mushroom-Conk Production: The site should produce a high amount.

Stand History: Very little sign of any logging in the past.

Insects and Disease: Some maple borer damage

Wildlife Habitat: The open mature hardwood forest with little understory makes for very good habitat for turkey and black bear. Jack-in-the-Pulpit and maidenhair fern is abundant here, and is a favorite food of both turkey and black bear in the spring and summer.

Boundaries: N/A

Regeneration: Very limited sugar maple regeneration, not free to grow.

Primary Objectives: See Multi-Management Unit Applicable Recommendations, "Primary objectives" on page 62.

Management:
-Uneven-age management
-Single tree and group selection
-Group size will vary from 1/4 to 1/2 acre, and no more than 5% of the area will be harvested as groups. Maintain at 100 sq. ft. of basal area between groups.
-Cutting cycle of 20 years

- Cutting diameter objective 24” d.b.h. for sugar maple and ash, 16” d.b.h. for paper birch, red maple and aspen
- The openings will help regeneration get established. The goal of this work is to have a variety of sapling, pole and saw log size trees in this stand.

Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business. 2016 - Single tree and group selection system to remove low-quality firewood trees and high-quality sawtimber that meets diameter objectives. Reduce basal back to +/-100 sq. ft. Medium priority.

Residual Basal Area after cut: 100 sq. ft.

Species favored for retention and regeneration: Sugar maple, yellow birch and beech

Diameter Distribution

Diameter Range (2-inch D. class)	Current Total Basal Area(ft/acre)	Current Acceptable Basal Area (ft/acre)	Target Total Residual Basal Area (ft/acre)
6-10 inch	47 sq. ft.	28 sq. ft.	40 sq. ft.
12-14 inch	44 sq. ft.	26 sq. ft.	38 sq. ft.
16 inch plus	26 sq. ft.	15 sq. ft.	22 sq. ft.

AREA 8

General Description: This area is dominated by good quality mixed hardwoods and is located in the northeast portion of the property. It lies at the base of a steep slope to the south. This site will grow chaga on the birch trees, bear’s-head tooth and old man’s beard on beech, chicken of the woods on ash and oyster mushrooms, all of which FSF intends to steward and consciously harvest. Ramps and stinging nettle are also found in this area. The average age of the trees in this area is 75 years. Access is good from the existing woods road that leads to Camels Hump Road. The operability is good. The form of the trees is good. The land slopes gradually to the north. The aging birch in this stand are producing conks that have economic value, and are a crop that will harvested by FSF.

Forest Type: Northern Hardwoods **Plots Taken** - 26 **Trees/Acre**: 220

Natural Community Type: “Northern Hardwood Forest” by Lapin & Engstrom in 2005

Species Composition: Sugar maple 47%, white ash 13% red maple 11%, yellow birch 7%, American beech 6%, paper birch 6%, black cherry 4%. Aspen, hophornbeam, hemlock and serviceberry make up the remaining 6%.

Acres: 104.3 **Access Distance**: +/-1/4 mile **Stocking**: Above A line

Total BA/AC: 130 **Acceptable BA/AC**: 103 **Mean Stand Diameter**: 10”

Site Class: I **Stand Age**: Even-aged

Soils: Peru - Marlow loam **Site Index** - 60

Saw timber Volumes/acre: 7,106 bd.ft./acre **Cordwood Volume/acre:** 18 cords/acre

Mushroom-Conk Production: The site should produce a high amount.

Stand History: Some logging 30 years ago, and more recently firewood harvested for FSF's personal use.

Insects and Disease: Some maple borer damage

Wildlife Habitat: Very low in wildlife habitat value.

Boundaries: Property lines need to be blazed and painted.

Regeneration: Beech regeneration is common here, not free to grow due to low light conditions through lack of canopy openings.

Primary Objectives: See Multi-Management Unit Applicable Recommendations, "Primary objectives" on page 62.

Management:
-Uneven-age management
-Single tree and group selection
-Group size will vary from 1/4 to 1/2 acre, and no more than 5% of the area will be harvested as groups. Maintain at 100 sq. ft. of basal area between groups.
-Cutting cycle of 20 years
- Cutting diameter objective 20" d.b.h. for sugar maple, ash and yellow birch, 16" d.b.h. for paper birch, red maple and black cherry
- The openings will help regeneration get established. The goal of this work is to have a variety of sapling, pole and saw log size trees in this stand.

Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2016 - Blaze and paint property lines. High Priority
2017 - Single tree and group selection system to remove low-quality firewood trees and high-quality sawtimber that meets diameter objectives. Reduce basal back to +/-100 sq. ft. Medium priority.

Residual Basal Area after cut: 100 sq. ft.

Species favored for retention and regeneration: Sugar maple, yellow birch and beech

Diameter Distribution

Diameter Range (2-inch D. class)	Current Total Basal Area(ft/acre)	Current Acceptable Basal Area (ft/acre)	Target Total Residual Basal Area (ft/acre)
6-10 inch	36 sq. ft.	29 sq. ft.	28 sq. ft.
12-14 inch	51 sq. ft.	42 sq. ft.	40 sq. ft.
16 inch plus	43 sq. ft.	32 sq. ft.	32 sq. ft.

AREA 9

General Description: This area is located in the western portion of the property, and encompasses the western side of the property's height of land. It is dominated by sugar maple that were once tapped and part of the sugaring operation. There are some very large cull maple trees that are over 125 years old. These trees make excellent habitat for many species of birds, mammals and insects. This fertile site will grow oyster, bear's-head tooth and old man's beard on beech, chicken of the woods on ash, morels around sick ash trees, chaga on yellow birch and turkey tail on any dead tree, all of which FSF intends to steward and consciously harvest. Ramps and stinging nettle can be found growing in this area also. The average age of the trees in this area is 100 years old. Access is

good from the existing woods road that leads to driveway. The operability is good. The form of the trees is good. The land slopes to the north, east and west with the steepest ground on the western slope. Ledge outcroppings are common here.

Forest Type: Sugar Maple **Plots Taken** - 7 **Trees/Acre**: 238

Natural Community Type: "Rich Northern Hardwood Forest" by Lapin & Engstrom in 2005

Species Composition: Sugar maple 51%, beech 19%, white ash 6%, hophornbeam 8%, red maple 6%. Yellow birch, black cherry and basswood make up the remaining 9%.

Acres: 40.7 **Access Distance**: +/-1/4 mile **Stocking**: Above A line

Total BA/AC: 128 **Acceptable BA/AC**: 71 **Mean Stand Diameter**: 10"

Site Class: I - IV **Stand Age**: Two-aged

Soils: Lyman Marlow rocky loam **Site Index** - 50

Saw timber Volumes/acre: 4,012 bd.ft./acre **Cordwood Volume/acre:** 22 cords/acre

Mushroom-Conk Production: The site should produce a fair amount.

Stand History: No signs of recent logging. Old sugar bush.

Insects and Disease: Beech scale disease is killing beech trees here.

Wildlife Habitat: Large maple tree dens make this area high in wildlife habitat value; bats, birds, rodents, fisher, porcupine and bees will make these trees their home. Turkeys roost here, and deer and bear bed near the height of land because the nearby fields and apple trees provide them food.

Boundaries: Property line blazes are faded and need to be re-marked.

Regeneration: Beech regeneration is common here, not free to grow in many places due to lack of canopy openings.

Primary Objectives: See Multi-Management Unit Applicable Recommendations, "Primary objectives" on page 62.

Management:
-Uneven-age management
-Single tree and group selection
-Group size will vary from 1/4 to 1/2 acre, and no more than 5% of the area will be harvested as groups. Maintain at 100 sq. ft. of basal area between groups.
-Cutting cycle of 20 years
- Cutting diameter objective 24" d.b.h. for sugar maple, ash and yellow birch, 16" d.b.h. for beech
- The openings will help regeneration get established. The goal of this work is to have a variety of sapling, pole and saw log size trees in this stand.

Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business. 2016 - Blaze and paint property lines. High Priority

2020 - Single tree and group selection system to remove low-quality firewood trees and high-quality sawtimber that meets diameter objectives. Reduce basal back to +/-100 sq. ft. Medium priority.

Residual Basal Area after cut: 100 sq. ft.

Species favored for retention and regeneration: Sugar maple

Diameter Distribution

Diameter Range (2-inch D. class)	Current Total Basal Area(ft/acre)	Current Acceptable Basal Area (ft/acre)	Target Total Residual Basal Area (ft/acre)
6-10 inch	45 sq. ft.	25 sq. ft.	35 sq. ft.
12-14 inch	39 sq. ft.	22 sq. ft.	30 sq. ft.
16 inch plus	44 sq. ft.	24 sq. ft.	35 sq. ft.

AREA 10

General Description: This area is located in the west central portion of the property. It is dominated by both small and large sugar maples along with a mix of other hardwood species. This site will grow oyster mushrooms on dead hardwoods, bear's-tooth head and old man's beard on beech, chaga on birches, chanterelle, and turkey tail on dead wood, all of which FSF intends to steward and consciously harvest. The oldest trees in this uneven-aged stand are up to 100 years old. Access is good from the existing woods road that leads to driveway. The operability is good. The stand is relatively dense with a high volume of small diameter stems. The land slopes gradually to the northeast.

Forest Type: Sugar Maple **Plots Taken** - 16 **Trees/Acre**: 309

Natural Community Type: "Beech-Red Maple-Hemlock Northern Forest" by Lapin & Engstrom in 2005

Species Composition: Sugar maple 23%, paper birch 12%, white ash 11%, red maple 11%, yellow birch 10%, red spruce 9%, hophornbeam 6%. Black cherry, aspen, beech, serviceberry, striped maple, white pine and red pine make up the remaining 17%.

Acres: 47.0 **Access Distance**: +/-1/4 mile **Stocking**: Just below the A line

Total BA/AC: 116 **Acceptable BA/AC**: 70 **Mean Stand Diameter**: 8"

Site Class: I - IV **Stand Age**: Uneven-aged

Soils: Lyman Marlow stony loam **Site Index** - 50

Saw timber Volumes/acre: 2786 bd.ft./acre **Cordwood Volume/acre:** 18 cords/acre

Mushroom-Conk Production: The site should produce fair amount.

Stand History: No signs of recent logging. Old sugar bush.

Insects and Disease: Beech scale disease is killing beech trees here.

Wildlife Habitat: Numerous den trees make this area high in wildlife habitat value for many species.

Boundaries: Sections of wire fence, stonewall, old faded blazes and pink ribbon. Property lines need to be blazed and painted.

Regeneration: Beech regeneration is common here, not free to grow in many places due to lack of canopy openings.

Primary Objectives: See Multi-Management Unit Applicable Recommendations, "Primary objectives" on page 62.

Management:
-Uneven-age management
-Single tree and group selection
-Group size will vary from 1/4 to 1/2 acre, and no more than 5% of the area will be harvested as groups. Maintain at 100 sq. ft. of basal area between groups.
-Cutting cycle of 20 years
- Cutting diameter objective 24" d.b.h. for sugar maple, ash and yellow birch, 16" d.b.h. for beech
- The openings will help regeneration get established. The goal of this work is to have a variety of sapling, pole and saw log size trees in this stand.

Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2016 - Blaze and paint property lines. High Priority
2026 - Single tree and group selection system to remove low-quality firewood trees and high-quality sawtimber that meets diameter objectives. Reduce basal back to +/-100 sq. ft. Medium priority.

Residual Basal Area after cut: 100 sq. ft.

Species favored for retention and regeneration: Sugar maple

Diameter Distribution

Diameter Range (2-inch D. class)	Current Total Basal Area(ft/acre)	Current Acceptable Basal Area (ft/acre)	Target Total Residual Basal Area (ft/acre)
6-10 inch	61 sq. ft.	37 sq. ft.	53 sq. ft.
12-14 inch	35 sq. ft.	21 sq. ft.	30 sq. ft.
16 inch plus	20 sq. ft.	12 sq. ft.	17 sq. ft.

AREA 11

General Description: This area is located in the west central portion of the property. It is dominated by red spruce that have poor form, indicating open grown conditions. The oldest age of the trees in this area is up to 75 years. Access is good from the existing woods road that leads along the field towards the house. The operability is good. Pockets of mature spruce are beginning to tip over and will likely continue to do so due to wet soil conditions. This site will likely grow chanterelle mushrooms, chaga on birches, and turkey tail on dead wood, all of which FSF intends to steward and consciously harvest. Good site for black and raspberries. The land slopes gradually to the north.

Forest Type: Red Spruce **Plots Taken** - 7 **Trees/Acre**: 211

Natural Community Type: "Northern Hardwood Forest" by Lapin & Engstrom in 2005

Species Composition: Red spruce 42%, red maple 17%, yellow birch 14%, hophornbeam 6%, paper birch 5%, white ash 5%. Elm, black cherry, aspen, serviceberry, sugar maple and white pine make up the remaining 11%.

Acres: 42.6 **Access Distance**: +/-1/4 mile **Stocking**: Between A & B line

Total BA/AC: 94 **Acceptable BA/AC**: 46 **Mean Stand Diameter**: 9”

Site Class: I-IV **Stand Age**: Two-aged

Soils: Lyman marlow & Peru loam **Site Index** - 50-60

Saw timber Volumes/acre: 1791 bd.ft./acre **Cordwood Volume/acre:** 17 cords/acre

Mushroom-Conk Production: The site should produce a high amount.

Stand History: No signs of recent logging.

Insects and Disease: Red spruce are showing signs of red rot and beginning to tip over.

Wildlife Habitat: Dense pockets of spruce provide exceptional cover for a variety of wildlife species, especially ruffed grouse and snowshoe hare. The moose have peeled some striped maple in this area during the winter months.

Boundaries: N/A

Regeneration: White ash, red maple, beech and some red spruce, not free to grow in many places.

Primary Objectives: The primary objectives for managing this area are: (1) development of old-growth forest features for mushroom production; (2) wildlife habitat enhancement; and (3) timber management to maintain red spruce forest types by promoting regeneration using even-age management.

Management:
-Even-age management
-Group selection or patch cuts; no cutting between patches
-Rotation age of 100 years

Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2026 - Two – One-acre patch cuts to promote black and raspberries, no other harvesting at this time. Locations will be determined during the time of marking, mapped and sent to the county forester. Medium priority.
No timber harvesting during this time due to age of stand.

Species favored for retention and regeneration: Red spruce

AREA 12

General Description: This area is located in the north central portion of the property. It is dominated by pole sized pioneer species, and was previously open land. This site will likely grow oyster mushrooms and chaga in the years to come. The average age of the trees in this area is a young 20 years. Access is good from the existing woods road shown on the map. The operability is

good but winter logging is recommended because of wet seeps. Deer and grouse are using the cover of the dense pole sized trees for cover throughout the spring, summer and fall.

Forest Type: Pioneer Species **Plots Taken** - 4 **Trees/Acre**: 482

Natural Community Type: "Wet - Mesic Mixed Forest" by Lapin & Engstrom in 2005

Species Composition: Paper birch 46%, aspen 30%, red maple 12%, yellow birch 9%, ash 3%.

Acres: 10.0 **Access Distance**: +/-1/4 mile **Stocking**: Between A & B line

Total BA/AC: 82 **Acceptable BA/AC**: 80 **Mean Stand Diameter**: 6"

Site Class: I **Stand Age**: Even-aged

Soils: Peru and Marlow **Site Index** - 60

Saw timber Volumes/acre: n/a **Cordwood Volume/acre:** n/a

Mushroom-Conk Production: The site should produce a fair amount.

Stand History: This area was previously cleared and has reverted back to forestland.

Insects, Damage and Disease: Pockets of tall, vigorous growing trees are bent over from ice accumulation during the past winter.

Wildlife Habitat: Many species of wildlife use the densely stocked saplings and poles for cover here. Grouse feed on the buds of the aspen.

Boundaries: N/A

Regeneration: Many of the stems in this stand would be considered regeneration.

Primary Objectives: See Multi-Management Unit Applicable Recommendations, "Primary objectives" on page 62.

Management:
-Uneven-age management
-Single tree and group selection
-Group size will vary from 1/4 to 1/2 acre, and no more than 5% of the area will be harvested as groups. Maintain at 100 sq. ft. of basal area between groups.
-Cutting cycle of 20 years
- Cutting diameter objective 24" d.b.h. for sugar maple, ash and yellow birch, 16" d.b.h. for beech
- The openings will help regeneration get established. The goal of this work is to have a variety of sapling, pole and saw log size trees in this stand.

Scheduled Treatment: No treatment at this time due to the young age of the stand.

Diameter Distribution

Diameter Range (2-inch D. class)	Current Total Basal Area(ft/acre)	Current Acceptable Basal Area (ft/acre)	Target Total Residual Basal Area (ft/acre)
6-10 inch	75 sq. ft.	73 sq. ft.	sq. ft.
12-14 inch	7 sq. ft.	7 sq. ft.	sq. ft.
16 inch plus	- sq. ft.	- sq. ft.	sq. ft.

AREA 13

General Description: This area is located in the east central portion of the property. It is dominated by sugar maple and makes up the largest stand on the property. This site will grow oyster mushrooms on dead hardwoods, bear's-tooth head and old man's beard on beech, chaga on birches, chanterelle, and turkey tail on deadwood. Ramps and stinging nettle are also found in this area. FSF intends to steward and consciously harvest these wild mushrooms and perennial greens. The oldest trees in this stand are up to 110 years. Access is good from established woods roads to enter the stand but more roads will need to be constructed. The operability is fair to poor due to steep slopes and ledge outcroppings. The form of the trees is good. The land slopes to the west and northwest.

Forest Type: Northern Hardwoods **Plots Taken** - 37 **Trees/Acre**: 171

Natural Community Type: "Rich Northern Hardwood Forest" by Lapin & Engstrom in 2005

Species Composition: Sugar maple 81%, beech 8%, yellow birch 5%. Hophornbeam, basswood, butternut, ash, paper birch, red maple and striped maple make up the remaining 6%

Acres: 168.9 **Access Distance**: +/-1/4 mile **Stocking**: Between A & B line

Total BA/AC: 111 **Acceptable BA/AC**: 72 **Mean Stand Diameter**: 11"

Site Class: I-IV **Stand Age**: Even-aged

Soils: Lyman-Marlow **Site Index** - 50-60

Saw timber Volumes/acre: 5397 bd.ft/acre **Cordwood Volume/acre:** 18 cords/acre

Mushroom-Conk Production: The site should produce huge amounts due to the size.

Stand History: Logging occurred many years ago as indicated from old woods roads and patch cuts, but stumps have rotted away.

Insects and Disease: Beech scale disease is killing beech trees here, eutypella cankers and maple borer damage are present in this stand.

Wildlife Habitat: Large den trees make this area high in wildlife habitat value. Maintain 4-5 per acre.

Boundaries: N/A

Regeneration: Beech regeneration is common here, not free to grow in many places.

Primary Objectives: See Multi-Management Unit Applicable Recommendations, "Primary objectives" on page 62.

Management:
-Uneven-age management
-Single tree and group selection
-Group size will vary from 1/4 to 1/2 acre, and no more than 5% of the area will be harvested as groups. Maintain at 100 sq. ft. of basal area between groups.
-Cutting cycle of 20 years
- Cutting diameter objective 24" d.b.h. for sugar maple, ash and yellow birch, 16" d.b.h. for beech
- The openings will help regeneration get established. The goal of this work is to have a variety of sapling, pole and saw log size trees in this stand.

Scheduled Treatment: 2015 - 2030 - Harvest mushrooms & conks annually for the farm business. 2023 - Single tree and group selection system to remove low-quality firewood trees and high-quality sawtimber that meets diameter objectives. Reduce basal back to +/-100 sq. ft. Medium priority.

Species favored for retention and regeneration: Sugar maple, yellow birch and ash

Residual Basal Area after cut: 100 sq. ft.

Diameter Distribution

Diameter Range (2-inch D. class)	Current Total Basal Area(ft/acre)	Current Acceptable Basal Area (ft/acre)	Target Total Residual Basal Area (ft/acre)
6-10 inch	29 sq. ft.	18 sq. ft.	26 sq. ft.
12-14 inch	41 sq. ft.	27 sq. ft.	37 sq. ft.
16 inch plus	41 sq. ft.	27 sq. ft.	37 sq. ft.

AREA 14

General Description: This area is located in the southwestern portion of the property. It is dominated by red maple and aspen. The oldest trees in this stand are up to 60 years. Access is good from established woods roads that lead from the house along the field. This site will grow oyster mushrooms on dead hardwoods, chaga on birches, chanterelle, and turkey tail on dead wood, all of which FSF intends to steward and consciously harvest. The operability is good in most areas, but wet spots do exist that must be taken into consideration. The form of the trees is fair to poor, and softwoods show an open grown form with large lower limbs. The land slopes gently to the east.

Forest Type: Mixed Woods **Plots Taken** - 5 **Trees/Acre**: 228

Natural Community Type: "Northern Hardwood Forest" by Lapin & Engstrom in 2005

Species Composition: Red maple 22%, aspen 22%, paper birch 12%, red spruce 12%, beech 12%, black cherry 8%, white ash 8%, white pine 4%.

Acres: 21.7 **Access Distance**: +/-1/4 mile **Stocking**: Between A & B line

Total BA/AC: 101 **Acceptable BA/AC**: 48 **Mean Stand Diameter**: 9"

Site Class: II **Stand Age**: Two-aged

Soils: Lyman-Marlow **Site Index** - 60

Saw timber Volumes/acre: 1637 bd.ft/acre **Cordwood Volume/acre:** 19 cords/acre

Mushroom-Conk Production: The site should produce a good amount.

Stand History: This area was previously open land approximately 60 years ago. There are no signs of any logging.

Insects and Disease: Red spruce are blowing over due to wet slopes and paper birch is declining.

Wildlife Habitat: Ruffed grouse feed on the aspen buds.

Boundaries: Old blazes are present, painting the lines again is recommended.

Regeneration: White ash, sugar maple and beech, not free to grow in many places.

Primary Objectives: The primary objectives for managing this area are: (1) development of old-growth forest features for mushroom production; (2) wildlife habitat enhancement; and (3) timber management to support a variety of habitat and stand structure.

Management:
-Even-age management
-Patch cuts, from 1 to 2 acres and no more than 5% of the area will be harvested as patches; no cutting between patches.
-Rotation age of 60 years
- These opening will help regeneration to get established. The goal of this work is to have a variety of habitat and stand structure in this stand.

Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2016 - Blaze and paint property lines. High Priority
2025 - Aspen patch cuts: Two patch cuts 1-2 acres in size in areas of mature aspen to encourage regeneration and wildlife habitat. These will be mapped and sent to the county forester for approval before they are cut. Medium priority.

Species favored for regeneration: Aspen

AREA 15

General Description: This area is located in the central portion of the property, along the eastern edge of an open/idle agricultural field. It was previously cleared, and is now composed of a variety of hardwood saplings and poles that are all around 20 years. Access is good from established woods roads. The operability is good in most portions of the stand, but wet areas are present. The form of the trees is good. The land slopes gradually to the north. Trees in this area are too small to inventory, and currently not producing many mushrooms due to their young age.

Forest Type: Regenerating Hdwds **Plots Taken** - N/A **Trees/Acre**: +/- 800

Natural Community Type: “Beech-Red Maple-Hemlock Northern Hardwood Forest” by Lapin & Engstrom in 2005

Species Composition: Paper birch 20%, red maple 20%, pin cherry 20%, black cherry 15%, yellow birch 10%, white ash 10%, grey birch 5%.

Acres: 8.5 **Access Distance**: +/-1/4 mile **Stocking**: Well stocked

Total BA/AC: - **Acceptable BA/AC**: - **Mean Stand Diameter**: 4”

Site Class: I **Stand Age**: Even-aged

Soils: Lyman-Marlow **Site Index** - 60

Saw timber Volumes/acre: N/A **Cordwood Volume/acre:** N/A

Mushroom-Conk Production: The site should produce a good amount in the future.

Stand History: This area reverted back to forest approximately 20 years ago.

I**nsects and Disease**: No insect or disease damage was noted.

Wildlife Habitat: Aspen buds provide an important food source for grouse. Dense saplings and poles provide cover and protection for many wildlife species.

Boundaries: N/A

Regeneration: Much of this stand would be considered regeneration.

Primary Objectives: See Multi-Management Unit Applicable Recommendations, “Primary objectives” on page 62.

Management:
-Uneven-age management
-Single tree and group selection
-Group size will vary from 1/4 to 1/2 acre, and no more than 5% of the area will be harvested as groups. Maintain at 100 sq. ft. of basal area between groups.
-Cutting cycle of 20 years
- Cutting diameter objective 24” d.b.h. for sugar maple, ash and yellow birch, 16” d.b.h. for beech
- The openings will help regeneration get established. The goal of this work is to have a variety of sapling, pole and saw log size trees in this stand.

Scheduled Treatment: No treatment due to the age and stocking levels.

AREA 16

General Description: This area is located in the south central portion of the property, along the southern edge of an open/idle agricultural field and just north of Trapp Road. It is dominated by a variety of hardwoods with softwood cover along the streams. The oldest trees in this stand are up to 65 years. This site will likely grow oyster mushrooms on dead hardwoods, chaga on birches, and turkey tail on dead wood, all of which FSF intends to steward and consciously harvest. Access is good from established woods roads either from the field or from Trapp Road. The operability and access are both good, but winter logging is recommended because of some wet areas. The land slopes to the west and south. Red maple and white pine form is poor, while the remaining stand has many high quality stems. Very poor firewood in this area.

Forest Type: Mixed Hardwoods **Plots Taken** - 7 **Trees/Acre**: 374

Natural Community Type: “Sugar Maple-Ash-Jack in the Pulpit Northern Hardwood Forest” by Lapin & Engstrom in 2005

Species Composition: Red maple 30%, black cherry 23%, paper birch 13%, yellow birch 13%, beech 8%, sugar maple 7%. Aspen, white ash and white pine make up the remaining 9%.

Acres: 40.6 **Access Distance**: +/-1/4 mile **Stocking**: At the A line

Total BA/AC: 124 **Acceptable BA/AC**: 77 **Mean Stand Diameter**: 8”

Site Class: II **Stand Age**: Even-aged

Soils: Peru/Marlow sandy loam **Site Index** - 60

Saw timber Volumes/acre: 2110 bd.ft/acre **Cordwood Volume/acre:** 20 cords/acre

Mushroom-Conk Production: The site should produce a fair amount.

Stand History: This area does not show any indication of past logging. Formerly pasture land in the 1800’s.

Insects and Disease: Many of the red maples are of low quality and have grown in clumps, further reducing quality as they grow.

Wildlife Habitat: Apple trees growing in this area provide an important food source for many wildlife species.

Boundaries: Faded blazes that need to be remarked and sections of town road.

Regeneration: Sugar maple, red maple, striped maple and beech are frequent here but are not free to grow in many places.

Primary Objectives: See Multi-Management Unit Applicable Recommendations, “Primary objectives” on page 62.

Management:
-Uneven-age management
-Single tree and group selection
-Group size will vary from 1/4 to 1/2 acre, and no more than 5% of the area will be harvested as groups. Maintain at 75 sq. ft. of basal area between groups.
-Cutting cycle of 20 years
- Cutting diameter objective 24” d.b.h. for sugar maple, black cherry, ash and yellow birch, 16” d.b.h. for beech, red maple and paper birch
- The openings will help regeneration get established. The goal of this work is to have a variety of sapling, pole and saw log size trees in this stand.

Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2016 - Blaze and paint property lines. High Priority
2019 - Single tree and group selection system to remove low-quality firewood trees and high-quality sawtimber that meets diameter objectives. Reduce basal back to +/- 75 sq. ft. Medium priority.

Residual Basal Area after cut: 75 sq. ft.

Species favored for retention and regeneration: Black cherry and yellow birch

Diameter Distribution

Diameter Range (2-inch D. class)	Current Total Basal Area(ft/acre)	Current Acceptable Basal Area (ft/acre)	Target Total Residual Basal Area (ft/acre)
6-10 inch	71 sq. ft.	44 sq. ft.	42 sq. ft.
12-14 inch	31 sq. ft.	19 sq. ft.	19 sq. ft.
16 inch plus	22 sq. ft.	14 sq. ft.	14 sq. ft.

AREA 17

General Description: This area is located in the south eastern portion of the property, just north of Trapp Road. It dominated by a mix of hardwoods that are fair to poor quality. This site will grow oyster mushrooms on dead hardwoods, bear's-head tooth and old man's beard on beech, chaga on birches, chanterelle, turkey tail on deadwood, all of which FSF intends to steward and consciously harvest. The oldest trees in this stand are up to 100 years. Access to this area needs to be improved, but wet areas limit operability to winter logging. Trees are of moderate to low quality, and wet seeps have reduced vigor in many places. The majority of the land slopes to the southwest.

Forest Type: Mixed Hardwoods **Plots Taken** - 10 **Trees/Acre**: 278

Natural Community Type: "Sugar Maple-Ash-Jack in the Pulpit Northern Hardwood Forest" by Lapin & Engstrom in 2005

Species Composition: Red maple 24%, beech 23%, sugar maple 16%, yellow birch 11%, white ash 10%, hemlock 6%, hophornbeam 5%. Basswood, paper birch, black cherry and red spruce make up the remaining 5%.

Acres: 22.3 **Access Distance**: +/-1/4 mile **Stocking**: At the A line

Total BA/AC: 127 **Acceptable BA/AC**: 67 **Mean Stand Diameter**: 9"

Site Class: I **Stand Age**: Two-aged

Soils: Peru stony loams **Site Index** - 60

Saw timber Volumes/acre: 3925 bd.ft/acre **Cordwood Volume/acre:** 20 cords/acre

Mushroom-Conk Production: The site should produce a good amount.

Stand History: Logging has occurred +/- 40 years ago as indicated from old woods roads.

Insects and Disease: Beech bark disease has caused many of the beech to decline.

Wildlife Habitat: American beech produce mast that is desired by most wildlife species ranging from bear and deer to squirrels and forest birds.

Boundaries: N/A

Regeneration: Beech regeneration is common here, not free to grow in many places.

Primary Objectives: See Multi-Management Unit Applicable Recommendations, "Primary objectives" on page 62.

Management:
-Uneven-age management
-Single tree and group selection
-Group size will vary from 1/4 to 1/2 acre, and no more than 5% of the area will be harvested as groups. Maintain at 80 sq. ft. of basal area between groups.
-Cutting cycle of 20 years
- Cutting diameter objective 24" d.b.h. for sugar maple, black cherry, ash and yellow birch, 16" d.b.h. for beech, red maple and paper birch
- The openings will help regeneration get established. The goal of this work is to have a variety of sapling, pole and saw log size trees in this stand.

Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business. 2029 - Single tree and group selection system to remove low-quality firewood trees and high-quality sawtimber that meets diameter objectives. Reduce basal back to +/-80 sq. ft. Medium priority.

Residual Basal Area after cut: 80 sq. ft.

Species favored for retention and regeneration: Yellow birch, sugar maple and ash

Diameter Distribution

Diameter Range (2-inch D. class)	Current Total Basal Area(ft/acre)	Current Acceptable Basal Area (ft/acre)	Target Total Residual Basal Area (ft/acre)
6-10 inch	48 sq. ft.	26 sq. ft.	30 sq. ft.
12-14 inch	46 sq. ft.	24 sq. ft.	29 sq. ft.
16 inch plus	33 sq. ft.	17 sq. ft.	21 sq. ft.

AREA 18

General Description: This area is located in the southern portion of the property, south of and abutting Trapp Road. It is dominated by hemlock, with a mix of hardwoods scattered throughout. This site will grow oyster on dead hardwoods, chanterelle around softwoods, reishi on hemlocks, chaga on birches, and turkey tail mushrooms on any deadwood, all of which FSF intends to steward and consciously harvest. The oldest trees in this stand are around 75 years. Access is good from Trapp Road, but woods roads need to be established. The operability is good in most places, but streams and wet spots are present. The form of the trees range from good in the younger age class to poor for the older stems. Much of the land slopes to the west.

Forest Type: Hemlock **Plots Taken** - 10 **Trees/Acre**: 267

Natural Community Type: "Hemlock-Northern Hardwoods Forest" by Lapin & Engstrom in 2005

Species Composition: Hemlock 25%, sugar maple 15%, white ash 14%, yellow birch 14%, red maple 12%, paper birch 7%, American beech 5%. Black cherry, aspen and red spruce make up the remaining 8%.

Acres: 19.0 **Access Distance**: +/-1/4 mile **Stocking**: Between A & B line

Total BA/AC: 102 **Acceptable BA/AC**: 60 **Mean Stand Diameter**: 8.5"

Site Class: II **Stand Age**: Two-aged

Soils: Peru stony loams **Site Index** - 60

Saw timber Volumes/acre: 2781 bd.ft/acre **Cordwood Volume/acre:** 16 cords/acre

Mushroom-Conk Production: The site should produce a good amount.

Stand History: This area was last logged approximately 30 years ago.

Insects and Disease: No serious problems noted.

Wildlife Habitat: Pockets of pure hemlock provide bedding areas for deer, especially in the early winter months.

Boundaries: Sections of stonewall and town road

Regeneration: Beech and spruce regeneration is common here, not free to grow in many places.

Primary Objectives: The primary objectives for managing this area are: (1) development of old-growth forest features for mushroom production; (2) wildlife habitat enhancement; and (3) timber management to begin a new generation of trees in an effort to maintain hemlock forest types.

Management:
-Even-age management
-Group selection or patch cuts; no cutting between patches
-Rotation age of 150 years

Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2016 - Blaze and paint property lines. High Priority.
No timber harvesting during this time due to low basal area.

Species favored for retention and regeneration: Hemlock

AREA 19

General Description: This area is located in the southeastern portion of the property. It is dominated by high-quality sugar maple and is located in the southeast portion of the property. This site will grow oyster mushrooms on dead hardwoods, bear's head-tooth and old man's beard on beech, chaga on birches, chanterelle, and turkey tail on deadwood, all of which FSF intends to steward and consciously harvest. The oldest trees in this stand are up to 110 years. Access is good from old woods roads, but some work will need to be done to improve them. Numerous white ash should produce morel mushrooms in years to come. The operability is fair in most portions, but some steep slopes, boulders and ledge outcroppings may limit machinery in all areas of the stand. The form of the trees is excellent. The land slopes to the west.

Forest Type: Northern Hardwoods **Plots Taken** - 6 **Trees/Acre**: 209

Natural Community Type: "Rich Northern Hardwood Forest" by Lapin & Engstrom in 2005

Species Composition: Sugar maple 63%, white ash 15%, American beech 7%, yellow birch 6%, hophornbeam 6%. Black cherry and red maple make up the remaining 3%.

Acres: 23.5 **Access Distance**: +/-1/4 mile **Stocking**: At the A line

Total BA/AC: 121 **Acceptable BA/AC**: 67 **Mean Stand Diameter**: 10.5"

Site Class: I **Stand Age**: Two-aged

Soils: Lyman-Marlow **Site Index** - 55

Saw timber Volumes/acre: 5896 bd.ft/acre **Cordwood Volume/acre:** 19 cords/acre

Mushroom-Conk Production: The site should produce a good amount.

Stand History: Logging has occurred approximately 25 years ago as indicated from old woods roads and a few remaining rotten stumps.

Insects and Disease: Beech bark disease is killing beech trees here, eutypella cankers and maple borer damage is present in this stand.

Wildlife Habitat: Large maple den trees make this area high in wildlife habitat value.

Boundaries: Faded blazes, painting these lines again is recommended.

Regeneration: Regeneration is very limited in this stand.

Primary Objectives: See Multi-Management Unit Applicable Recommendations, “Primary objectives” on page 62.

Management:
-Uneven-age management
-Single tree and group selection
-Group size will vary from 1/4 to 1/2 acre, and no more than 5% of the area will be harvested as groups. Maintain at 100 sq. ft. of basal area between groups.
-Cutting cycle of 20 years
- Cutting diameter objective 24” d.b.h. for sugar maple, black cherry, ash and yellow birch, 16” d.b.h. for beech, red maple and paper birch
- The openings will help regeneration get established. The goal of this work is to have a variety of sapling, pole and saw log size trees in this stand.

Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2016 - Blaze and paint property lines. High Priority
2021 - Single tree and group selection system to remove low-quality firewood trees and high-quality sawtimber that meets diameter objectives. Reduce basal back to +/-100 sq. ft. Medium priority.

Residual Basal Area after cut: 100 sq. ft.

Species favored for retention and regeneration: Sugar maple and ash.

Diameter Distribution

Diameter Range (2-inch D. class)	Current Total Basal Area(ft/acre)	Current Acceptable Basal Area (ft/acre)	Target Total Residual Basal Area (ft/acre)
6-10 inch	37 sq. ft.	21 sq. ft.	31 sq. ft.
12-14 inch	30 sq. ft.	17 sq. ft.	25 sq. ft.
16 inch plus	54 sq. ft.	29 sq. ft.	44 sq. ft.

AREA 20

General Description: This area is located in the southern portion of the property, and it bisected by Trapp Road. It is dominated by red maple and birches. The oldest trees in this stand are up to 50 years. This site will grow oyster mushrooms on dead hardwoods, bear's-head tooth and old man's beard on beech, chaga on birches, chanterelle, and turkey tail on dead wood, all of which FSF intends to steward and consciously harvest. Access is good from established woods roads to enter the stand. The operability is fair to poor due to very wet soils. The form of the trees is very poor. Much of land slopes to the north.

Forest Type: Mixed Hardwoods **Plots Taken** - 12 **Trees/Acre**: 228

Natural Community Type: "Wet-mesic Mixed Forest" by Lapin & Engstrom in 2005

Species Composition: Red maple 43%, beech 12%, aspen 8%, sugar maple 6%. Black cherry, white pine, yellow birch, red spruce make up the remaining 14%.

Acres: 42.8 **Access Distance**: +/-1/2 mile **Stocking**: B Line

Total BA/AC: 90 **Acceptable BA/AC**: 36 **Mean Stand Diameter**: 8.5"

Site Class: 3 **Stand Age**: Two-aged

Soils: Duanne and Deerfield, Colton **Site Index** - 55

Saw timber Volumes/acre: 1,687 bd.ft/acre **Cordwood Volume/acre:** 15 cords/acre

Mushroom-Conk Production: The site should produce a fair amount.

Stand History: Logging occurred 25-30 years ago as indicated from old woods roads and stumps have rotted away.

Insects and Disease: Beech scale disease is killing beech trees here.

Wildlife Habitat: Moose have peeled maples in the past in this area

Boundaries: Marks are faded between GPS points 17 and 19. They should be remarked.

Regeneration: Red maple regeneration is common here.

Primary Objectives: See Multi-Management Unit Applicable Recommendations, "Primary objectives" on page 62.

Management:
-Uneven-age management
-Single tree and group selection
-Group size will vary from 1/4 to 1/2 acre, and no more than 5% of the area will be harvested as groups. Maintain at 100 sq. ft. of basal area between groups.
-Cutting cycle of 20 years
- Cutting diameter objective 24" d.b.h. for sugar maple, black cherry, ash and yellow birch, 12" d.b.h. for beech, red maple and paper birch

- The openings will help regeneration get established. The goal of this work is to have a variety of sapling, pole and saw log size trees in this stand.

Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2016 - Blaze and paint property lines. High Priority
No treatment in this area during this period due to low basal area.

Species favored for retention and regeneration: Red Maple, yellow and white birch.

AREA 21

General Description: This area is located in the southern portion of the property, just north of Trapp Road. It is dominated by paper birch. This was formerly pasture land in the 1800's and early 1900's. This site will grow oyster mushrooms on dead hardwoods, chaga on birches, chicken of woods on cherry trees, and turkey tail on deadwood, all of which FSF intends to steward and consciously harvest. The average age of the trees in this stand is 50 years. Access is good from Trapp Road. The operability is good. The form of the trees is good. The land slopes to the west and southwest.

Forest Type: Paper Birch **Plots Taken** - 8 **Trees/Acre**: 335

Natural Community Type: "Northern Hardwoods Forest" by Lapin & Engstrom in 2005

Species Composition: Paper birch 23%, yellow birch 18%, sugar maple 18%, white ash 9%, black cherry 9%, red maple 9%. Basswood, aspen, service berry, eastern hemlock and red spruce make up the remaining 6%.

Acres: 21.1 **Access Distance**: +/-1/4 mile **Stocking**: A line

Total BA/AC: 138 **Acceptable BA/AC**: 88 **Mean Stand Diameter**: 8.7"

Site Class: 1 **Stand Age**: Two-aged

Soils: Peru stony loams **Site Index** - 60

Saw timber Volumes/acre: 2,863 bd.ft/acre **Cordwood Volume/acre:** 24 cords/acre

Mushroom-Conk Production: The site should produce a good amount.

Stand History: Logging has occurred many years ago as indicated from old woods roads and patch cuts but stumps have rotted away.

Insects and Disease: Mortality in the birch tops likely due to old age and bronze birch borer.

Wildlife Habitat: Very little good habitat here. Any type of harvesting in this area would improve it.

Boundaries: Faded marks that need to be remarked.

Regeneration: Beech, ash, birch regeneration is common here, not free to grow in many places.

Primary Objectives: See Multi-Management Unit Applicable Recommendations, "Primary objectives" on page 62.

Management:
-Uneven-age management
-Single tree and group selection
-Group size will vary from 1/4 to 1/2 acre, and no more than 5% of the area will be harvested as groups. Maintain at 100 sq. ft. of basal area between groups.
-Cutting cycle of 20 years
- Cutting diameter objective 24" d.b.h. for sugar maple, black cherry, ash and yellow birch, 12" d.b.h. for beech, red maple and paper birch
- The openings will help regeneration get established. The goal of this work is to have a variety of sapling, pole and saw log size trees in this stand.

Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2016 - Blaze and paint property lines. High Priority
2020 - Single tree and group selection system to remove low-quality firewood trees and high-quality sawtimber that meets diameter objectives. Reduce basal back to +/-100 sq. ft. Medium priority.

Residual Basal Area after cut: 100 sq. ft.

Species favored for retention and regeneration: Sugar maple, black cherry and yellow birch

Diameter Distribution

Diameter Range (2-inch D. class)	Current Total Basal Area(ft/acre)	Current Acceptable Basal Area (ft/acre)	Target Total Residual Basal Area (ft/acre)
6-10 inch	78 sq. ft.	50 sq. ft.	56 sq. ft.
12-14 inch	30 sq. ft.	19 sq. ft.	22 sq. ft.
16 inch plus	30 sq. ft.	19 sq. ft.	22 sq. ft.

ESTA 1
Riparian Area

General Description: ESTA 1 is comprised of three separate, discontiguous areas: (1) northern ESTA 1 follows Brush Brook, which is essentially the property's northern boundary; (2) southern ESTA 1 follows Cobb Brook, which is the property's southern boundary; and (3) south central ESTA 1 follows an interior stream, which extends from the property's eastern boundary north of Trapp Road all the way to its western boundary south of Trapp Road. All three waterways drain into the Huntington River.

Characteristics of the ESTA 1 riparian areas that make them ecologically inappropriate sites for timber harvesting include steep banks, highly erodible soils, use as prime terrestrial wildlife travel corridors, critical wildlife wintering habitat, adjacent proximity to and support of ESTA 2 Natural Community, Montane Spruce-Fir Forest, ESTA 3 Natural Community, Montane Yellow Birch-Sugar Maple-Red Spruce Forest, and ESTA 4 Forested Wetland, and poor access and operability due to a long skid (especially to reach the south central and southern ESTA's) and necessary stream crossings with steep stream banks and steep slopes. Timber management would threaten these values, undermining the ability of ESTA 1 to protect channel-forming processes and channel stability, and therefore does not make economic or ecological sense in ESTA 1.

ESTA 1 is dominated by even-aged hemlocks that average 85 years old. Hemlocks in the northeast have been known to live up to 400 years, and provide good cover their entire life. They are very shade tolerant trees, and we have found healthy 100 year old hemlocks that are only 8" in diameter growing in the under story. They can, however, take off and grow at a normal rate if a tree blows

over near them and the canopy opens up. In the northeast, hemlock trees are the sole species to support the growth of reishi mushrooms, which have high economic value for their documented medicinal qualities as well as being sought after for their culinary contribution. ESTA 1 areas are the most prolific reishi mushroom growing areas on the property, and in the absence of timber harvests will be managed to optimize wildlife habitat, soil health, water quality, and the long-term health and growth of this high-value non-timber forest product. ESTA 1's conditions also support the growth of chaga on birches, chanterelle, and turkey tail on deadwood, all providing an economic resource without harvesting the hemlocks and other species that grow on this site. In addition to mushroom production, portions of ESTA 1 feature abandoned, overgrown apple orchards that FSF intends to release as part of its development of apple products, which already include barrel-aged apple balsamic vinegar, apple cider vinegar, barrel and carboy-aged hard cider, apple juice, and apple sauce.

Forest Type: Hemlock **Trees/Acre**: 121

Natural Community Type: "Hemlock-Northern Hardwoods Forest" by Lapin & Engstrom in 2005

Tree Species Composition: Hemlock 58%, sugar maple 30%, yellow birch 7%. American beech, elm, black cherry, aspen, white pine, white ash, paper birch, red spruce, red maple, striped maple and hophornbeam make up the remaining 5%.

Acres: 170.7 **Access Distance**: +/-1/4 to +/-3/4 mile **Stocking**: Between A & B line

Total BA/AC: 154 **Acceptable BA/AC**: 102 **Mean Stand Diameter**: 9"

Site Class: I & II **Stand Age**: Even-Aged

Soils: Lyman-Marlow, Peru & Colton, Peru Stony Loams

Stand History: Small pockets of timber where harvested by past owners 30 years ago.

Mushroom-Conk Production: The site should produce a good amount.

Insects and Disease: Some red rot in the spruce that is noted by the pitch dripping from the branch stubs, beech bark disease, eutypella cankers and maple borer.

Wildlife Habitat: Critical deer and turkey wintering habitat, American beech produce mast desired by most wildlife species, small forest songbirds use the rigid yellow birch leaves as perches while catching and eating insects.

Boundaries: Streams, stonewalls, old blazes, and town roads.

Regeneration: Varies throughout the stand. Some sections have established regeneration but some have very little due to the dense canopy. Red Spruce, hemlock, beech, striped maple and yellow birch make up the majority of the regeneration.

Primary Objectives: The primary objectives for managing this area are: (1) development of old-growth forest features for mushroom production; (2) wildlife habitat enhancement; and (3) release of apple trees. The stand objectives fulfill overall management objectives to maintain biological diversity and ecosystem services.

Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2016 - Blaze and paint property lines. High Priority.
2016 - 2030 - Release apple trees by cutting or girdling trees shading them. Medium priority.
No timber management treatment in this area during this period due to designation as an ESTA.

ESTA 2
Natural Community, Montane Spruce-Fir Forest

General Description: ESTA 2 is located in the east central portion of the property, just below the height of land. It is largely surrounded by ESTA 3, described below.

According to Eric Sorensen, *Community Ecologist, Natural Heritage Inventory, Vermont Fish and Wildlife Department*, ESTA 2's rarity rank (S1-S5, describes the rarity of natural community types) is S3, or "uncommon" in Vermont. Its elemental occurence rank (A-D, describes the relative condition and quality of individual examples of a natural community) is A, and it is one of the best examples known in Vermont.

The 2005 Lapin & Engstrom ecological report, which summarizes the men's natural community inventory, assessment, and preliminary mapping, describes ESTA 2 this way, "M*ontane Spruce-Fir Forest is the natural community that clothes the spine of the Green Mountains, and small patches also cover some of the lower sub-summits, as is the case on the Teal Farm. The highest prominence of the property at 2,280' is just one such sub-summit. The 25 acre patch of high-elevation forest features a thicket of red spruce, balsam fir, and paper birch, amongst numerous blown-down trees. As is characteristic of the natural community, mountain-ash is an occasional small tree and skunk currant is a frequent low shrub. The herb layer, similar to the montane mixed forest…includes a few species. The most common are wood-sorrel, bluebead lily, mountain wood fern, Canada mayflower, goldthread, bunchberry dogwood, and starflower. Moss covers much of the ground, with Schreber's and haircap mosses the two common species.*"

Characteristics of ESTA 2 that make it an ecologically inappropriate site for timber harvesting include shallow soils, high winds — trees rely on each other for support on this windy site, critical habitat for moose, black bear, and coyote - including early-spring food source and winter bedding area, steep topography, adjacent proximity to and support of ESTA 3, Natural Community, Montane Yellow Birch-Sugar Maple-Red Spruce Forest, and poor access and operability due to a long skid and necessary stream crossings with steep stream banks and steep slopes. Timber management would threaten these values, and therefore does not make economic or ecological sense in ESTA 2.

ESTA 2 is dominated by even-aged spruce, fir and birch, with the oldest trees being around 75 years. In the absence of timber harvests, ESTA 2 will be managed to optimize wildlife habitat, soil health, water quality, and the long-term health and growth of its mushroom population, including chaga on birches, chanterelle around the spruce, and turkey tail on deadwood. This provides an economic resource without harvesting the trees.

Forest Type: Red Spruce **Trees/Acre**: 262

Natural Community Type: "Montane Spruce-Fir Forest" by Lapin & Engstrom in 2005, approved by Eric Sorensen in 2015

Tree Species Composition: Red spruce 58%, white and yellow birch 30%, balsam fir 10%, beech 2%.

Acres: 25.8 **Access Distance**: +/-1/4 mile **Stocking**: B line

Total BA/AC: 91 **Acceptable BA/AC**: 46 **Mean Stand Diameter**: 8”

Site Class: IV **Stand Age**: Even-Aged
Soils: Lyman - Marlow

Mushroom-Conk Production: The site should produce a good amount.

Stand History: No signs of any past harvesting.

Insects and Disease: Some red rot in the spruce noted by the pitch dripping from the branch stubs.

Wildlife Habitat: Critical bedding habitat for bear, deer, moose and coyote. Sign from all of these animals was seen here in the summer of 2015.

Boundaries: Mostly interior, small section along eastern boundary.

Regeneration: Varies throughout the stand. Some sections have established regeneration but other sections have very little due to the dense canopy. Red Spruce, striped maple and yellow birch make up the majority of the regeneration.

Primary Objectives: The primary objectives for managing this area are: (1) development of old-growth forest features for mushroom production; and (2) wildlife habitat enhancement. The stand objectives fulfill overall management objectives to maintain biological diversity and ecosystem services.

Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business. No timber management treatment in this area during this period due to designation as an ESTA.

ESTA 3
Natural Community, Montane Yellow Birch-Sugar Maple-Red Spruce Forest

General Description: ESTA 3 is comprised of four separate, discontiguous areas all located in close proximity to each other in the east central portion of the property, with the easternmost area encompassing the highest elevation point on the entire property.

According to Eric Sorensen, ESTA 3’s rarity rank is S3 and its elemental occurence rank is A.

The 2005 Lapin & Engstrom ecological report describes ESTA 3 this way, [excerpts] “*Mountain slopes between approximately 2,000’ and 2,500’ are typically montane forests with a canopy strongly dominated by a mix of red spruce and yellow birch. These places have a cooler climate and greater exposure to winds and storms. Most of the montane mixed forest on the farm is able to support sugar maple, and it is classified as the Montane Yellow Birch-Sugar Maple-Red Spruce Forest variant. Small patches within this type where there are ledges or other conditions unfavorable to sugar maple do occur…The property really only contains a very small piece of an extensive forest natural community that covers large expanses of the adjacent slopes of Mt. Ira Allen, Mt. Ethan Allen, Camels Hump, and north and south from these. On the Teal Farm it extends down as low as 1,800’. The natural community is characterized by a moderate to very dense growth of the low/medium shrbu hobblebush, dominance of wood ferns, and shining clubmoss, and just a few other herb species. In richer pockets, more herbs will be evident, while in the general landscape*

one is likely to frequently encounter wood-sorrel, bluebead lily, starflower, Canada mayflower, and just a few other species. In addition to the trees mentioned above, paper birch, red maple, and beech are present in some areas. The hardwood trees are typically of shorter stature than those lower on the slopes, and their crowns are frequently quite contorted. Due to the very intensive spruce logging that occured in the first cycle of forest harvest in northern New England, red spruce may not be very common in the current forest composition. Additionally, red spruce has been particularly adversely affected by acid precipitation and appears to be in widespread decline. At the southern end of the farm's high-elevation lands, several large spruce signify teh species' former glory in the Green Mountains. One of these 20"-dbh trees was approximately 125 years old, and at 72' tall overtopped the hardwood canopy by several meters. Large-diameter yellow birch, although not exceptionally tall, also occur in parts of this natural community, where individuals greater than 25"-dbh were noted."

Characteristics of the ESTA 3 areas that make them ecologically inappropriate sites for timber harvesting include shallow soils, high winds — trees rely on each other for support on this windy site, critical habitat for moose, black bear, and coyote - including early-spring food source and winter bedding area, steep topography, adjacent proximity to and support of ESTA 1, ESTA 2 and Camels Hump State Park, and poor access and operability due to a long skid and necessary stream crossings with steep stream banks and steep slopes. Timber management would threaten these values, and therefore does not make economic or ecological sense in the ESTA 3 areas.

ESTA 3 is a mix of even-aged northern hardwoods, with the oldest trees being around 100 years. In the absence of timber harvests, ESTA 3 will be managed to optimize wildlife habitat, soil health, water quality, and the long-term health and growth of its mushroom population, including chaga on birches, chanterelle around the spruce, bear's head and old man's beard on beech, and oyster and turkey tail on any deadwood. This provides an economic resource without harvesting the trees.

Forest Type: Northern Hardwoods **Trees/Acre**: 212

Natural Community Type: "Montane Yellow Birch-Sugar Maple-Red Spruce Forest" by Lapin & Engstrom in 2005, approved by Eric Sorensen in 2015

Species Composition: Yellow birch 27%, sugar maple 27%, red maple 16%, beech 15%, red spruce 6%. Black cherry, white ash and paper birch make up the remaining 9%.

Acres: 74.0 **Access Distance**: +/-1/2 mile **Stocking**: Between A & B line

Total BA/AC: 89 **Acceptable BA/AC**: 52 **Mean Stand Diameter**: 9"

Site Class: II **Stand Age**: Even-Aged

Soils: Lyman-Marlow, Peru stony loams **Site Index** - 60

Mushroom-Conk Production: The site should produce a good amount.

Stand History: A few old skid roads are present, and patch cuts, indicating past harvesting but stumps have rotted away.

Insects and Disease: Beech bark disease, eutypella cankers, maple borer.

Wildlife Habitat: Many small forest songbirds use the rigid yellow birch leaves as perches while catching and eating insects, large den trees.

Boundaries: Old blazes, it is recommended that property lines be painted again.

Regeneration: Beech regeneration is common here with scattered red spruce, not free to grow in many places.

Primary Objectives: The primary objectives for managing this area are: (1) development of old-growth forest features for mushroom production; and (2) wildlife habitat enhancement. The stand objectives fulfill overall management objectives to maintain biological diversity and ecosystem services.

Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2016 - Blaze and paint property lines. High Priority
No timber management treatment in this area during this period due to designation as an ESTA.

ESTA 4
Forested Wetland

General Description: ESTA 4 is comprised of ten separate, discontiguous areas spread across the entire property; some areas are located in close proximity to each other. The largest area is located in the southern portion of the property, south of Trapp Road, and the second largest is located in the northern portion of the property due east and adjacent to the 12 acre excluded area. The smallest area is located in the northwestern portion of the property, within Area 10.

In reviewing the two natural community ESTA's on the property, and because he was familiar with FSF's land stewardship goals, Eric Sorensen brougth to FSF's attention that the "Wet-mesic Mixed Forest" areas mapped by Lapin & Engstrom may qualify as Forested Wetland ESTA's, subject to County Forester approval. In September 2015, Addison County Forester Chris Olson conducted a site visit of several proposed Forested Wetland areas in the company of Pat Bartlett, and approved enrollment of all such mapped areas.

The 2005 Lapin & Engstrom ecological report, describes "Wet-mesic Mixed Forest" in this way, [excerpts] "*The largest area…is between the two branches of Cobb Brook. Parts of it are very wet, while others are merely moist. The successional vegetation at the west end features gray birch, red maple, white pine, black cherry, and trembling aspen as the most common trees. Meadowsweet is very common in the shrub layer, and wet spots also have patches of willows. The herb flora includes sensitive, cinnamon, interrupted and lady ferns, rough and smooth goldenrods, water avens, dwarf raspberry, New England ragwort, and the sedge. In the middle of the property, adjacent to the high meadow, a very young succesional forest features a dense pole- and sapling-sized growth of paper birch and pin cherry. The soil is a wet-mesic stony silt loam, and the herb layer is a dense growth of hay-scented and New York ferns. In the northwest area of the farm is a much smaller successional field with wet-mesic conditions. This area is fed by a seep and probably other groundwater seepage as well. The vegetation is very similar to the largest area described above. All of these areas are level to gently sloping.*"

Characteristics of the ESTA 4 areas that make them ecologically inappropriate sites for timber harvesting include deep organic soils, extreme wetness, presence of groundwater seepage that prevents freezing of organic soils, adjacent proximity to and support of ESTA 1 riparian areas, and poor access and operability due to wetness and necessary stream crossings with steep stream

banks and steep slopes. Timber management would threaten these values, and could cause significant soil rutting leading to alteration of the wetland hydrology, change in flood flows, or alteration of microhabitats that change species composition and diveristy, and therefore does not make economic or ecological sense in the ESTA 4 areas.

ESTA 4 is a mix of northern hardwoods, with the oldest trees being around 50 to 85 years. In the absence of timber harvests, ESTA 4 will be managed to optimize wildlife habitat, soil health, water quality, and the long-term health and growth of its mushroom population, including chaga on birches, oyster, bear's head and old man's beard on beech, and turkey tail on any deadwood. This provides an economic resource without harvesting the trees.

Forest Type: Mixed Hardwoods **Trees/Acre**: 228

Natural Community Type: "Wet-mesic Mixed Forest" by Lapin & Engstrom in 2005, approved by County Forester Chris Olson in 2015

Tree Species Composition: Red maple 43%, white ash 20%, beech 12%, sugar maple 6%. Elm, black cherry, hemlock, yellow birch, red spruce, aspen, paper birch, and pine make up the remaining 19%.

Acres: 42.8 **Access Distance**: +/-1/2mile **Stocking**: B line

Total BA/AC: 90 **Acceptable BA/AC**: 36 **Mean Stand Diameter**: 8.5"

Site Class: III **Stand Age**: Two-aged

Soils: Lyman-Marlow, Peru-Marlow loam, Duanne and Deerfield, Colton

Mushroom-Conk Production: The site should produce a good amount.

Stand History: Old pasture lands that have been slowly growing in for the past 70 years, evidence logging 25-40 years ago indicated by old woods roads and stumps that have rotted away.

Insects and Disease: Some stressed trees around seeps and springs, red rot in the spruce noted by the pitch dripping from the branch stubs, beech bark disease.

Wildlife Habitat: Important wildlife corridor, limited edge habitat for deer, grouse, woodcock, turkey, and songbirds, moose-peeled maples.

Boundaries: Mostly interior, small sections of boundary with faded marks that should be remarked.

Regeneration: Red spruce, red maple, and hophornbeam established but not free to grow,

Primary Objectives: The primary objectives for managing this area are: (1) development of old-growth forest features for mushroom production; and (2) wildlife habitat enhancement. The stand objectives fulfill overall management objectives to maintain biological diversity and ecosystem services.

Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business. No timber management treatment in this area during this period due to designation as an ESTA.

Open/Idle Agriculture

General Description: Northwest corner of the property and 3 separate parcels in the center of the property.

Acres: 116.1

Long-Term Management Objectives: To expand the farming of products sold from the farm.

Scheduled Treatment: None during the plan period.

Non-Productive

General Description: The two ponds in the enrolled land.

Acres: 3.4

Long-Term Management Objectives: To keep as wild ponds and wild food foraging sites, free from dock, rafts and man-made structures.

Scheduled Treatment: None during the plan period.

SUMMARY SHEET

Area 1
Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2018 - Release apple trees by cutting or girdling trees shading them. Medium priority.
No timber harvesting during this time due to age of stand.

Area 2
Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2019 - Release apple trees by cutting or girdling trees shading them. Medium priority.

Area 3
Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2016 - Blaze and paint property lines. High Priority
2021 - Single tree and group selection system to remove low-quality firewood trees and high-quality saw timber that meets diameter objectives. Reduce basal back to +/-80 sq. ft. . Medium priority.

Area 4
Scheduled Treatment: 2015 - 2030: Harvest Mushrooms & Conks annually for the farm business.
2022 - Single tree and group selection system to remove low-quality firewood trees and high-quality saw timber that meets diameter objectives. Reduce basal back to +/-80 sq. ft. Medium priority.

Area 5
Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2023 - Single tree and group selection system to remove low-quality firewood trees and high-quality saw timber that meets diameter objectives. Reduce basal back to +/-80 sq. ft. Medium priority.

Area 6
Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2016 - Blaze and paint property lines. High Priority
2018 - Single tree and group selection system to remove low-quality firewood trees and high-quality saw timber that meets diameter objectives. Reduce basal back to +/-80 sq. ft. Medium priority.

Area 7
Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2016 - Single tree and group selection system to remove low-quality firewood trees and high-quality saw timber that meets diameter objectives. Reduce basal back to +/-100 sq. ft. Medium priority.

Area 8
Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2016 - Blaze and paint property lines. High Priority
2017 - Single tree and group selection system to remove low-quality firewood trees and high-quality saw timber that meets diameter objectives. Reduce basal back to +/-100 sq. ft. Medium priority.

Area 9
Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2016 - Blaze and paint property lines. High Priority
2020 - Single tree and group selection system to remove low-quality firewood trees and high-quality saw timber that meets diameter objectives. Reduce basal back to +/-100 sq. ft. Medium priority.

Area 10
Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2016 - Blaze and paint property lines. High Priority
2026 - Single tree and group selection system to remove low-quality firewood trees and high-quality saw timber that meets diameter objectives. Reduce basal back to +/-100 sq. ft. Medium priority.

Area 11
Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2026 - Two - One-acre patch cuts to promote black and raspberries, no other harvesting at this time. Locations will be determined during the time of marking, mapped and sent to the county forester. Medium priority.
No timber harvesting during this time due to age of stand.

Area 12
Scheduled Treatment: No treatment at this time due to the young age of the stand.

Area 13
Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2023 - Single tree and group selection system to remove low-quality firewood trees and high-quality saw timber that meets diameter objectives. Reduce basal back to +/-100 sq. ft. Medium priority.

Area 14
Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2016 - Blaze and paint property lines. High Priority
2025 - Aspen patch cuts: Two patch cuts 1-2 acres in size in areas of mature aspen to encourage regeneration and wildlife habitat. These will be mapped and sent to the county forester for approval before they are cut. Medium priority.

Area 15
Scheduled Treatment: No treatment due to the age and stocking levels.

Area 16
Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2016 - Blaze and paint property lines. High Priority
2019 - Single tree and group selection system to remove low-quality firewood trees and high-quality sawtimber that meets diameter objectives. Reduce basal back to +/- 75 sq. ft. Medium priority.

Area 17
Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2029 - Single tree and group selection system to remove low-quality firewood trees and high-quality sawtimber that meets diameter objectives. Reduce basal back to +/-80 sq. ft. Medium priority.

Area 18
Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2016 - Blaze and paint property lines. High Priority.
No timber harvesting during this time due to low basal area.

Area 19
Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2016 - Blaze and paint property lines. High Priority

2021 - Single tree and group selection system to remove low-quality firewood trees and high-quality sawtimber that meets diameter objectives. Reduce basal back to +/-100 sq. ft. Medium priority.

Area 20
Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2016 - Blaze and paint property lines. High Priority
No treatment in this area during this period due to low basal area.

Area 21
Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2016 - Blaze and paint property lines. High Priority
2020 - Single tree and group selection system to remove low-quality firewood trees and high-quality sawtimber that meets diameter objectives. Reduce basal back to +/-100 sq. ft. Medium priority.

ESTA 1 - Riparian Area
Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2016 - Blaze and paint property lines. High Priority.
2016 - 2030 - Release apple trees by cutting or girdling trees shading them. Medium priority.
No timber management treatment in this area during the plan period due to designation as an ESTA.

ESTA 2 - Natural Community, Montane Spruce-Fir Forest
Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
No timber management treatment in this area during the plan period due to designation as an ESTA.

ESTA 3 - Natural Community, Montane Yellow Birch-Sugar Maple-Red Spruce Forest
Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
2016 - Blaze and paint property lines. High Priority
No timber management treatment in this area during the plan period due to designation as an ESTA.

ESTA 4 - Forested Wetland
Scheduled Treatment: 2015 - 2030 - Harvest Mushrooms & Conks annually for the farm business.
No timber management treatment in this area during the plan period due to designation as an ESTA.

Open/Idle Agriculture
Scheduled Treatment: None during the plan period due to designation as open/idle agriculture.

Non-Productive
Scheduled Treatment: None during the plan period due to designation as non-productive.

GLOSSARY OF TERMS

Abbreviations: AB-American Beech, ASP- Aspen, BC-Black Cherry, EWP-Eastern White Pine, EH-Eastern Hemlock, NRO- Northern Red Oak, NS - Norway spruce, OST- Hophornbeam, PB-Paper Birch, REP- Red Pine, RM- Red Maple, SM- Sugar Maple, SPP- Species, YB- Yellow Birch, WA-White Ash

Acceptable Growing Stock: The basal area per acre (BA/AC) of stems which have the potential to meet merchantability standards for the products identified in the plan.

Acre: An area on the ground, 43,560 square feet or 209' x 209'

Armillaria: One of the most common fungus in the eastern United States that can infect nearly every species of tree through a wound or root graft. This can and usually does kill the infected tree.

BA/AC or Basal Area per Acre: The area in square feet of a cross section at breast height of the trees in stand expressed on per acre basis.

Browse: Buds, leaves and twigs of seedling and sapling regeneration that are utilized as a food resource by wildlife.

Canopy: The combined cover of individual tree crowns.

Chain: A measurement of horizontal distance, 66 feet. Areas expressed in square chains can immediately be converted to acres by dividing by 10.

Cleaning: The removal of competing vegetation to release desired regeneration for optimal growth.

Patch or clear cut: A silvicultural method which removes all trees from designated area at one time for the purpose of creating a new, even-aged stand. This management system is usually used to regenerate shade-intolerant tree species. Variation include patch and strip clear cutting.

Climax: An association of plant and animals that will prevail in the absence of disturbance.

Codominate: Trees with crowns forming the general level of the forest canopy and receiving full sunlight from above but comparatively little for the sides.

Crop trees: Trees to be grown to the end of the rotation in even-aged management or trees to be favored for future growth in uneven-aged management.

Crown: The branches and twigs of the upper part of a tree.

Cruise: A survey of forest stands to determine the number, size and species of trees, as well as terrain, soil condition, access and any other factors relevant to forest management planing.

Cull: Trees that have no current or potential commercial value.

Cutting Cycle: Period of years between cuts.

GLOSSARY OF TERMS (continued)

D.B.H. or Diameter at Breast Height: This is a diameter measurement that is taken on the tree at 4.5' above the ground.

D.B.H. or Diameter at Breast Height: This is a diameter measurement that is taken on the tree at 4.5' above the ground.

Dominant: Trees with well developed crowns which are above the canopy and receive direct sunlight from above and partially from the side.

Epicormic branching: Branches that sprout from adventitious buds on the bole of a tree, usually when it is stressed or is subjected to full sunlight.

Even age Stand: A stand of trees with no more than two age classes of trees. Example: Red Pine Plantation.

Even age Management: This management strategy involves managing a forest until the best trees are mature and then harvesting the majority of these trees to start a new stand.

Uneven age Stand: A stand of trees with three or more age classes. Typically sawlogs, pole timber and saplings.

Uneven age Management: This management strategy involves doing selective harvesting of some sawlogs and pole sized trees every ten to twenty years. The goal is to maintain an equal number of sawlog, pole, and sapling sized trees in the forest.

Intermediate Treatments: Harvesting methods employed during even-aged management. The removal of trees from a stand between the time of establishment and the final harvest with the purpose of improving stand growth and/or health.

Intolerant Species: Trees unable to grow and develop in the shade of other species. Intolerant commercial species in Vermont include: paper birch and aspen.

Landing: Any place where logs are assembled for further transport.

Liquidation Cutting: Removal of all merchantable products from the forest with no regard for stand improvement or regeneration, usually preceding the sale of land.

Log Rule: A table or formula showing estimated volumes, usually in board feet, for various log diameters and lengths.

Mast: Nuts, berries and seeds utilized by wildlife as a food resource.

Mature Tree: Any tree that has reached the point in it's life span when it will no longer gain any economic value. Sites, soils and water will have a key role in the specific heights and diameters attained by individual trees and species.

MBF: The abbreviation for one thousand board feet.

GLOSSARY OF TERMS (continued)

M.S.D. or Mean Stand Diameter: The average D.B.H. of a given stand of trees which are over 5' at breast height.

Mixed Hardwoods: Timber stands characterized by a mixture o hardwood species.

Over mature: A tree or stand of trees that is older than normal rotation age for the type.

Overstory: Those trees making up the main canopy. The overstory is usually referenced as the larger trees in the stand.

Phloem: Tissue of the inner bark that conducts photosynthate from the leaves down to the roots.

Pioneer: Shade intolerant species that are the first trees to develop in an area after a large scale disturbance or after the abandonment of a field. Pioneer species include aspen, gray birch, pin cherry and paper birch.

Pole Timber: Trees with a D.B.H. between 5" and 11.9"

Q-Factor: The ratio of the number of trees in a diameter class divided by the number of trees in the next smaller diameter class. The lower the q-factor, the higher the proportion of large diameter trees.

Rotation Age: The period of years required to grow a stand of trees to maturity.

Sapling: A tree with a D.B.H. of 1" – 4.9"

Sawlogs: A tree with a D.B.H. greater than 11.9" that is sound enough to be sawed into lumber.

Scheduled Treatment: The Use Value Program requires that specific dates be set for work to be done, but allows the work to be completed up to three years before or three years after the scheduled date. Any greater deviations from that date requires that an amendment to the plan be submitted to the County Forester for approval.

Site Class: A classification of forest land to denote the potential tree growth expressed in cubic feet per year. Example: Site I could be a former corn field in a valley with deep, fertile soils, that was planted back to pines. Site IV may be on a mountain top where the soils are only a few inches deep and red spruce are growing.

T.S.I. or Timber Stand Improvement: Improvements that are made to the forest that encourages desirable trees by reducing the number of undesirable trees competing with them. These improvements generally do not produce enough revenue to pay for the work. Cost share programs are sometimes available to help pay for this work in some cases.

Weeviled: This refers to the crooked or badly formed trunks of the white pine and Norway spruce. This is caused by the white pine weevil feeding on and killing the young new growth at the top of the tree. Once the terminal leader on the tree has been killed, one of the side branches curves upward to become the terminal leader. The result is a severe bend in the main stem of the tree.

Wildlife Habitat: An area that provides wildlife with either food, water and/or shelter in a given area.

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photo by M. Hoffman: A typical day at SHO Farm. Shawn off to forage.