Tree Growth Management Plan

Hastings and Hastings
Town: Fryeburg
County: Oxford
Tax Map: Map 25 Lot 31
Acreage: 53 Acres
Date Prepared: 3/30/2020

Prepared by:
Wadsworth Woodlands, Inc.
Kevin Frankhauser FI#4076

Wadsworth Woodlands, Inc.

John A. Wadsworth
President
35 Rock Crop Way
Hiram, Maine 04041

Telephone 207-625-2468
Fax 207-625-3289
e-mail: kfrankhauser@wadsworthwoodlands.com
www.wadsworthwoodlands.com

Tree Growth Management Plan

General Information

Owner:	Hastings and Hastings
Address:	P.O. Box 290 Fryeburg, ME 04037
Phone:	(207) 935-2061
Plan Prepared:	3/30/2020
Prepared by:	Wadsworth Woodlands Inc. Kevin Frankhauser FI#4076

Parcel Location:

Town:	**Fryeburg**
County:	**Oxford**
Tax Map:	**Map 25 Lot 31**
Total Acres:	**53 Acres**

Owners Objectives:
Maintain the woodlot as a healthy growing forest for the commercial production of timber, firewood, recreational use, and wildlife habitat, while maintaining its' aesthetic beauty and biological diversity.

Location and Access:
This woodlot is located in the town of Fryeburg, and can be accessed via the North Fryeburg Road, also called Route 113. This property has ample room for harvesting and harvesting equipment, as well as suitable access for logging trucks.

Boundaries:
The boundaries of this woodlot are currently in fair shape. Evidence includes old blazed trees, as well as barbed wire and sections of rock wall. It is generally recommended that boundary lines be repainted and/or blazed every ten years or so.

Forest Type Description:
This property contains all two major forest cover types; softwood and mixed wood. A mixed wood forest type contains both hardwood and softwood species, neither of which are more dominant than the other. The mix of diameter classes on this woodlot provides great opportunity for the forest to be managed in a way that the individuals with the most potential for success can be fostered into the future.

Acreage Listing:

Cover Type	Description	Acreage
Forested	Stand 1 – Softwood	5
	Stand 2 – Mixed Wood	25
	Stand 3 – Mixed Wood	17
	Total Classified Forested Acreage	**47**
Non-Forested	Wetlands	6
Total Acreage		**53**

Stand 1: Softwood, 5 Acres

Species Composition	Size Class	Quality
White Pine	6-22"	Fair-Good
American Beech	5-10"	Poor
Red Maple	5-10"	Fair
Regeneration	American Beech, Red Maple	

Stand 1 is located in the eastern portion of this woodlot, covering 5 acres of softwood forest cover. This stand is roughly 95% white pine, with several scattered hardwoods in the understory. The white pine within this stand ranges from 6-22 inches in diameter, and is of fair-good quality. Many of the dominant and co-dominant white pine within this stand have large and healthy crowns, which indicate wind-firmness and will also provide an excellent seed source. A component of these dominant white pine have large seams and cracks along the stems, as well as rot at the butt of the tree, which will lower the quality of the tree. There is a large component of white pine which is suppressed, being overtopped by the dominant white pine. These suppressed white pine trees have tall stems

with very small live crowns, indicating that these trees will not respond well to a thinning. Often times white pine with small crowns will blow over after a thinning is conducted, as small crowns often correlate with small root systems. When managing this stand, suppressed/overtopped white pine with small crowns should be harvested, as well as any white pine with seams, cracks, or rot.

Stand 1 is well stocked with white pine, which is mixed in quality.

Stand 1 has a very small component of hardwood in the understory, mainly red maple and American beech of lesser quality. These maple and beech range from 1-10 inches in diameter, with both saplings and small merchantable stems. Much of the American beech in the stand is diseased, and has poor form as well as cankers in the stem. Any merchantable beech should be harvested during the next entry, as well as any red maple of poor quality.

Stand 1 Prescription

Time Frame	Silvicultural Recommendations
2020-2030	A thinning from below is recommended for this stand during this time frame. This thinning should focus on harvesting any suppressed white pine with small crowns, as well as any white pine with signs of decline along the stems, such as rot or large seams. The poor quality hardwood component should also be harvested. This thinning should take place during the winter months, due to wet ground conditions in surrounding stands.

Stand 2: Mixed Wood, 25 Acres

Species Composition	Size Class	Quality
Red Maple	5-18”	Fair-Good
Red Oak	5-16”	Good
White Pine	6-24”	Fair-Good
Balsam Fir	6-12”	Fair
Regeneration	Red Maple, Red Oak, Balsam Fir	

Stand 2 covers 25 acres of mixed wood forest cover, reaching into the northern, southern and eastern portion of this woodlot. Red maple is a dominant species within this stand, ranging from 1-18 inches in diameter, and of fairly good quality. Much of the larger diameter red maple have poor form and have grown in clusters of 3-4, although there are many smaller stems which are of better quality, and have the potential to yield saw logs in the future. Red oak is also abundant within this stand, ranging from 5-16 inches in diameter and of good quality. These red oak trees have straight stems with few defects, and have grown with shade covering the stems, preventing epicormic branching. A component of the larger diameter red oak can be harvested during the next entry, while any smaller diameter stems should be maintained within the stand and fostered into the future.

Larger diameter white pine is scattered in the overstory of this stand, and are of fairly good quality. These pine trees range from 6-24 inches in diameter, and have large and healthy crowns. Much of the pine within this stand are of good quality and have high quality stems, though a portion of these trees will have large knots in the wood, as well as weevil damage. Any pulp quality white pine should be harvested from this stand, as well as a component of the mature, large diameter stems. Any high quality growing stock should be maintained within the stand. There is a small component of balsam fir as well, ranging from 6-12 inches in diameter. These trees should be harvested during the next entry, as these trees will likely decline in quality in the future.

Large diameter white pine overtopping mixed hardwoods in stand 2.

Stand 2 Prescription

Time Frame	Silvicultural Recommendations
2020-2030	A selective thinning of poor quality trees of each species is recommended for this stand. This thinning should focus on the removal of pulp quality red maple, balsam fir, and white pine, as well as a component of the mature red oak and white pine. Reserves should include high quality growing stock of each species within the stand.

Stand 3: Mixed Wood, 17 Acres

Species Composition	Size Class	Quality
Red Maple	5-18”	Fair
Red Oak	6-20”	Fair-Good
White Pine	12-22”	Fair-Good
Balsam Fir	8-12”	Fair
Yellow Birch	6-12”	Fair
Regeneration	Red Maple, Balsam Fir	

Stand 32 is located in the western portion of this woodlot, covering 17 acres of mixed wood forest cover. This mixed wood stand is a drainage area from the wetland which can be found adjacent to the stand, and has extremely wet ground conditions. Due to wet

ground, much of the growth within this stand is of poor form and pulp quality. Red maple is the dominant species within the stand, ranging from 2-18 inches in diameter, and of fair quality. Much of this maple will yield pulpwood, as these trees have poor form, rot, and cavities in the stems. A large component of these trees are also growing in clusters of 3-4, due to stump sprouting. Much of the red maple pulp should be harvested, while any growing stock of higher quality should be maintained. Red oak can also be found scattered throughout the stand, ranging from 6-20 inches in diameter. Much of the red oak is of pulp quality due to poor form, however, a component of these stems are of crop tree size and quality. When managing this stand, the pulp red oak should be harvested, as well as a component of the mature red oak. Any crop trees should be maintained, and fostered into the future. A key component of fostering these crop trees into the future is to thin around the crowns of these trees, while maintaining adequate shade along the stems in order to prevent epicormic branching. Yellow birch makes up a small component of this stand as well, ranging from 6-12 inches in diameter. Many of these yellow birch have poor form, as well as epicormic branches which have developed along the stems.

White pine and balsam fir make up the softwood component of this stand, with white pine more abundant. This pine ranges from 12-22 inches in diameter, and is of fair-good quality. Many of these larger diameter stems have crooks or weevil damage, though a component of the smaller diameter white pine has grown straight and contains few defects. When thinning this stand, any white pine with poor form or small crowns should be harvested, while high quality growing stock should be maintained. The balsam fir in this stand ranges from 8-12 inches in diameter, and is of fair quality. This fir may have poor quality stems due to rot because of wet ground conditions, and should be harvested during the next entry.

Stand 3 has wet ground conditions, which has caused poor growth and form among many of the trees.

Stand 3 Prescription

Time Frame	Silvicultural Recommendations
2020-2030	A selective thinning of poor quality trees of each species is recommended for this stand during this time frame. This thinning should focus specifically on the poorest quality red maple and balsam fir, as well as a component of the pulp quality red oak and white pine. Any growing stock with the potential of growing saw logs in the future should be maintained.

Timber Management
The recommended silvicultural system for this lot is uneven-aged management, which focuses on a diversity of ages, heights and tree species on the lot. Management practices are stand specific, and designed to increase growth rates for the species best suited for the soils and terrain in each stand, as well as improving the species composition of the woodlot.

Generally, selective harvests remove the undesirable trees that are not suited for optimal growth in a stand, which may be mature trees or those with poor form, injury, or disease. This in turn allows more light to reach residual trees, as well as regeneration. Small gaps in the residual canopy are preferred, which promotes regeneration (for moderately shade tolerant trees species such as white pine and red oak) without breaking up the continuity of the canopy cover in the woodlot. This improves wildlife habitat by meeting the food and cover requirements for a greater number of species.

Removal of the poorer quality trees is based on selecting trees with poor or inferior crowns as a result of competition, injury or disease, large knots created by dead or dying limbs, and trees that are especially prone to windfall. Trees that meet these specifications are those that are the least likely to survive for more then 10-20 years, or until the next harvest activity.

The majority of Southern Maine forestlands are well suited for white pine and red oak growth. To promote white pine regeneration, harvesting should be performed during the summer or fall of seed year, since the harvesting equipment scarifies the soil. Also, when harvesting around red oaks, shade should be left on the south side to prevent epicormic sprouting. These guidelines are applied to the woodlot as a blanket prescription with specific considerations to stands and the harvesting schedule outlined in the stand prescriptions.

Wildlife Habitat Considerations
Several portions of this woodlot contain wet areas that create beneficial conditions for a variety of wildlife species. During wet seasons, standing water can be found in places which provides drinking water for species such as deer and bear. During oak seed years, the red oak on the property provide acorns that are a critical hard mast for deer, bear, and turkey. The hemlock component helps intercept snowfall to aid in wildlife movement during winter months, and during the summer provides the cool, moist understory that benefits countless species. The overall diversity of the vertical structure of the woodlot provides habitat for numerous species that require varying canopy and ground vegetation structures for habitat and food.

This property contains all of the necessary requirements for wildlife habitat: food, cover, and water. Habitat conditions and quality are based on three environmental factors: land use (forest, non-forest, water), vegetative structure (grasses, shrubs, trees- seedlings, saplings, poles, and saw timber), and vegetative species. As the landscape is continually changing naturally, so are the species of wildlife which occupy it. Almost all species of wildlife benefit one way or another from the early successional habitats provided by timber harvesting. Different age classes of trees can help to provide a variety of habitat

features for wildlife including cavity trees, snags, down woody debris, browse, hard and soft mast, cover, food, nesting or den sites, and raptor perches, to name a few.

Areas with mature red oak and beech will produce nuts that will attract a variety of wildlife species, especially on a seed year (large number of seeds produced). White-tailed deer, black bear, partridge, gray squirrels, chipmunks, and turkey commonly feed on such hard mast. In general, wildlife habitat can be improved by promoting hard and soft mast production (by releasing and/or pruning), leaving cavity and den trees of various size classes (although the larger the tree, the better), leaving snags, maintaining openings, and by promoting adequate cover (i.e., a variety of species and age classes).

Water Quality, Wetlands, and Riparian Areas

Water quality is a very important concern in every timber harvesting operation, as the quality of the ground water is directly related to the quality of the surface water. The importance of clean ground and surface water is not only crucial to humans, but to the survival of fish and other aquatic organisms. Changes in water temperature, sedimentation, and water levels in streams, bodies of water, and wetlands, are things that should be prevented against in a harvest. Skid trails should be free of surface water, which can be prevented by using water bars. Skidder bridges or poled ford bridges should be used, with a culvert if necessary, when crossing streams or other wet areas (as recommended by “Best Management Practices for Forestry: Protecting Maine’s Water Quality”). These crossings should be removed within 7 months after the harvest is completed. Winter harvests on frozen ground are recommended for minimal impact to sensitive areas.

In Maine, there are laws pertaining to timber harvesting that were designed to protect water quality. The Natural Resources Protection Act states there can be no soil disturbance in areas within a 100’ from a lake, pond, river, stream, brook, freshwater wetland or tidal water. A Shoreland Zoning law applies to all areas within 250’ of lakes, ponds, rivers, tidal areas, and certain freshwater wetlands and at least 75’ from certain streams and allows for selective timber harvesting of no more than 40% of the trees 4” or on any lot in a 10 year period, as long as a well-distributed stand of trees and vegetation remains (any exceptions would need to be approved by the town planning board). In areas of the shoreland zone that are zoned for “Resource Protection” abutting a great pond (10 acres or more), no timber harvesting within 75’ of the protected resource is permitted, except to remove hazard trees, although towns may adopt an ordinance that allows limited harvesting under special conditions and regulations. Beyond the 75’ strip, the average basal area of trees 4” and up (at d.b.h.) must be no lower than 30 sq.ft. per acre. No accumulation of slash can be left within 50’ of the normal high water line of any water body. These measures help to protect water quality, habitat protection, and scenic objectives.

Aesthetic Values

Aesthetics are an important concern during and after a timber harvest. There are several practices that can be utilized to keep the impact on the land and the residual stand damage to a minimum;

- Timber harvests should be scheduled during periods of low recreational use and when conditions are most favorable to the protection of regeneration, wet areas, and the residual stand (i.e., dry or frozen ground conditions);
- Skid trails should be laid out efficiently and at acute angles from one another, thereby reducing the number of bumper trees (which should be designated before harvesting) and the overall residual damage to the stand. When possible, it is recommended that existing skid trails be used, in order to minimize soil compaction and damage;
- Bumper trees should be assessed for removal at the end of a harvest, unless there is another entry scheduled for the near future;
- Stream crossings should be in accordance with "Best Management Practices for Forestry: Protecting Maine's Water Quality";
- There should be buffer zones around lakes, ponds, rivers, streams, tidal areas, and certain freshwater wetlands;
- Timber harvesting activities, as well as landings, should be shielded from the view of main roadways, using buffer zones, whenever possible;
- Slash should be bucked up enough to achieve contact with the ground, speeding up decomposition, and returning nutrients to the soil in a timelier manner;
- Landings should be cleared of most debris, and seeded and/or hayed if it is necessary to stabilize the soil, or for wildlife or general appearance.

Insects and Disease

Field observations in February of 2020 yielded signs of American beech trees, infected with the beech bark disease. Merchantable stems should be harvested from the stand.

Woodlot conditions should be monitored periodically and during different seasons when insect or disease infestations may be more obvious. In general, large weakened or dying tree populations can greatly increase the likelihood that populations of insects and pathogens will increase beyond their normal levels and eventually cause damage to adjacent healthy stands.

To maintain a vigorous forest condition and increase the resistance of trees to insects or diseases, the following general silvicultural techniques are appropriate preventative measures;

- Encourage a mixture of tree species and age classes, discouraging species monocultures;
- Choose or favor species that are best adapted to existing site conditions;
- Protect against uncontrolled fires;
- Apply intermediate harvesting techniques to avoid forest stagnation, improve species composition, and optimize the presence of diseased or injured trees;
- Harvest over mature or declining trees in areas where there are already adequate stocking levels of such specimens;
- For seed sources, favor healthy specimens that seem to exhibit characteristics of pest and disease resistance;
- Maintain periodic monitoring schedules for signs of infestation, decline, or mortality.

Glossary of Common Forestry Terms

Age Class: Intervals of tree age used to describe stand characteristics, for example, 10 or 20 year age class.

Basal Area: A measure of tree density. It is determined by estimating the total cross-sectional area of all trees measured at breast height (4.5 feet) and expressed in square feet per acre.

Best Management Practices (BMP's): A practice or combination of practices determined to be the most effective and practicable means of preventing negative impacts of silvicultural activities.

Biodiversity: The variety and variability of all living organisms.

Board Feet: A unit of measurement volume of lumber. Example, MBF= thousand board feet.

Browse: Leaves, buds, and woody stems used as food by woodland mammals like deer and moose.

Canopy: The more or less continuous cover of branches and foliage formed by the crowns of adjacent trees and other woody growth.

Cord: A unit of measurement to determine cubic volume of round wood equal to 128 cubic feet, including bark and air.

Crop Tree: A tree which is retained for maximum longevity in a stand due to desired characteristics such as commercial quality or biotic contribution.

Crown: The upper part of the tree, including branches and foliage.

Crown Classes of Forest Trees:

a) Dominant: A tree whose crown receives full sunlight on the top and all sides.
b) Co-Dominant: A tree whose crown receives full sunlight on the top and indirect lighting on the sides.
c) Intermediate: A tree whose crown and sides receive only indirect lighting.
d) Suppressed: A tree which has grown in low light which has thwarted its growth.

DBH: Diameter at Breast Height, four and a half feet above the ground. Diameters are measured at this height to calculate volumes of trees.

Depletion Unit: A calculable value of timber at the time of harvest which is deducted from the taxable income. Expressed as $/MBF, it is based on the value of the timber at the time of purchase and the total volume on the lot at harvest. This value is known as Depletion Unit Allowance.

Epicormic Branching: The sprouting of dormant buds from under the bark of the tree, on either the bole or limbs, due to environmental stress such as over-exposure to sunlight following a harvest, insect defoliation, disease, ice damage or weakening of the tree.

Even-Aged Management: A timber management system that results in the creation of stands in which trees of essentially the same age grow together. Regeneration in a particular stand is obtained during a short period at or near the time that a stand has reached the desired age or size for regeneration and is harvested. Cutting methods producing even aged stands are clearcutting, patch clearing, strip clearcutting, shelterwood, and seed tree harvests.

Even-Aged Stand: All trees are the same age or at least of the same age class. A stand is considered even-aged if the difference in age between the oldest and youngest trees does not exceed 20 years or 20 percent of the length of the rotation.

Forest Stand or Type: A group of trees, occupying a specific area and uniform I composition, species, age arrangement and condition, as to be distinguished from other adjoining forested areas.

Habitat: Any area that contains all resources essential to the survival of a wildlife population. Essential ingredients include food, water, and cover.

Improvement Cut: A broad term used to describe a harvest technique designed to promote health, growth, vigor, and optimum stocking for crop trees.

Landing: A place where trees and logs are gathered in or near a harvest site for further processing and transport.

MBF: An abbreviation of the industry standard for sawtimber equaling thousand board feet.

Pulpwood: The portion of a tree not suitable for lumber, due to size or quality, which has economic value in the production of paper products or fuelwood.

Regeneration: The natural or artificial restocking of an area with a new generation of trees.

Release Cutting: Includes all operations designed to regulate the species composition or improve the growth of very young stands. Can be commercial or non-commercial, the later is considered timber stand improvement (or TSI).

Residual Trees: Trees that are left to grow in the stand following a silvicultural treatment.

Rotation: The period of years required to reproduce, grow, and harvest a crop of timber under definite objectives of timber management.

Salvage Cut: The harvest of timber that has compromised by nature (i.e. ice or wind storms, disease, etc.), which its value would be lost if left untouched.

Sawlog: The part of the tree which has economic value as sawed lumber.

Scarification: A method of disturbing the ground cover in preparation of natural or artificial regeneration. Is a very important factor in reproducing white pine.

Selective Harvest: The removal of trees, either as single scattered individuals or in small groups, at relatively short intervals, repeated indefinitely, so that the continuous establishment of reproduction is encouraged and an uneven-aged stand is maintained.

Shelterwood: A series of two or three harvests that gradually opens the stand and stimulates natural reproduction of a new even aged stand.

Silviculture: The art and science of managing a forest.

Site Index: A measure of the productivity of the site based upon the average height of the canopy trees at age 50, i.e. SI of 80=80’ tall at age 50.

Snag: A standing dead tree.

Stocking Density: The number of trees on a given area of land in relation to what the optimum number should be. Generally referred to as under, over, or moderately stocked.

Timber Stand Improvement (TSI): Silvicultural activities, usually non-commercial, that improve the composition, constitution, condition and growth of a timber stand. Common practices include pruning and weeding.

Tree Size Classes:

a) Regeneration: less that 4.5’ tall, and 0-2 inches DBH

b) Sapling: more that 4.5’ tall, but less than 5” DBH
c) Pole: between 4-10 inches DBH
d) Sawlog: over 11 inches DBH

Uneven-Aged Management: The application of actions needed to maintain a continuous high-forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a wide range of ages and sizes to provide a sustained yield of forest products. Cutting methods that develop and maintain uneven-aged stands include single tree selection and group selection.

Uneven-Aged Stand: A stand of trees that contains at least three well defined age classes intermingled on the same area.

Vernal Pool: A ephemeral body of water that fills in the spring, holds water for at least 10 days, and dries up by fall or in some or all years and that does not contain fish.

Weeding: Removal of trees or other vegetation to encourage the growth of desirable trees.

Windfirm: The ability of the root system of a tree to withstand wind pressure and keep the tree upright.