Forest Stewardship Plan

Fields Farm
Merrimack, NH

Merrimack Conservation Commission

Plan prepared by:

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Bow, NH

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PLAN PURPOSE AND DESIGN

The purpose of this plan is to give guidance on the management of the forested tract of land known as the Fields Farm owned by the town of Merrimack, New Hampshire.

PROPERTY LOCATION AND BRIEF DESCRIPTION

The Fields Farm is located in the Town of Merrimack, NH and is identified as Tax Map 4A, Lot 2. The lot has frontage on Amherst Road between, and opposite, the intersections with Peaslee Road and Mason Road. The 97-acre parcel is completely forested and slopes gradually downhill from Amherst Road. From the highest elevation on Amherst Road to the Souhegan River is approximately 125 feet. The property is bounded to the north by the Windy Hollow Circle Subdivision and the Souhegan River. The river also forms the western boundary. Stone walls adjacent to residential properties form much of the southern border. Amherst Road forms the eastern boundary. The parcel has many scenic attributes that include mature forests, flowering mountain laurel thickets and long frontage on the Souhegan River.

WOODLOT HISTORY

Fields Farm was deeded to the Town of Merrimack by Charles Ireland in 2004 for conservation and outdoor recreation purposes. Up until the middle 1900's Fields Farm was actively farmed and produced hay and pasture for livestock. The existing mature forest has grown up around the many stone walls that formerly lined fields and pasture. There are also remnants of barbed wire fence. There is a wonderful, detailed history of the Fields Farm titled A House in Merrimack, and written by Charles Ireland, that describes the historical landscape and activities that took place on the farm. This document is being preserved by the Merrimack Historical Society.

LANDOWNER GOALS AND OBJECTIVES

The Merrimack Conservation Commission has established the following goals and objectives for the Fields Farm property:

1. Adhere to the "conditions, covenants and agreements" described in the conveyance of the Fields Farm from Charles Ireland to the Town of Merrimack and recorded in the Hillsborough County Registry of Deeds at Book 7207 and Page 727.
2. Enhance safe recreational opportunities on the property by creating a parking area off of Amherst Road.
3. Create additional recreational opportunities by providing access to the riverfront for water access and picnic sites.
4. Maintain the cycling trail system and hiking trails throughout the property.
5. Maintain the scenic quality of the forest.

6. Establish a sustainable timber harvest schedule that will improve the health and vigor of the forest in a way that is compatible with the other objectives.
7. Protect water quality by following best practices for erosion control.
8. Encourage and promote practices that will enhance wildlife habitat.
9. Protect historical and archeological features on the property.
10. Create an environment that is conducive to outdoor educational opportunities.

GEOLOGIC AND GEOGRAPHIC ATTRIBUTES

The topography at Fields Farm slopes gently away from Amherst Road toward the Souhegan River. The elevation at the highest point on the property is around 350 feet above sea level and drops 125 feet to the shoreline of the Souhegan River. Slopes on the property generally range from 0 to 15 percent with limited areas of steeper slopes. The aspect is easterly facing the morning sun. The soils as described in more detail below are comprised of glacial till, are deep, sandy, and very well drained.

BROOKS, PONDS AND WETLANDS

The Souhegan River is the largest water feature on the property. Several small drainages that feed the river become well defined as they join closer to the river. Most of the parcel is well drained, however the southern portion of the lot contains damp soils that ultimately form the more defined drainage areas. There were no observed vernal pools.

SOILS

Generally, the soils on the Fields Farm are formed from acidic glacial till that are well drained. The observed timber growing on these soils is consistent with what should be present based on soils information. The United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRSC) has identified the following soils on the property:

Paxton Fine Sandy Loam (PfB and PfC) This soil type is contiguous running along the northern most and easterly portions of the property and consists of approximately 41 acres. Slopes range from 0 to 15 percent. The soil is deep with at least 60 inches to bedrock. The seasonal high water table ranges from 2.5 to 4 feet below the surface. The Paxton soils are well suited for cultivating agricultural crop or pasture. They are also excellent forest soils for growing timber. In a forest setting trees commonly found occupying this soil type are: red, black and white oak, hickory, white pine and hemlock.

Windsor Loamy Sand (WdB and WbC) This soil type has narrow frontage on Amherst Road and bisects the property north and south below the Paxton Fine Sandy Loam soil type, extending to, and running along the Souhegan River. The area contained in this soil type is approximately 43 acres. Slopes range from 3 to 15 percent. Windsor Sandy Loam is acidic and excessively well drained. The soil is deep with more than 5 feet to bedrock and depth to the seasonal high-water mark is more than 6 feet. Cultivating crops on this soil type is suitable with irrigation. This soil type is well suited to growing white pine with a limiting concern being competition for moisture. Silvicultural techniques can be used to keep stocking levels at a point that promotes vigorous growth. This is also an excellent soil for stable road construction.

Woodbridge Fine Sandy Loan (WoB) This soil is found on the most southern portion of the Field Farm and is approximately 5 acres in size, and contains 3 to 8 percent slopes. It is acidic, moderately well drained, and deep with depth to bedrock greater than 65 inches. Woodbridge Fine Sandy Loam is considered an important agricultural soil, but erodible. Erosion control must be a consideration with management operations. Portions of this soil type have hydric characteristics consistent with the ferns and tree species observed that favor moist sites. Woodbridge Fine Sandy Loam is considered a good general soil for timber growth.

Chatfield Hollis Complex (CsC) This soil type consists of 3 acres off of Amherst Road near, and opposite Mason Rd. Slopes can range from 8 to 15 percent. Chatfield Hollis Complex is found on hilltops where the depth to bedrock is 2 to 3 feet. The soil is very well drained and tends to be rocky. Red oak is a timber specie that grows well on this sight.

Natural Communities

The forest type generally is Pine, Oak, Hemlock which fairly common in southern New Hampshire. Pockets of mountain laurel and blueberries are growing together throughout the property which is a characteristic of Appalachian Oak Pine forests.

INSECTS AND DISEASE

There were no observed concerns related to insects or disease within the Fields Farm Forest outside of normal expectations for a mature forest. The forest should be regularly monitored for hemlock wooly adelgid, spongy (gypsy) moth (a threat to oaks and other species), and caliciopsis canker (found in white pine). Additionally, following publications from the University of New Hampshire Cooperative Extension can help identify and prepare for new forest pests and diseases.

ACCESS AND BOUNDARIES

The boundaries of the Fields Farm are generally described above under PROPERTY LOCATION AND BRIEF DESCRIPTION. Much of the property is bounded by man-made and natural features such as the Souhegan River, Amherst Road and stone walls. Some sections of boundary are simply compass bearings that may me be evidenced by old surveyor blazes or sections of barbed wire fence to help indicate their location. These sections should be blazed and painted to clearly designate the boundaries of the property. Long frontage on Amherst Road provides excellent opportunities for safe access to the property for forest management and recreation. Currently, there is no off-road parking available or established forest management access locations.

WILDLIFE HABITAT CONDITIONS

The Fields Farm property has great wildlife potential for a wide variety of native species. Red, black and white oak along with hickory are abundant and are important mast (nut) producing tree species that are important to white tailed deer, black bear, wild turkeys and smaller animals such as squirrels and chipmunks. Mountain laurel thickets provide cover for many bird species and small animals. There are an adequate number of "den" trees (standing trees in various stages of decomposition that contain cavities utilized by wildlife) on the property. Due to the mature nature of the forest, little sunlight is reaching the forest floor suppressing the regeneration of the seedlings and saplings necessary to eventually replace the existing forest. Small openings should be created within the forest to establish a more diverse vertical height structure by encouraging regeneration and "edge" (transition zones from clearings to open forest) habitat that provide food and cover for many wildlife species.

The Souhegan River also provides habitat for fish, birds and mammals that thrive in a wetland environment. All management activities on the property should be conducted in a way that protects water quality through best practices and erosion control measures. The Souhegan River is a major tributary to the Merrimack River, and as such, is subject the Shoreline Protection Act created by RSA 483-B. All activity, including forest management. on the property should be conducted in a manner consistent with the provisions of RSA 483-B. Even without the Act, natural buffer areas should be maintained between the river bank and any forest management activity to protect water quality, wildlife habitat and scenic enjoyment.

RECREATIONAL AND EDUCATIONAL OPPORTUNITIES

This property has many opportunities for recreational pursuits. Currently there is an extensive mountain bike trail system that is heavily used. The existing trails have been carefully laid out with erosion control measures including wooden bridges across drainage areas. In addition, the long river frontage creates opportunities for fishing, canoeing and kayaking, and picnicking. Hiking, bird watching and photography are also potential activities. All of these activities would

be enhanced with an off-road parking area and interior road access to near the river-frontage. The development of parking and interior road access should adhere to best practices for erosion control. The property is also conducive to a wide range of educational opportunities including sustainable, multi-use forest management practices, ecosystems, wildlife observation, nature walks and more.

FOREST CONDITIONS

To help establish a base-line of forest conditions on the Fields Farm, woodlot data was collected in June of 2025 for the purpose of drafting a forest stewardship plan. A systematic timber cruise was employed, taking sample points every 200 feet along compass lines spaced 400 feet apart. Sample plots were taken at each point using a 10-factor prism to determine basal area. Basal area is the area contained within the horizontal cross section of each tree measured at diameter at breast height (dbh) within the sample plot multiplied by a factor of 10. Basal area is reported in square feet and helps determine the stocking levels in a given stand of trees. In addition to timber inventory data, notes were also taken related to overstory and understory conditions timber quality, topographical features and evidence of historical activity.

TIGER for Woodlands and Compartments 2.0 developed by Carl Mize and Joe Colletti at Iowa State University and customized for New Hampshire is the software used to process the inventory data for the Fields Farm.

The Fields Farm Forest is mature (in some cases over mature) and contains an overstory consisting of large sawlog sized trees. The forest is uneven aged, but due to its age and absence of regular thinning lacks adequate regeneration. There are 7 distinct stands of timber with 4 stands being the Oak–Pine type, 2 being the White Pine type and the last a Mixed Wood type. Timber types are determined by the species that dominate the overstory. In this forest the understory is made up of pole and small sawlog sized trees with seedling and sapling growth scattered or non-existent. Crown closure of the dominant trees is such that sunlight needed for regeneration is not reaching the forest floor. All of the stands are fully or overstocked and would benefit from some thinning to improve vigor and regeneration. The site index for the species present is very good. Site index is a measure of how tall a tree will grow in a specified period of years on the soils present. White pine and oak appear throughout the property and hemlock is present in many sections. The entire forest is generally healthy and typical of an average forest of its age (80 to 100 years). The forest has grown beyond optimal stocking levels which will slow tree growth and vigor. Throughout the life of the forest, as trees increase in diameter, the number of trees in the forest decreases. This is all part of a natural thinning process resulting from trees competing for nutrients and sunlight. Overall, the timber on Fields Farm is of average quality with high per acre volumes of sawlogs and pulp.

FOREST TYPES

Oak / Pine 1 – This stand is 42 acres in size and is comprised of the northern half of the parcel with the exception of a white pine stand along the northern river frontage. With a basal area of 115 square feet and 101 trees per acre the timber growth is approaching the upper range of being fully stocked. Regeneration of white pine and oak seedlings is scattered or non-existent. Mountain laurel thickets and blueberry bushes are abundant.

Sawlog volume in Oak / Pine 1 stand is as follows:

- White Pine 322 Mbf (thousand board feet)
- Red Oak 133 Mbf
- White Oak 6 Mbf
- Red Pine 5 Mbf
- Red Maple 5 Mbf
- Black Oak 4 Mbf

Additionally, there are 516 cords of pulp in the stand.

Oak / Pine 2 - This stand is 7 acres in size, situated along Amherst Road, and encompasses the Chatfield Hollis Complex soil type. With a basal area of 103 square feet and 169 trees per acre the timber growth is approaching the upper range of being fully stocked. There is very little regeneration of white pine and oak occurring in this stand. Mountain laurel thickets and blueberry bushes are abundant.

Sawlog volume in Oak / Pine 2 stand is as follows:

- White Pine 31 Mbf (thousand board feet)
- Red Oak 15 Mbf
- White Oak 3 Mbf
- Red Maple 2 Mbf

Additionally, there are 147 cords of pulp in the stand.

Oak / Pine 3 - This stand is 6 acres in size and is located on the west side of the property adjacent to the river and is surrounded by a white pine stand to the north and the mixed wood stand to the south. With a basal area of 167 square feet and 163 trees per acre the stand is overstocked. Regeneration of white pine and oak seedlings is scattered or non-existent. Mountain laurel thickets exist and due to the stands proximity to the river hemlock is also present in the stand.

Sawlog volume in Oak / Pine 3 stand is as follows:

- White Pine 48 Mbf (thousand board feet)
- Red Oak 17 Mbf
- White Oak 3 Mbf
- Hemlock 5 Mbf
- Black Oak 4 Mbf

Additionally, there are 104 cords of pulp in the stand.

Oak / Pine 4 - This stand is 7 acres in size and is located along the river and a portion of the southern boundary of the property. With a basal area of 173 square feet and 186 trees per acre the timber growth is overstocked. Regeneration is non-existent. Hemlock has a greater presence in the stand compared to the other Oak / Pine stands.

Sawlog volume in Oak / Pine 4 stand is as follows:

- White Pine 78 Mbf (thousand board feet)
- Red Oak 3 Mbf
- Red Maple 2 Mbf
- Red Pine 2 Mbf
- Hemlock 6 Mbf
- Black Oak 11 Mbf

Additionally, there are 163 cords of pulp in the stand.

White Pine 1 – This stand bisects the property east to west midway through the north-south line of the property containing 13 acres. The basal area is 158 square feet with 154 trees per acre representing a fully stocked stand. Regeneration is very limited and mountain laurel and blueberries are abundant.

Sawlog volume in the White Pine 1 stand is as follows:

- White Pine 233 Mbf (thousand board feet)
- Red Oak 8 Mbf
- White Oak 2 Mbf
- Red Pine 1 Mbf

Additionally, there are 237 cords of pulp in the stand.

White Pine 2 – This stand is located at the northern most portion of the property adjacent to the Souhegan River and contains 7 acres. The basal area is 123 square feet with 120 trees per acre representing a fully stocked stand with more room to grow. Drainages containing runoff from the property are well defined in this area as they meander toward the river.

Sawlog volume in the White Pine 2 stand is as follows:

- White Pine 67 Mbf (thousand board feet)
- Red Oak 4 Mbf
- Red Maple 2 Mbf
- Red Pine 2 Mbf

Additionally, there are 237 cords of pulp in the stand.

Mixed Wood – The Mixed Wood stand runs from the southern frontage of Amherst Road northwesterly to the Souhegan River. The stand contains 15 acres and has a basal area of 124 square feet and 142 trees per acre. The stand is overstocked with very limited regeneration. The soils in this stand seem to hold their moisture resulting in fern growth and a more diverse mix of tree species including black cherry, black birch and pignut hickory.

Sawlog volume in the Mixed Wood stand is as follows:

- White Pine 51 Mbf (thousand board feet)
- Red Oak 10 Mbf
- Hemlock 16 Mbf
- Black Birch 1 Mbf
- Red Maple 8 Mbf
- Black Oak 3 Mbf

Additionally, there are 333 cords of pulp in the stand.

FOREST MANAGEMENT PRESCRIPTION

Considering the landowner objectives and the homogeneity of the mature forest as a whole, this plan will recommend a single set of prescriptions for the entire forest instead of a plan for each individual stand.

Recommendations –

1. Layout a parking area and interior access road off of Amherst Road that can be used for recreation and forest management purposes. The access road would extend to a point that would provide easy access to the Souhegan River utilizing appropriate erosion control and maintaining the scenic qualities of the property. These features should be located on the Windsor Loamy Sand soil type to minimize erosion concerns.
2. A timber harvest is recommended to cut out the parking area and access road.
3. At the same time a series of small openings approximately 1/4 acre in size should be created throughout the parcel to create conditions necessary to establish regeneration and vertical structure in the forest to improve vigor and create wildlife habitat.
4. Maintaining access roads, skid trails, clearings and even bike and hiking trails are helpful in suppressing potential wildfires.
5. No more than 20 percent of the basal area should be removed in the first harvest to maintain the mature feel of the forest and protect the conditions necessary to maintain the recreational attributes and scenic qualities of the property. Providing a shaded environment will help maintain the existing mountain laurel thickets.
6. Future silvicultural treatments could take place at 10 to 15 year intervals and should focus on creating additional small openings in the canopy to encourage additional regeneration.
7. Prior to any silvicultural activity confer with the NH Natural Heritage Bureau to identify any rare and endangered species that may be present on the property.
8. Forest access skid trails should be located to minimize erosion and protect water quality, and located in a manner that will respect the current mountain biking trails to the extent possible.
9. Every effort should be taken to protect the many stonewalls on the property and any foundations and other historical features that may be present.
10. Maintain a generous natural buffer along the Souhegan River consistent with RSA 43-B (Shoreline Protection Act).
11. Annually monitor the forest for damaging pest and disease issues.

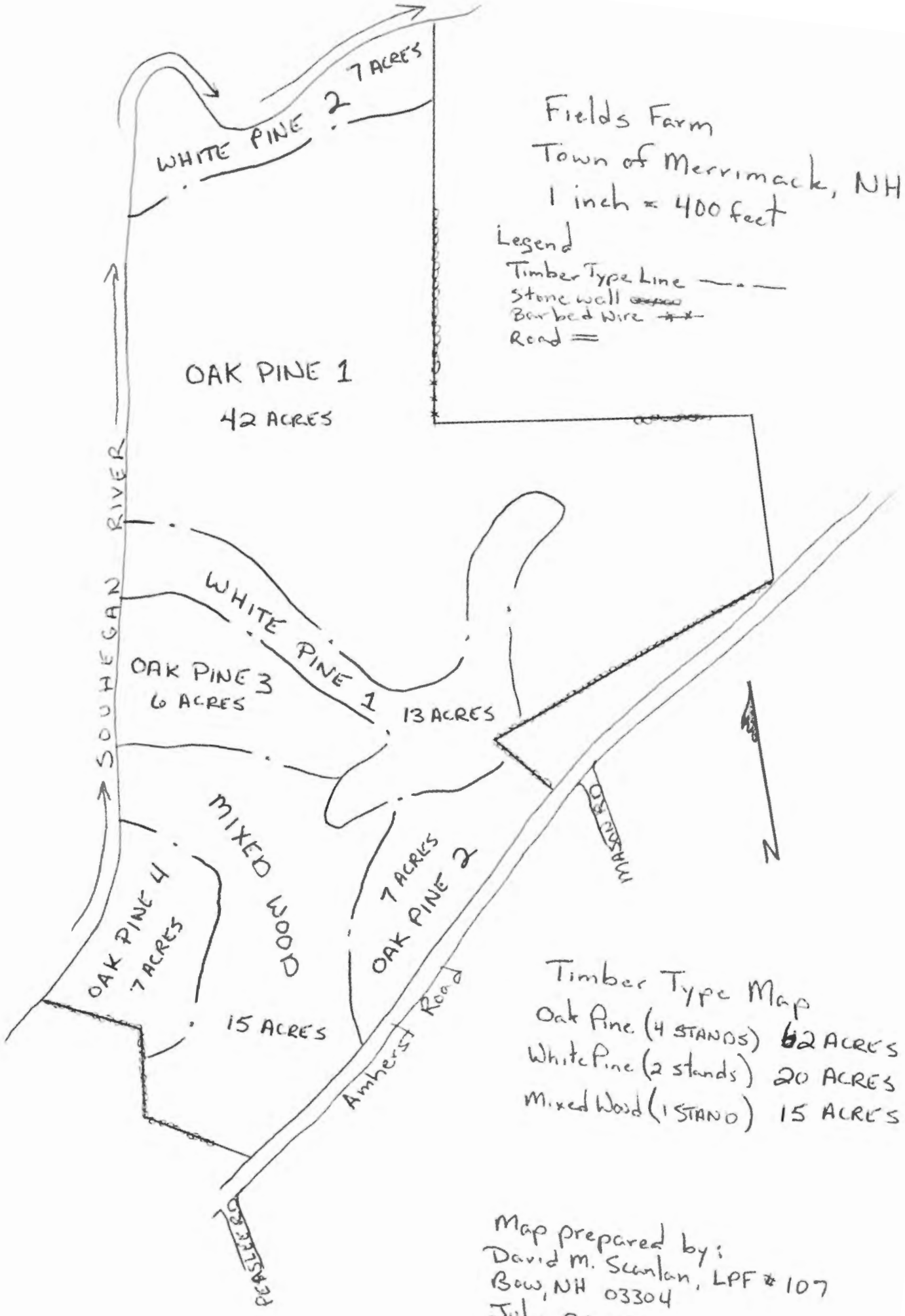
CURRENT TIMBER ASSET (LIQUIDATION) VALUE

SAWLOGS	Total Mbf	Stumpage price Mbf	Value
Black Birch	1.56	45	$70.20
Black Cherry	0.00		$0.00
Black Oak	22.98	250	$5,745.75
Hemlock	27.01	45	$1,215.23
White Pine	829.74	200	$165,948.80
Hickory	0.00		$0.00
Red Oak	191.15	350	$66,903.90
Red Maple	18.27	150	$2,740.35
Red Pine	9.99	20	$199.80
White Oak	13.55	250	$3,387.50
Total	1,114.26		$246,211.53

PULP	Total cords	Stumpage per cord	Value
Black Birch	28.50	5	$142.50
Black Cherry	3.00	5	$15.00
Black Oak	119.50	5	$597.50
Hemlock	195.00	3	$585.00
White Pine	573.50	0	$0.00
Hickory	5.00	5	$25.00
Red Oak	398.00	5	$1,990.00
Red Maple	271.00	5	$1,355.00
Red Pine	12.00	0	$0.00
White Oak	79.00	5	$395.00
	1684.50		$5,105.00

Forest Type Stand Data

1. Forest Type Map
2. Oak Pine 1
3. Oak Pine 2
4. Oak Pine 3
5. Oak Pine 4
6. White Pine 1
7. White Pine 2
8. Mixed Wood
9. Stand Total Volumes


Fields Farm
Town of Merrimack, NH
1 inch = 400 feet
Legend
Timber Type Line
Stone wall
Barbed Wire
Road
WHITE PINE 2
7 ACRES
OAK PINE 1
42 ACRES
SOUHEGAN RIVER
WHITE PINE 1
13 ACRES
OAK PINE 3
6 ACRES
MIXED WOOD
15 ACRES
OAK PINE 4
7 ACRES
7 ACRES
OAK PINE 2
MARSH RD
N
Amherst Road
PEASLEE RD
Timber Type Map
Oak Pine (4 STANDS) 62 ACRES
White Pine (2 stands) 20 ACRES
Mixed Wood (1 STAND) 15 ACRES
Map prepared by:
David M. Scanlan, LPF # 107
Bow, NH 03304
July 2005

Tract Name: Fields Farm
Compartment Name: Oak Pine 1
Inventory File Name: C:\Users\david\OneDrive\Documents\Fields Farm Oak Pine 1
Based on 19 plots
Data Collected By: David Scanlan
Total Acres in Stand: 42
Year Inventory Done: 2025
Age of Stand: 80 years.
Site Index of Site Species: No site index entered. The state average was used.
Average Trees per Acre: 101
Sampling Technique: Variable radius with a 10 baf

The following results are estimates of the initial condition of the stand.

If all trees were harvested and all materials were sold for biomass, there would be 79.6 tons of wood and bark per acre (standard error = 4.4). If all merchantable trees were harvested, there would be 11.7 tons of wood and bark per acre (standard error = 0.7) from nonmerchantable trees and the tops of merchantable trees.

Species	Trees #/Ac	Basal area Sq Ft/Ac	Dq in	Pulp amount Cd/Ac	Sawlog amount BF/Ac
13-Black oak	3.3	2.6	12.0	0.4	95
19-Eastern hemlock	4.2	3.2	11.7	0.6	0
21-Eastern white pine	34.9	53.7	16.8	4.6	7664
23-Northern red oak	41.2	44.7	14.1	6.3	3176
31-Red maple	9.5	4.7	9.5	0.9	116
32-Red pine	1.2	1.6	15.2	0.1	118
43-White oak	6.3	4.7	11.7	0.8	139
Total	100.8	115.3	14.5	13.7	11308
Standard error	9.2	6.5			
95% Conf. interval	82-120	102-129			

SUMMARY OF AMOUNTS	Average (Amount/Ac)	95% Conf. Interval (Amount/Ac)	SE of Ave. (Amount/Ac)	SE of Ave. (%)	Total	SE of Total
Pulp (Cd)	13.7	12-16	1	7	577	41
Sawtimber (BF)	11308	8800-13817	1194	11	474952	50153

Tract Name: Fields Farm
Compartment Name: Oak Pine 2
Inventory File Name: C:\Users\david\OneDrive\Documents\Fields Farm Oak Pine 2
Based on 3 plots
Data Collected By: David Scanlan
Total Acres in Stand: 7
Year Inventory Done: 2025
Age of Stand: 80 years.
Site Index of Site Species: No site index entered. The state average was used.
Average Trees per Acre: 169
Sampling Technique: Variable radius with a 10 baf

The following results are estimates of the initial condition of the stand.

If all trees were harvested and all materials were sold for biomass, there would be 67.7 tons of wood and bark per acre (standard error = 11.3). If all merchantable trees were harvested, there would be 10.5 tons of wood and bark per acre (standard error = 1.4) from nonmerchantable trees and the tops of merchantable trees.

Species	Trees	Basal area	Dq	Pulp amount	Sawlog amount
	#/Ac	Sq Ft/Ac	in	Cd/Ac	BF/Ac
21-Eastern white pine	41.4	40.0	13.3	4.2	4400
23-Northern red oak	76.8	43.3	10.2	7.1	2152
27-Pignut hickory	17.0	3.3	6.0	0.7	0
31-Red maple	1.9	3.3	18.0	0.5	257
43-White oak	31.6	13.3	8.8	1.9	475
Total	168.6	103.3	10.6	14.3	7283
Standard error	37.5	14.5			
95% Conf. interval	7-330	41-166			

SUMMARY OF AMOUNTS	Average (Amount/Ac)	95% Conf. Interval (Amount/Ac)	SE of Ave. (Amount/Ac)	SE of Ave. (%)	Total	SE of Total
Pulp (Cd)	14.3	10-19	1.1	7	100	8
Sawtimber (BF)	7283	0-22392	3511	48	50983	24578

Tract Name: Fields Farm
Compartment Name: Oak Pine 3
Based on 3 plots
Data Collected By: David Scanlan
Total Acres in Stand: 6
Year Inventory Done: 2025
Age of Stand: 80 years.
Site Index of Site Species: No site index entered. The state average was used.
Average Trees per Acre: 163
Sampling Technique: Variable radius with a 10 baf

The following results are estimates of the initial condition of the stand.

If all trees were harvested and all materials were sold for biomass, there would be 114 tons of wood and bark per acre (standard error = 18.6). If all merchantable trees were harvested, there would be 19.1 tons of wood and bark per acre (standard error = 2.4) from nonmerchantable trees and the tops of merchantable trees.

Species	Trees #/Ac	Basal area Sq Ft/Ac	Dq in	Pulp amount Cd/Ac	Sawlog amount BF/Ac
13-Black oak	38.5	30.0	12.0	6.1	728
19-Eastern hemlock	35.4	36.7	13.8	7.5	757
21-Eastern white pine	33.3	50.0	16.6	3.6	8035
23-Northern red oak	21.2	30.0	16.1	3.7	2784
31-Red maple	6.1	3.3	10.0	0.9	0
43-White oak	28.4	16.7	10.4	3.1	430
Total	162.8	166.7	13.7	24.8	12734
Standard error	44.0	35.3			
95% Conf. interval	0-352	15-319			

SUMMARY OF AMOUNTS	Average (Amount/Ac)	95% Conf. Interval (Amount/Ac)	SE of Ave. (Amount/Ac)	SE of Ave. (%)	Total	SE of Total
Pulp (Cd)	24.8	5-45	4.6	18	149	28
Sawtimber (BF)	12734	0-30768	4191	33	76406	25145

Tract Name: Fields Farm
Compartment Name: Oak Pine 4
Based on 3 plots
Data Collected By: David Scanlan
Total Acres in Stand: 7
Year Inventory Done: 2025
Age of Stand: 80 years.
Site Index of Site Species: No site index entered. The state average was used.
Average Trees per Acre: 186
Sampling Technique: Variable radius with a 10 baf

The following results are estimates of the initial condition of the stand.

If all trees were harvested and all materials were sold for biomass, there would be 106 tons of wood and bark per acre (standard error = 1.6). If all merchantable trees were harvested, there would be 17.8 tons of wood and bark per acre (standard error = 1.6) from nonmerchantable trees and the tops of merchantable trees.

Species	Trees	Basal area	Dq	Pulp amount	Sawlog amount
	#/Ac	Sq Ft/Ac	in	Cd/Ac	BF/Ac
13-Black oak	25.9	26.7	13.7	4.1	1635
19-Eastern hemlock	28.3	30.0	13.9	5.5	869
21-Eastern white pine	81.9	86.7	13.9	7.7	11177
23-Northern red oak	16.7	10.0	10.5	1.9	468
31-Red maple	30.0	16.7	10.1	3.8	253
32-Red pine	3.1	3.3	14.0	0.5	243
Total	185.9	173.3	13.1	23.5	14645
Standard error	27.0	3.3			
95% Conf. interval	70-302	159-188			

SUMMARY OF AMOUNTS	Average (Amount/Ac)	95% Conf. Interval (Amount/Ac)	SE of Ave. (Amount/Ac)	SE of Ave. (%)	Total	SE of Total
Pulp (Cd)	23.5	21-26	0.5	2	165	3
Sawtimber (BF)	14645	11202-18088	800	5	102515	5601

Tract Name: Fields Farm
Compartment Name: White Pine 1
Based on 6 plots
Data Collected By: David Scanlan
Total Acres in Stand: 13
Year Inventory Done: 2025
Age of Stand: 80 years.
Site Index of Site Species: No site index entered. The state average was used.
Average Trees per Acre: 154
Sampling Technique: Variable radius with a 10 baf

The following results are estimates of the initial condition of the stand.

If all trees were harvested and all materials were sold for biomass, there would be 89.3 tons of wood and bark per acre (standard error = 7.5). If all merchantable trees were harvested, there would be 11.2 tons of wood and bark per acre (standard error = 2.3) from nonmerchantable trees and the tops of merchantable trees.

Species	Trees #/Ac	Basal area Sq Ft/Ac	Dq in	Pulp amount Cd/Ac	Sawlog amount BF/Ac
19-Eastern hemlock	28.4	11.7	8.7	2.1	0
21-Eastern white pine	94.8	123.3	15.4	10.5	17944
23-Northern red oak	15.0	11.7	11.9	1.8	640
31-Red maple	4.9	5.0	13.7	1.6	0
40-Sweet birch	10.9	6.7	10.6	1.5	0
Total	154.0	158.3	13.7	17.5	18584
Standard error	31.2	13.0			
95% Conf. interval	74-234	125-192			

SUMMARY OF AMOUNTS	Average (Amount/Ac)	95% Conf. Interval (Amount/Ac)	SE of Ave. (Amount/Ac)	SE of Ave. (%)	Total	SE of Total
Pulp (Cd)	17.5	12-23	2.3	13	227	30
Sawtimber (BF)	18584	13531-23638	1966	11	241597	25553

Tract Name: Fields Farm
Compartment Name: White Pine 2
Based on 3 plots
Data Collected By: David Scanlan
Total Acres in Stand: 7
Year Inventory Done: 2025
Age of Stand: 80 years.
Site Index Species: Eastern white pine
Site Index of Site Species: 10 at 50 years.
Average Trees per Acre: 120
Sampling Technique: Variable radius with a 10 baf

The following results are estimates of the initial condition of the stand.

If all trees were harvested and all materials were sold for biomass, there would be 74.1 tons of wood and bark per acre (standard error = 7.2). If all merchantable trees were harvested, there would be 2.4 tons of wood and bark per acre (standard error = 0.9) from nonmerchantable trees and the tops of merchantable trees.

Species	Trees #/Ac	Basal area Sq Ft/Ac	Dq in	Pulp amount Cd/Ac	Sawlog amount BF/Ac
19-Eastern hemlock	6.1	3.3	10.0	0.5	0
21-Eastern white pine	59.8	83.3	16.0	10.4	9515
23-Northern red oak	28.7	16.7	10.3	2.5	619
31-Red maple	23.1	16.7	11.5	3.7	253
32-Red pine	1.9	3.3	18.0	0.4	257
Total	119.6	123.3	13.8	17.6	10643
Standard error	25.3	12.0			
95% Conf. interval	11-229	72-175			

SUMMARY OF AMOUNTS	Average (Amount/Ac)	95% Conf. Interval (Amount/Ac)	SE of Ave. (Amount/Ac)	SE of Ave. (%)	Total	SE of Total
Pulp (Cd)	17.6	2-33	3.7	21	123	26
Sawtimber (BF)	10643	2137-19150	1977	19	74503	13838

Tract Name: Fields Farm
Compartment Name: Mixed Wood
Based on 7 plots
Data Collected By: David Scanlan
Total Acres in Stand: 15
Year Inventory Done: 2025
Age of Stand: 80 years.
Site Index of Site Species: No site index entered. The state average was used.
Average Trees per Acre: 142
Sampling Technique: Variable radius with a 10 baf

The following results are estimates of the initial condition of the stand.

If all trees were harvested and all materials were sold for biomass, there would be 80.4 tons of wood and bark per acre (standard error = 5.7). If all merchantable trees were harvested, there would be 15.7 tons of wood and bark per acre (standard error = 1.2) from nonmerchantable trees and the tops of merchantable trees.

Species	Trees #/Ac	Basal area Sq Ft/Ac	Dq in	Pulp amount Cd/Ac	Sawlog amount BF/Ac
11-Black cherry	2.6	1.4	10.0	0.2	0
13-Black oak	13.1	11.4	12.7	2.5	212
19-Eastern hemlock	27.2	24.3	12.8	3.7	1092
21-Eastern white pine	24.9	32.9	15.6	4.4	3382
23-Northern red oak	3.7	5.7	16.8	0.5	671
27-Pignut hickory	5.9	2.9	9.4	0.6	0
31-Red maple	60.3	41.4	11.2	10.1	543
40-Sweet birch	3.2	2.9	12.9	0.6	104
43-White oak	1.3	1.4	14.0	0.2	0
Total	142.3	124.3	12.7	22.9	6004
Standard error	13.7	7.8			
95% Conf. interval	109-176	105-143			

SUMMARY OF AMOUNTS	Average (Amount/Ac)	95% Conf. Interval (Amount/Ac)	SE of Ave. (Amount/Ac)	SE of Ave. (%)	Total	SE of Total
Pulp (Cd)	22.9	18-28	2.1	9	343	31
Sawtimber (BF)	6004	2370-9638	1485	25	90061	22274

Oak / Pine 1

Specie	Sawlogs BF/AC	Pulp Cd/AC	Acres	Total Mbf	Total cords
Black Oak	95	0.4	42	3.99	16.8
Hemlock	0	0.6	42	0	25.2
White Pine	7664	4.6	42	321.888	193.2
Red Oak	3176	6.3	42	133.392	264.6
Red Maple	116	0.9	42	4.872	37.8
Red Pine	118	0.1	42	4.956	4.2
White Oak	139	0.8	42	5.838	33.6

Oak / Pine 2

Specie	Sawlogs BF/AC	Pulp Cd/AC	Acres	Total Mbf	Total cords
Hickory	0	0.7	7	0	4.9
White Pine	4400	4.2	7	30.8	29.4
Red Oak	2152	7.1	7	15.064	49.7
Red Maple	257	0.5	7	1.799	3.5
White Oak	475	1.9	7	3.325	13.3

Oak / Pine 3

Specie	Sawlogs BF/AC	Pulp Cd/AC	Acres	Total Mbf	Total cords
Black Oak	728	6.1	6	4.368	36.6
Hemlock	757	7.5	6	4.542	45
White Pine	8035	3.6	6	48.21	21.6
Red Oak	2784	3.7	6	16.704	22.2
Red Maple	0	0.9	6	0	5.4
White Oak	430	3.1	6	2.58	18.6

Oak / Pine 4

Specie	Sawlogs BF/AC	Pulp Cd/AC	Acres	Total Mbf	Total cords
Black Oak	1635	4.1	7	11.445	28.7
Hemlock	869	5.5	7	6.083	38.5
White Pine	11,177	7.7	7	78.239	53.9
Red Oak	468	1.9	7	3.276	13.3
Red Maple	253	3.8	7	1.771	26.6
Red Pine	243	0.5	7	1.701	3.5

White Pine 1

Specie	Sawlogs BF/AC	Pulp Cd/AC	Acres	Total Mbf	Total cords
Black Birch	0	1.5	13	0	19.5
Hemlock	0	2.1	13	0	27.3
White Pine	17,944	10.5	13	233.272	136.5
Red Oak	640	1.8	13	8.32	23.4
Red Maple	0	1.6	13	0	20.8
Red Pine	118	0.1	13	1.534	1.3
White Oak	139	0.8	13	1.807	10.4

White Pine 2

Specie	Sawlogs BF/AC	Pulp Cd/AC	Acres	Total Mbf	Total cords
Hemlock	0	0.5	7	0	3.5
White Pine	9,515	10.4	7	66.605	72.8
Red Oak	619	2.5	7	4.333	17.5
Red Maple	253	3.7	7	1.771	25.9
Red Pine	257	0.4	7	1.799	2.8

Mixed Wood

Specie	Sawlogs BF/AC	Pulp Cd/AC	Acres	Total Mbf	Total cords
Black Birch	104	0.6	15	1.56	9
Black Cherry	0	0.2	15	0	3
Black Oak	212	2.5	15	3.18	37.5
Hemlock	1092	3.7	15	16.38	55.5
White Pine	3382	4.4	15	50.73	66
Red Oak	671	0.5	15	10.065	7.5
Red Maple	543	10.1	15	8.145	151.5
White Oak	0	0.2	15	0	3

Soils

1. General Soils Map
2. Soils suitable for road building

Soil Map—Hillsborough County, New Hampshire, Eastern Part
(Fields Farm Conservation Area)

Map Scale: 1:6,320 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 300 600 1200 1800

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Hillsborough County, New Hampshire, Eastern Part
Survey Area Data: Version 27, Sep 3, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CmE	Canton stony fine sandy loam, 25 to 35 percent slopes	0.4	0.4%
CsC	Chatfield-Hollis complex, 8 to 15 percent slopes, rocky	3.1	3.1%
Oc	Occum fine sandy loam	0.3	0.3%
PfB	Paxton fine sandy loam, 0 to 8 percent slopes, very stony	14.5	14.5%
PfC	Paxton fine sandy loam, 8 to 15 percent slopes, very stony	27.0	27.0%
Su	Suncook loamy fine sand	2.6	2.6%
W	Water (less than 40 acres)	3.8	3.8%
WdB	Windsor loamy sand, 3 to 8 percent slopes	33.7	33.8%
WdC	Windsor loamy sand, 8 to 15 percent slopes	8.4	8.4%
WoB	Woodbridge fine sandy loam, 3 to 8 percent slopes	5.0	5.0%
WvB	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony	0.9	0.9%
Totals for Area of Interest		**99.7**	**100.0%**

Unpaved Local Roads and Streets—Hillsborough County, New Hampshire, Eastern Part
(Fields Farm Conservation Area - road potential)

Map Scale: 1:6,320 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 300 600 1200 1600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

Description

ENG - Engineering

Unpaved local roads and streets are those roads and streets that carry traffic year round but have a graded surface of local soil material or aggregate.

Description:

Unpaved local roads and streets are those roads and streets that carry traffic year round but have a graded surface of local soil material or aggregate.

The roads and streets consist of

(1) the underlying local soil material, either cut or fill, which is called "the sub-grade";

(2) the surface, which may be the same as the subgrade or may have aggrate such as crushed limestone added.

They are graded to shed water, and conventional drainage measures are provided. These roads and streets are built mainly from the soil at the site. Soil interpretations for local roads and streets are used as a tool in evaluating soil suitability and identifying soil limitations for the practice. The rating is for soils in their present condition and does not consider present land use. Soil properties and qualities that affect local roads and streets are those that influence the ease of excavation and grading and the traffic-supporting capacity. The properties and qualities that affect the ease of excavation and grading are hardness of bedrock or a cemented pan, depth to bedrock or a cemented pan, depth to a water table, flooding, the amount of large stones, and slope. The properties that affect traffic-supporting capacity are soil strength as inferred from the AASHTO group index and the Unified classification, subsidence, shrink-swell behavior, potential frost action, and depth to the seasonal high water table. The dust generating tendacy of the soil is also considered.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Unpaved Local Roads and Streets

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
CmE	Canton stony fine sandy loam, 25 to 35 percent slopes	Very limited	Canton (90%)	Slope (1.00)	0.4	0.4%
				Dusty (0.00)		
CsC	Chatfield-Hollis complex, 8 to 15 percent slopes, rocky	Somewhat limited	Chatfield, very stony (55%)	Slope (0.63)	3.1	3.1%
				Depth to hard bedrock (0.57)		
				Frost action (0.50)		
				Dusty (0.00)		
			Charlton, very stony (8%)	Slope (0.63)		
				Frost action (0.50)		
				Dusty (0.00)		
			Paxton, very stony (4%)	Slope (0.63)		
				Frost action (0.50)		
				Depth to saturated zone (0.08)		
				Dusty (0.00)		
Oc	Occum fine sandy loam	Very limited	Occum (85%)	Flooding (1.00)	0.3	0.3%
				Frost action (0.50)		
				Dusty (0.00)		
			Pootatuck (15%)	Flooding (1.00)		
				Frost action (0.50)		
				Dusty (0.05)		
				Depth to saturated zone (0.04)		
PfB	Paxton fine sandy loam, 0 to 8 percent slopes, very stony	Somewhat limited	Paxton, very stony (85%)	Frost action (0.50)	14.5	14.5%
				Depth to saturated zone (0.08)		
				Dusty (0.00)		

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
			Woodbridge, very stony (8%)	Depth to saturated zone (0.56)		
				Frost action (0.50)		
				Dusty (0.00)		
			Charlton, very stony (3%)	Frost action (0.50)		
				Dusty (0.00)		
PfC	Paxton fine sandy loam, 8 to 15 percent slopes, very stony	Somewhat limited	Paxton, very stony (85%)	Slope (0.63)	27.0	27.0%
				Frost action (0.50)		
				Depth to saturated zone (0.08)		
				Dusty (0.00)		
			Woodbridge, very stony (8%)	Depth to saturated zone (0.56)		
				Frost action (0.50)		
				Dusty (0.00)		
			Charlton, very stony (5%)	Slope (0.63)		
				Frost action (0.50)		
				Dusty (0.00)		
Su	Suncook loamy fine sand	Very limited	Suncook (90%)	Flooding (1.00)	2.6	2.6%
			Occum (5%)	Flooding (1.00)		
				Frost action (0.50)		
				Dusty (0.03)		
W	Water (less than 40 acres)	Not rated	Water < 40 (100%)		3.8	3.8%
WdB	Windsor loamy sand, 3 to 8 percent slopes	Not limited	Windsor (85%)		33.7	33.8%
			Hinckley (10%)			
WdC	Windsor loamy sand, 8 to 15 percent slopes	Somewhat limited	Windsor (85%)	Slope (0.16)	8.4	8.4%
			Hinckley (10%)	Slope (0.16)		
			Deerfield (5%)	Depth to saturated zone (0.94)		
WoB	Woodbridge fine sandy loam, 3 to 8 percent slopes	Somewhat limited	Woodbridge, fine sandy loam (82%)	Depth to saturated zone (0.75)	5.0	5.0%

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
				Frost action (0.50)		
				Dusty (0.00)		
			Paxton (10%)	Frost action (0.50)		
				Depth to saturated zone (0.19)		
				Dusty (0.00)		
WvB	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony	Somewhat limited	Woodbridge, very stony (82%)	Depth to saturated zone (0.56)	0.9	0.9%
				Frost action (0.50)		
				Dusty (0.00)		
			Paxton, very stony (10%)	Frost action (0.50)		
				Depth to saturated zone (0.08)		
				Dusty (0.00)		
Totals for Area of Interest					**99.7**	**100.0%**

Rating	Acres in AOI	Percent of AOI
Somewhat limited	58.8	59.0%
Not limited	33.7	33.8%
Very limited	3.3	3.3%
Null or Not Rated	3.8	3.8%
Totals for Area of Interest	**99.7**	**100.0%**

Forest Pests and Disease

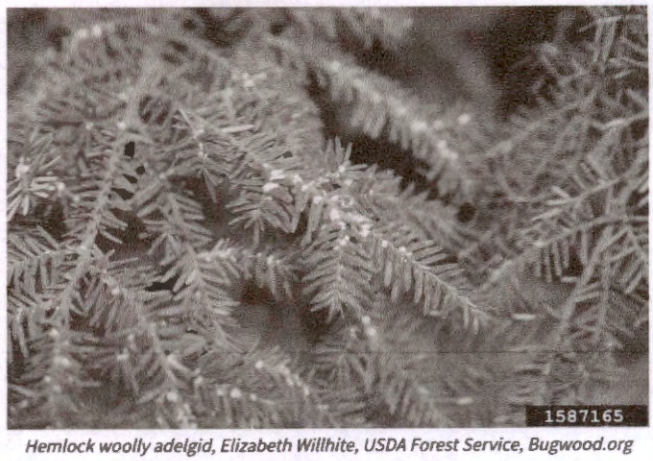
1. Hemlock Woolly Adelgid
2. Spongy (Gypsy) Moth
3. Caliciopsis

Hemlock Woolly Adelgid

Originally from Asia, Hemlock Woolly Adelgid (HWA) was first discovered in New Hampshire in Portsmouth in 2000. This small, wingless insect uses its piercing mouth-parts to feed in the xylem of the small hemlock twigs. HWA, left untreated, can kill a tree in 4 to 10 years. Untreated outbreaks of HWA weaken the tree and leave it susceptible to damage from other pests, such as elongate hemlock scale and hemlock borer. Maintaining trees in a healthy condition lessens damage by other pests.

HWA populations can be found in more than half of the towns in New Hampshire and every county except Coös. This pest can be introduced into new areas by birds and other wildlife, and through human activities, such as the movement of infested nursery stock and forest products. Spread of HWA on nursery stock and forest products is prohibited by existing nursery stock (RSAs 433:28-433:30) and forestry regulations (RSA 227-K:17) which prohibit the sale of nursery stock and forest products infested with HWA. HWA is also a prohibited invasive insect in the state (Agr 3802.01), so that it is not permissible to transport live HWA except for purposes of destruction.

N.H. Division of Forests and Lands has an action plan in response to HWA.



Hemlock woolly adelgid, Elizabeth Willhite, USDA Forest Service, Bugwood.org

There are extensive best management practices for nurseries to prevent the spread of HWA and elongate hemlock scale.

Best management practices for forest products include:

- Completely delimb all hemlock roundwood.
- Power wash all equipment between jobs at sites where hemlock was harvested.
- Consider documenting your use of BMPs with a compliance agreement with the N.H. Division of Forests and Lands.

NH TOWNS WITH DETECTIONS - ALPHABETICAL LIST >
NH TOWNS WITH DETECTIONS - MAP BY YEAR >
NH TOWNS SURVEYED FOR HEMLOCK WOOLLY ADELGID IN 2022 >

Hemlock Tree Treatment Options

A licensed pesticide applicator can be hired to treat your hemlock trees. When seeking the help of an arborist, you can ask if they are licensed by State of NH Division of Pesticide Control or contact the State of NH Division of Pesticide Control at (603) 271-3550 to find licensed applicators in your area. Resources for selecting an arborist in NH and a link to the NH Arborists Association can be found by clicking below.

VISIT NH DIVISION OF PESTICIDE CONTROL >
FIND AN ARBORIST >

The Basics & What To Do

- Forest Service Pest Alert

Spongy Moth

Spongy moth (*Lymantria dispar*), formerly known as the gypsy moth, is an important defoliating insect of hardwoods in New Hampshire. A native of Europe and Asia (though we don't think we have the Asian varieties), spongy moth was introduced into North America in 1869 when specimens were accidentally released in Medford, Massachusetts. Spongy moth is an outbreak pest and can remain at low levels for several years and then numbers can rise every few years. Many might remember the outbreaks in the early 1980s and 1990s. Unless areas are actively monitored, even moderate spongy moth populations can exist unnoticed. Although these cycles are influenced by numerous factors, the low populations in New Hampshire in recent years generally are believed to be the result, at least in part, of a spongy moth disease caused by the fungus *Entomophaga maimaiga*.

Female spongy moth and their egg masses on tree bark. John Ghent, Bugwood.org

Recent outbreaks of spongy moth in southern New England and some small populations in a few southern New Hampshire towns are worrisome. Forest health specialists are monitoring the situation. For forest landowners and managing foresters - We recommend as a best management practice not to harvest timber in a stands defoliated by spongy moth until three (3) years after the outbreak subsides. Trees need time to recharge their starch reserves without additional root and soil stress.

We will add updates here as they become available. *Last updated February, 2022.*

More About Spongy Moth

SPONGY MOTH FACT SHEET > UNH Cooperative Extension
SPONGY MOTH PEST ALERT > US Forest Service
SPONGY MOTH DEFOLIATION IN NH THROUGH THE DECADES >
SPONGY MOTH MANAGEMENT IN THE UNITED STATES: A COOPERATIVE APPROACH >
EUROPEAN SPONGY MOTH >

Other Information

'PRAY FOR A WET SPRING' > Eagle Tribune, 10/30/2016
CHECK YOUR LAWN FURNITURE AND OUTDOOR TOYS FOR SPONGY MOTH EGG MASSES BEFORE MOVING OR TAKING A TRIP >
SPONGY MOTH SEND FOREST ANIMALS PACKING > Video

Spongy moth caterpillar

REPORT AN INVASIVE SPECIES OR DISEASE

NHBugs

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COOPERATING AGENCIES

New Hampshire Department of Agriculture, Markets & Food

APHIS

Caliciopsis Canker (pine canker)

Caliciopsis pinea

Host: Eastern and western white pine, and many firs.

Distribution: Throughout the northeast, Quebec, and Ontario. First reported in New Hampshire in 1997. Most commonly found throughout the central region of New Hampshire on sandy, well drained soils.

Identifying symptoms: Profuse pitching from small, round or elongated cankers in the mid to upper bole of eastern white pine. The cankers are found between the whorls which distinguishes it from blister rust which is associated with branch intersections.

Figure 1.

Figure 2.

Life History: This canker disease is not well understood. It's thought to be a weak perennial fungus which attacks thin barked areas of the branch and bole. Spores mature in late winter and the black hair like fruiting structures can persist throughout the year. Spores are probably rain splash disseminated and enter through bark lenticels or small insect wounds.

Stand Damage: In New Hampshire, it would not be uncommon to find white pine pole stands with as many as 70% of the stems infected. To date, mortality attributed to caliciopsis is very low. However increased crown transparency and reduced crown density on the infected trees suggests tree vigor is being reduced by heavy infections of this disease.

Control: Management practices which create increased sunlight and warmer temperatures in the upper bole area of the tree may decrease spore production and dissemination.

Figure 1. Arrow indicates canker location in crown stem.

Figure 2. Outline of severe three year old canker.

Figure 3. Yellow arrow points to first year canker.

Figure 4. Arrow indicates defect from 10 year old canker.

Prepared by: Kyle Lombard, 2003

Figure 3.

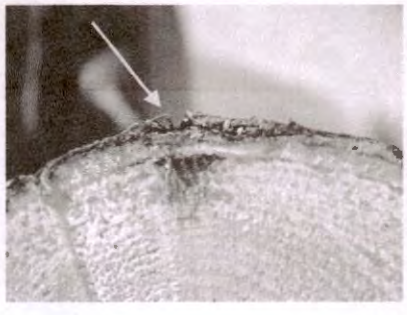


Figure 4.

Miscellaneous

1. Appalachian Oak Pine Forests
2. Shoreline Protection Corridor (RSA 483-B)
3. Fields Farm Mountain Bike Trail Map

Appalachian Oak-Pine Forests

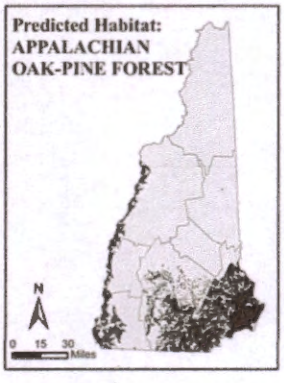
DOWNLOAD RESOURCE

Appalachian oak-pine forests occur in southern and central New Hampshire below 900 feet of elevation, or on dry, rocky ridges at higher elevations. Here, the **warmer and drier climate promotes tree species adapted to drier soils**. White pine and oak trees dominate the tree canopy.

The presence of tree species typical of southern (Appalachian) states sets this habitat apart from the more common oak-pine forest type (also called Hemlock-Hardwood-Pine). Look for black, scarlet, chestnut and white oaks, and shagbark and pignut hickories. Black birch, aspen, pitch pine, sassafras, and yellow birch may also be present. Blueberry, black huckleberry, sheep laurel, and Pennsylvania sedge are typical understory plants. In southwest New Hampshire, mountain laurel shrubs can dominate the understory, while along the Connecticut River and in the Seacoast, Appalachian oaks and hickories mix with sugar maple and white ash on richer soils.

Squirrels may play a key role in re-growing (regenerating) oak stands by burying acorns, often under stands of white pine. They also bury pine cones under oak trees. As a result, it is common to find oak in the understory of white pines, and white pine regenerating under oak.

Where are Appalachian Oak-Pine Forests?



Appalachian oak-pine forests cover less than 10% of the state, mostly in the southeastern portions, especially Rockingham County, where the largest blocks of this habitat are found. A narrow band also follows the Connecticut Rivernorth from Cheshire into Sullivan and Grafton Counties. Examples of high-quality Appalachian oak-pine forests are in Pawtuckaway State Park in Nottingham, around Great Bay in Durham (Crommet Creek), and at Beaver Brook Association lands in Hollis.

Why are These Forests so Important?

Appalachian oak-pine forests, with their abundance of nut-bearing oaks and hickories, provide a rich food source for wildlife such as ruffed grouse, turkey, black bear, squirrels, mice and chipmunks. In turn, raptors such as northern goshawk feed on small mammals and find nesting and perching sites in white pines in the tree canopy. Near water, white pines provide key nest and perch sites for bald eagles, great blue herons, and osprey.

Threats to Appalachian Oak-Pine Forests

Habitat Lost to Development

Most Appalachian oak-pine forests are in southeastern New Hampshire, coinciding with the highest densities of people. The dry soils in these forests are easily developed for homes, buildings, and septic systems. Much of New Hampshire's historical Appalachian oak-pine forest is already permanently lost to human development. Large, intact blocks of this forest type are relatively rare, and only 12% of existing forests are permanently conserved.

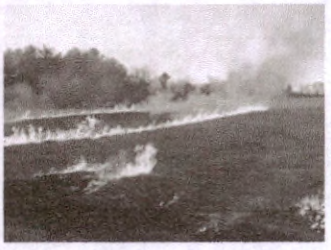
Land Use History

Many stands of Appalachian oak-pine forest are of the same age, roughly 80-100 years old. They re-grew after farms were abandoned throughout the last century. Many wildlife species of conservation concern found in Appalachian oak-pine forests are attracted to patches of old or young trees within the larger forested landscape. Without a diverse range of ages and sizes of trees, today's Appalachian oak-pine forests are less diverse and do not support as many of these rare species.

Fewer Beaver Dams, Less Diversity

Prior to human settlement, large complexes of beaver wetlands occurred on the landscape in varying stages of abandonment – from newly flooded sites, to ponds, open meadows and forests. Beaver activity contributed to the patchwork of different tree sizes, types, and ages in pre-settlement Appalachian oak-pine forests. The flat landscape in southern New Hampshire meant that beaver flooding covered more of the landscape than in other hillier parts of the state. Over time, human development encroached on beaver habitats, reducing the ability of beavers to influence the forested landscape, making our forests more uniform and less diverse.

Less Fire, Less Diversity



Historically, the dry soils and warm temperatures in southern New Hampshire allowed occasional low intensity fires to burn in the forest. These fires were caused by both lightning and burning by Native Americans. Oak trees are relatively resistant to fire and are able to sprout from stumps after a burn, so fire helped maintain a large component of oak in the forest. Without fire, today's forests likely have a higher proportion of white pine, hemlock, sugar maple and birch, trees less tolerant of fire which don't provide as rich a supply of nuts for wildlife. Today's mature Appalachian oak-pine forests may also be denser, as historical low ground fires would have created a more open understory in the forest, important for such species as whip-poor-wills and northern goshawks.

Climate Vulnerabilities for Appalachian Oak-Pine Forests

- Although the species that dominate Appalachian oak-pine are tolerant of warmer and potentially drier conditions, and thus believed resistant to climate change, expansion of this habitat is likely to be limited by site conditions. Timing of range shifts will also vary considerably among species, and any migration is also likely to take place over timeframes longer than the present assessment considers.
- Drought-induced water shortages may make this habitat more susceptible to fire, but this is unlikely to significantly alter its extent or composition. Note that fire is still relatively rare even in similar habitats well to the south of NH, so the likelihood of increased fire events is probably low.
- As with other forest types, some forest pests may increase with warmer and/or drier conditions (e.g., gypsy moth), although the potential impacts of these on the overall habitat is unknown.

Click here for the Appalachian Oak-Pine Climate Assessment, a section of the Ecosystems and Wildlife Climate Change Adaptation Plan (2013), an Amendment to the NH Wildlife Action Plan

Stewardship Guidelines for Appalachian Oak-Pine Forests

- In the face of intense development pressure, **land conservation is critical to protect large forest blocks** (>500 acres) of Appalachian oak-pine habitat. These large forest blocks are rare, and are critical to protect wide-ranging species such as bobcat, black bear, and moose.

- For both conservation and land stewardship efforts, **focus on conserving oak-pine habitat characterized by:**
  - **Areas with large trees** (>18" diameter) which are important as nutproducers, especially oaks and hickories, and as future snags and den trees used by bats, black bear, and other species;
  - **Areas with particularly dry soils** — look for an open understory and less common trees such as red pine, pitch pine, white oak, chestnut oak, scarlet oak, hickories, and sassafras;
  - **Areas with a diversity of tree sizes and ages**, including patches of young forest, used by New England cottontail, Canada warbler, American woodcock.
- **Work to regenerate a mosaic of tree age classes and a mix of tree species to create a "patchy" forest canopy**. A full-range of age classes, well-distributed across the landscape, is important to support the great diversity of wildlife dependent on Appalachian oak-pine habitats.
- **Provide continual patches of young, regenerating forest** habitat to enhance: cover for wildlife, berry-producing shrubs, hardwood stump sprouts, and other key features of "early-successional" habitat (see Shrublands habitats).
- **Maintain downed woody material** (fallen logs, branches, and leaves) on the forest floor as cover for small mammals, amphibians, and ground-nesting birds. Large downed logs (>18" diameter) provide "drumming sites" used by male ruffed grouse to attract females.
- When conducting forest management activities, **maintain some overstory pine** to provide additional wildlife cover, perches, seed sources and large future cavity trees. "Wolf pines" (large, branchy pines with low timber value) can be a good source for these wildlife habitat features.
- **Maintain existing cavity trees and snags** whenever possible. Cavity trees and snags at least 18" in diameter support the greatest diversity of wildlife species.
- Re-growing oak and white pine after a timber harvest can be tricky. **Use carefully planned harvest techniques to regenerate Appalachian oak-pine species**. Techniques may include partial "shelterwood" harvests and "group selection" harvests, combined with attention to oak-pine seed sources, seasonal timing of harvest, and planned disturbance of the forest floor to create a favorable seedbed.
- **Always consult a licensed New Hampshire forester** before conducting a timber harvest on your property. Foresters can employ harvest ("silvicultural") techniques to regenerate Appalachian oak-pine forest. Understand and follow all laws pertaining to the harvesting of trees near wetlands and waterbodies. Follow established Best Management Practices, and harvest timber near wetlands only when the soils are either frozen (winter) or very dry (summer).

Wildlife Found in Appalachian Oak-Pine Forests

A great many wildlife species use Appalachian oak-pine forests, including those listed below. Be on the lookout for these species, and follow stewardship guidelines to help maintain and enhance these forests. Species of conservation concern, those wildlife species identified in the Wildlife Action Plan as having the greatest need of conservation, appear in **bold** typeface and link to their wildlife profile from the Plan.

- American woodcock
- Bald eagle*
- Black bear
- Black racer*
- Blanding's turtle**
- Bobcat
- Canada warbler
- Cerulean warbler
- Common nighthawk**
- Cooper's hawk
- Eastern pipistrelle
- Eastern red bat
- Hognose snake**
- Moose
- New England cottontail rabbit**

- Northern goshawk
- Northern myotis
- Ribbon snake
- Ruffed grouse
- Silver-haired bat
- Smooth green snake
- Timber rattlesnake**
- Veery
- Whip-poor-will
- White-tailed deer
- Wild turkey
- Wood thrush

Other Resources for Appalachian Oak-Pine Forests

- NH Wildlife Action Plan habitat profile for Appalachian oak-pine forests, learn more about Appalachian oak-pine forest in NH, including the condition and location of this habitat, the threats facing this habitat, and recommended conservation actions
- More Publications related to Habitats

Photo Credits on this page: Sean Kirwin, Mike Marchand, Frank Mitchell, Ben Kimball, Malin Clyde

Research for this webpage and accompanying Habitat Stewardship brochures was conducted by UNH Cooperative Extension staff with support from the Sustainable Forestry Initiative and NH Fish & Game

Contact

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Cooperative Extension
Nesmith Hall
Durham, NH 03824

TOPICS: Natural Resources

TAGS: Habitat Stewardship Brochures

CATEGORIES: Natural Resources, NH Coverts Project

ArcGIS Web Map

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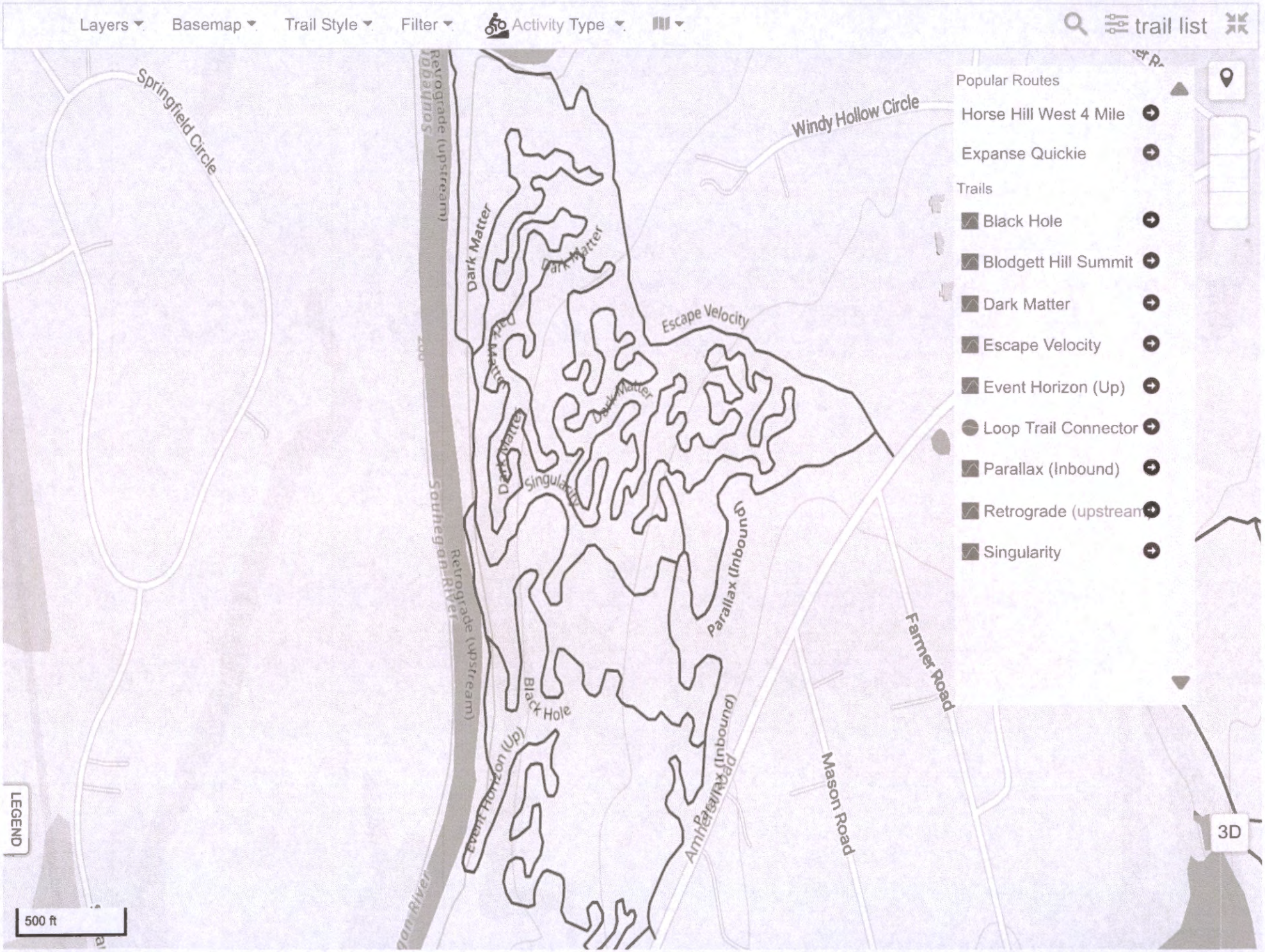
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Blodgett Hill Summit
Dark Matter
Escape Velocity
Event Horizon (Up)
Loop Trail Connector
Parallax (Inbound)
Retrograde (upstream)
Singularity
Springfield Circle
Windy Hollow Circle
Farmer Road
Mason Road
Amherst Road
Retrograde (upstream)
Parallax (Inbound)
Event Horizon (Up)
Black Hole
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Escape Velocity
Singularity
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Deed

Charles Ireland to Town of Merrimack
Hillsborough County Registry of Deeds
Book 7207, Page 727
March 18, 2004

4032427 2004 APR 13 PM 3:27

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COPY

WARRANTY DEED

KNOW ALL MEN BY THESE PRESENTS, That I, Charles E. Ireland of 222 Amherst Road, Merrimack, County of Hillsborough and State of New Hampshire for consideration paid grants to the Town of Merrimack, a municipal corporation with a principal place of business at Baboosic Lake Road, Merrimack, County of Hillsborough, State of New Hampshire, with ***WARRANTY COVENANTS***, two certain tracts or parcels of land located in Merrimack, County of Hillsborough, State of New Hampshire, more particularly bounded and described as follows:

TRACT I

A certain tract or parcel of land, located in Merrimack, County of Hillsborough, State of New Hampshire, bounded and described as follows:

Beginning at an iron pipe in the ground in the northwesterly line of the highway leading from Amherst to Merrimack at the northeast corner of land now or formerly of the grantor; thence

North 61 degrees west two hundred fifty (250) feet by a stone wall to a bend in the wall; thence

North 69-1/2 degrees west by said wall, one hundred eighty-five (185) feet to a corner in the wall; thence

South 19-3/4 degrees west, two hundred forty-five (245) feet by land of the grantor; thence

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South 27 degrees west, two hundred sixty-two (262) feet by land now or formerly of the grantor to an iron pipe in the ground; thence

North 54 degrees west, one hundred seventy-four (174) feet by a stone wall to an iron pipe in the wall; thence

North 6-1/2 degrees east, three hundred forty-eight (348) feet by a stone wall to a corner in the wall; thence

North 75 degrees west partly by a stone wall and a wire fence, three hundred forty-six (346) feet to the Souhegan River; thence

Northerly by the easterly bank of the Souhegan River, sixteen hundred fifty (1650) feet to a point; thence

Northerly and easterly by said River and following the course of said River to a group of stones at the northwest corner of land now or formerly of Leonard Stearns; thence

Southerly by said Stearns land, eleven hundred (1100) feet, more or less to a stone bound; thence

South 87 degrees east by said Stearns land, fifty-nine (59) rods to a pointed stone in the wall; thence

South 3-1/2 degrees east, thirty-one and one-half (31-1/2) rods to a pointed stone in the wall at a point in the northwesterly line of said highway; thence

South 66-1/2 degrees west by a stone wall, nine hundred thirty (930) feet to a stone bound; thence

South 50 degrees east, two hundred forty-three (243) feet by a stone wall to a stone bound set in the ground in the northwesterly line of said highway; thence

Southwesterly by said highway, eight hundred sixty-seven (867) feet, more or less, to the point of beginning.

Said premises are shown on a plan entitled "Property of Bert Peaslee, Merrimack, NH" dated January, 1960, made by W.M. Falconer, Surveyor recorded in the Hillsborough County Registry of Deeds.

This conveyance is made subject to whatever rights the Connecticut River Power Company, or its successors or assigns, may have to erect poles and wires.

Meaning and intending to describe and convey the same premises as conveyed to Charles E. Ireland and Dorothy R. Ireland, by deed of Bert L. Peaslee dated February 6, 1960 and recorded in the Hillsborough County Registry of Deeds in Book 1596 at Page 430.

TRACT II

A certain tract or parcel of land with the buildings thereon situate on the highway leading from Thornton's Ferry to Seavern's Bridge, sometimes knows as the County Road, in Merrimack, County of Hillsborough, State of New Hampshire, bounded and described as follows:

Beginning at the northeast corner of the premises at an iron pipe in the ground on the westerly side of the above mentioned highway; thence

North sixty-one and one-quarter (61 ¼) degrees West by a stone wall, two hundred fifty (250) feet to a bend in the wall; thence

North sixty-nine and one-half (69 ½) degrees West by a stone wall, one hundred eighty-five (185) feet to an iron pipe in the ground; thence

South nineteen and three-quarters (19 ¾) degrees West by a stone wall, two hundred forty-five (245) feet; thence

South twenty-seven (27) degrees West, partly by a stone wall, two hundred sixty-two (262) feet to an iron pipe in the wall; thence

South fifty-three and one-half (53 ½) degrees East, one hundred eighty-four (184) feet to the westerly side of the said highway; thence

Northeasterly by and along said highway to the point of beginning.

Said premises are conveyed subject to whatever rights may exist in the Connecticut River Power Company or its successors or assigns, by virtue of the instrument recorded in said Registry of Deeds in Volume 772 at page 311.

Meaning and intending to describe and convey Tract 2 as conveyed to Charles E. Ireland and Dorothy R. Ireland by deed of Bert L. Peaslee dated February 23, 1954 and recorded in the Hillsborough County Registry of Deeds in Book 1381 at Page 55.

The grantor releases all rights of homestead and other interest in the above described premises.

The grantor is the surviving joint tenant, the said Dorothy R. Ireland having predeceased the grantor.

The premises are conveyed to the Town of Merrimack subject to the following conditions, covenants and agreements.

The property conveyed herein is to be used, managed and controlled by the Town of Merrimack for conservation and public park purposes. The property shall be maintained in its natural state as much as possible subject to appropriate forestry and land use management practices. The property is conveyed to the Town of Merrimack for purposes of protecting the Town of Merrimack's open space lands; to protect wetlands, upland habitat and the plants and wildlife that the said property supports; to conserve the property for unmotorized, outdoor recreation by the general public; and to preserve open space within the Town of Merrimack. The Town shall use the property with the above goals in mind and shall maintain soil productivity, water quality, and wetlands; conservation of scenic qualities; protection of unique or fragile natural areas; protection of unique historical and cultural features; and the conservation of native plants and animal species.

The Town, by acceptance of this deed agrees not to sell, rent or exchange said property. The Town further agrees not to allow the use of the property for commercial or industrial uses. Furthermore, the Town agrees that there shall be no mining, quarrying or excavation and removal of rocks or minerals from the property unless in connection with improvements which enhance the property and its conservation or recreational aspects.

The Town may use the property for low impact recreational/educational uses such as hiking, wildlife observation, jogging trails, cross country skiing, and similar recreational activities, but not for athletic fields. The Town shall prohibit the use of motorized vehicles, all-terrain vehicles, snowmobiles and motorcycles, or the like unless necessary for maintenance, police or emergency purposes.

The Town shall make all reasonable efforts to preserve and respect the privacy of abutters, including locating parking areas as far as reasonably possible away from abutters, taking into consideration the land's topography, terrain and other natural characteristics.

DATED this 18 day of March, 2004.

Charles E. Ireland

STATE OF NEW HAMPSHIRE
COUNTY OF HILLSBOROUGH March 18, 2004

Personally appeared the above named Charles E. Ireland known to me, or satisfactorily proven to be the person whose name is subscribed to the within instrument and acknowledged that he executed the same for the purposes therein contained.

Justice of the Peace/~~Notary Public~~

MARTHA E. O'NEILL
Justice of the Peace
My Commission Expires: 10/9/07

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