Ossipee Fuel Mapping Results and Recommended Fuel Models

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I. Introduction

This report summarizes the results of 1) data collected in 34 plots at Ossipee Pine Barrens in 2013 to describe vegetation and fuels, 2) interviews with several prescribed fire practitioners in the northeast and 3) recommendations on fuel models that could be used at Ossipee based on the above information.

II. Summary of Field Methods

Data were collected in 10 m radius plots (Batcher 2013). Estimates were made of cover and height by species in the following strata and for the total cover and estimated average height for each stratum:

- T1 - Trees greater than 5 meters tall – Emergent: trees that are greater than 5 meters in height and that are above the canopy (we probably will not encounter this strata, but just in case)
- T2 - Trees greater than 5 meters tall – Canopy: trees forming the canopy
- T3- Trees greater than 5 meters tall in the subcanopy
- S1 - Tall shrubs 2 to 5 meters tall
- S2 - Short shrubs less than 2 meters tall
- H - Herbaceous vegetation
- N - Nonvascular vegetation (lichens or mosses on the forest floor) – record moss or lichen, and don't try to identify by species.

Cover was estimated and height measured using a clinometer. Three 1 m^2 subplots were randomly located and estimates of surface cover made in the following categories:

- Litter – litter depth to the nearest 0.1 cm was also measured in these subplots
- Duff
- Soil
- Rock
- Vascular plants
- Nonvascular plants
- Wood in the following size classes:
  - <1/4 inch
  - ¼ to 1 inch
  - 1 to 3 inches
  - 3 to 8 inches
  - >8 inches

Vertical photographs (looking down) were taken of the subplots. Horizontal photographs were taken of the plot and a vertical photograph (looking up) was taken of the canopy. Data were entered into an MS Access database.

III. Data Analyses

A. Methods and Results

1. Vegetation Data

I reviewed the data and made various "corrections" prior to analyses. These corrections involved 1) correcting some species names where the same species was listed twice in a plot, but given slightly different names, 2) giving each species an eight character code for use in PC-Ord, a program for multivariate analyses and 3) distinguishing species by strata. So, for example, if red maple (*Acer rubrum*) appeared in the tree (T2) and the shrub (S2) strata, I listed each as a separate species as follows: AcerubT2 and AcerubS2. This is typical in multivariate analyses (McCune and Grace 2002).

The reason I chose to use multivariate analyses was to try to group the plots into similar types based on vegetation and, hence fuel characteristics. McCune and Grace review several methods and recommend nonmetric multidimensional scaling or NMS as a method that avoids some of the problems of other methods as all have limitations. I ran the analyses using several methods and with and without transforming the data and the arrangement of plots with respect to one another was largely the same.

Figure 1 below shows the results of the NMS analysis with data that have not been transformed. Plots that are close together in Figure 1 are more similar in species composition and abundance than those further apart. This is why it is important to incorporate strata in the analysis. Otherwise, plots with, say, pitch pine found only in the tree layer would appear to be similar to plots with pitch pine only in the shrub layer. The main message of Figure 1 is that plots that were burned are very similar to those that were mechanically treated and burned, and both of those types are similar to some of those that received only mechanical treatments.

To arrive at groups shown in the figure, I used GIS data to determine the treatment unit within which each plot was located. In several cases, plots were located outside of units. GIS data provided by Jeff Lougee showed how each unit has been treated over the last 7-10 years. Treatments varied with respect to timing and type, so the groupings include units that were burned at different times or mechanically treated in different ways as well as combinations of the two. Appendix I shows how I characterized plots. Appendix II summarizes the characteristics of each of the treatment groups based on the field data.

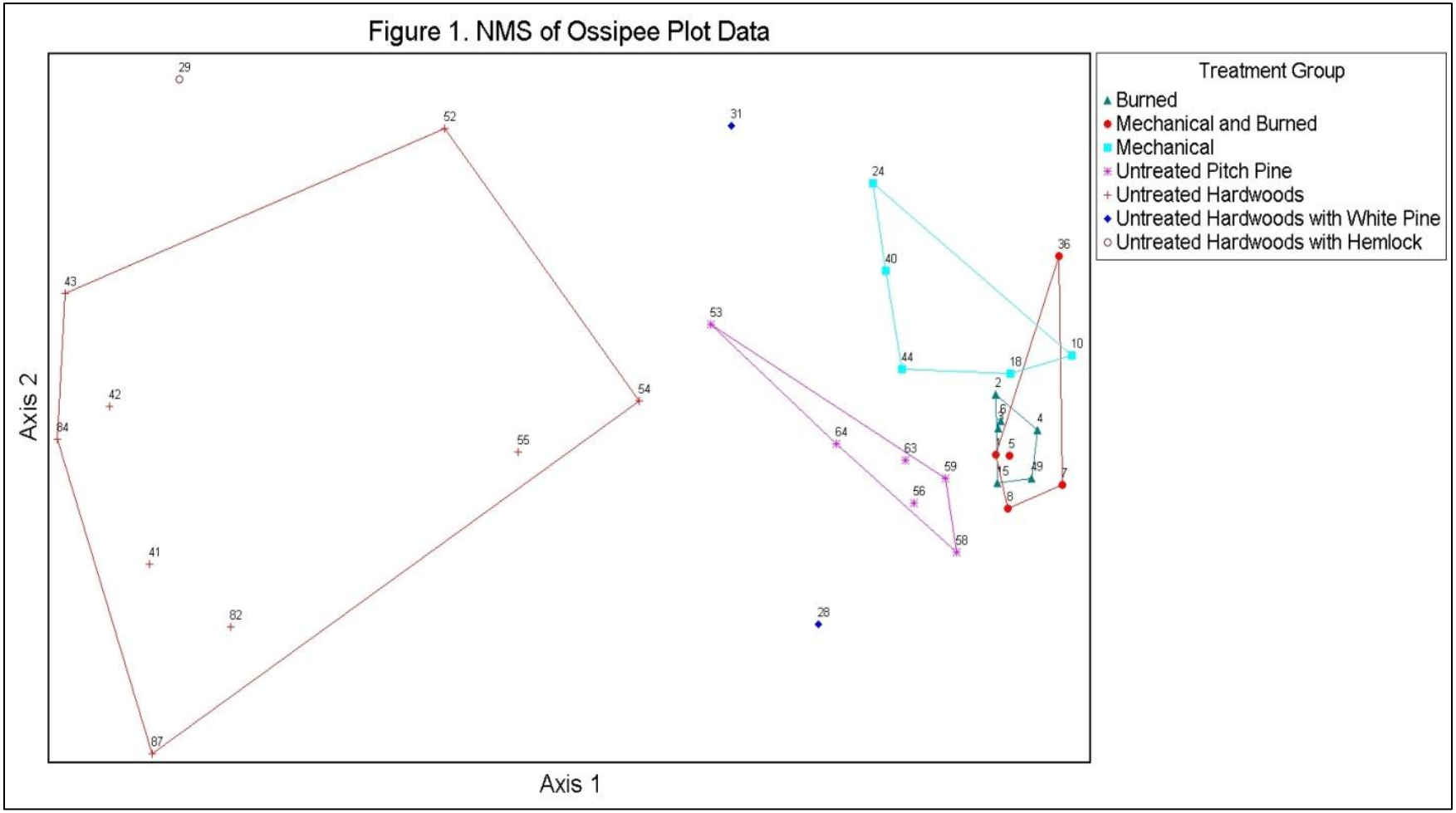
Figure 1. NMS of Ossipee Plot Data
Axis 2
Axis 1
Treatment Group
Burned
Mechanical and Burned
Mechanical
Untreated Pitch Pine
Untreated Hardwoods
Untreated Hardwoods with White Pine
Untreated Hardwoods with Hemlock
29
52
31
24
36
40
43
53
10
44
18
54
42
2
6
4
84
64
55
63
5
59
49
15
7
56
8
41
58
82
28
87

2. Plot by Plot Review

Data are lost when grouping plots, so I went through the data for each plot, focusing on the cover by species and cover and height by strata in the data and in the photographs. The photographs and cover for the shrub strata gave the most information on the short and tall shrub layers and the photographs and estimates of cover for litter and the fuel classes (1, 10 and 100-hour classes) provided the best information on surface characteristics. Plot by plot assessments are summarized in Appendix III. Fuel models are briefly described in Appendix IV.

B. Caveats

In reviewing these results, the reader should be aware of the following:

1. Vegetation and fuels data are highly variable both within and across plots. The 34 plots represent a snapshot, but no complete picture is attainable. For treated plots, the variation is due to time since treatment as well as the rate of regrowth of vegetation. In untreated plots, the variability is due to variation across the mapped type and/or treatment unit. One can see the degree of variation in each of the strata in the descriptions in Appendix II.
2. Treatment units varied in size from a few acres to over 40 acres, so a single plot could not describe an entire unit in many cases.
3. Data entry was uneven. In many cases, the average strata cover and height were not estimated. I rectified this for average height of the S1 and S2 layers by calculating the weighted average of the height of each using the height and cover recorded by species. In many cases, I estimated total average S1 and S2 strata cover based on the estimated cover by species and my past field experience. I did not do these estimates for other strata as the shrub layers are of great importance in fire behavior, and herbaceous cover was generally low.
4. Where data were not collected, as in total plot cover for surface characteristics, I used only data from the subplots. The point of collecting data for the whole plot was to assure a better estimate of the range of variation in materials, particularly woody fuels that might be missed in small subplots.
5. GIS data on treatments and fuel mapping was updated in 2013. I received this relatively recently, after having completed most of the analyses reported here. So there is some chance I missed changes and errors remain.

V. Survey of Practitioners

A. Fuel Models

Appendix IV provides brief descriptions of the standard (Anderson 1982) and Scott and Burgan (2005) fuel models. The original thirteen models have been used in fire management planning for decades. They were developed to predict fire behavior during the most severe

periods when intensity and rates of spread would be highest. Scott and Burgan developed a wider range of fuel models to 1) incorporate a wider range of types and potential fire behavior, 2) expand the range of parameters when the models would be applicable and 3) create more dynamic models that incorporate live fuel moistures.

Another set of fuel models were pioneered by Dr. William Patterson III, formerly with the University of Massachusetts at Amherst. These models are site specific and developed to address the specific characteristics of pine barrens at Cape Cod National Seashore, Manuel F. Correllus State Forest (MFCSF) on Martha's Vineyard, Waterboro Barrens in Maine and Ossipee Barrens in New Hampshire.

Fuel models represent estimates of 1, 10 and 100 hour fuels, fuel bed depth and other parameters that can be used in BehavePlus (Andrews et al. 2008) to estimate fire behavior. The major limitation is that these estimates are single numbers and do not capture the range of variation across an area. Appendix II shows the range of the various strata and surface cover, so one can imagine how much fuel loads in each of those can vary.

B. Survey Results

Table 1 summarizes models used by various practitioners in the northeast. During interviews, I asked about models in the Fuel/Vegetation Types in the first column. In many cases, there was little experience, such as burning in wetlands. A common thread was the use of the Martha's Vineyard models by many practitioners since these models were developed for untreated pitch pine-scrub oak as well as mechanically treated, thinned and grazed vegetation.

Table 1. Summary of fuel models reported by various practitioners in the northeast. Sources: Interviews in 2014 with Joel Carlson, Tyler Briggs, Jenny Case, Craig Kostzrewski, Pat McElhenny, Tim Simmons, Alex Belote, NYS Department of Environmental Conservation et al. 2011

Fuel/Vegetation Type	Fuel Type	Comments/Notes
Barrens with shrubs <0.5 m	TU2	Shawangunks
Barrens with shrubs 0.5-1 m	SH4	Shawangunks
Barrens with shrubs > 1 m	SH8	Shawangunks
Untreated scrub oak 1-2 m	SFM4, 6, 9; Martha's Vineyard (MV)[1] custom SH6, SH8, SH9	Live fuel moisture 150 in growing season as higher levels prevent useful estimates of fire behavior
Untreated scrub oak > 2m	SH8	
Dead standing scrub oak	SFM4, Martha's Vineyard custom untreated; SH8 SB models	Dry shrub fuel models May not fit in any models

[1] These refer to the MFCSF custom models.

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Fuel/Vegetation Type	Fuel Type	Comments/Notes
Treated (mowed) scrub oak with live sprouting scrub oak	SFM7 with SFM 10/11; Martha's Vineyard custom treated; SB1, SB2	
Open heaths, primarily huckleberry	M V Oak Woodland-Dormant SH6, SH8 SH2, SH3 growing TL6 and/or SH8 growing GS2 if grasses or SH4 TU models	
Open heaths, primarily blueberry	TU models	
Chestnut Oak Forest (shrubs < 0.5 m)	TU2	Shawangunks
Chestnut Oak Forest (shrubs to 1 m)	SH4	Shawangunks
Oak forest leaf litter	SFM9. TU2, MV Oak Woodland, TU models TL2, TL6	Includes Oak, Oak-Hickory and Oak-Pine in the Shawangunks
Oak leaf litter and huckleberry	SFM6, SFM9, MV Oak Woodland, TL6, Brookhaven National Laboratory Custom Models (Long Island)	
Northern hardwoods (red maple, sugar maple, beech, white pine)	TU1, TL2	Few had much experience in this type
Hemlock dominated	TL1	Shawangunks
White Pine Forest	TL3	Shawangunks
Dry oak-heath mowed	SFM7 with SFM 10/ 11	Pennsylvania
Warm season grasses < 2m	SFM3, GR 1, GR2, GR4, GR5, GR6, GR8 GS3 in growing season	
Cool season grasses < 1 m	SFM1 or GR models with lower loads	
Goldenrod < 2 m	SFM3, grass models but not low shrub	
Graminoid Wetland (cat-tail, sedges, bulrush)	SFM3 for cat-tails	Little or no experience in this type

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Fuel/Vegetation Type	Fuel Type	Comments/Notes
Shrub swamp (alder, willow with graminoid underneath	SH3, SH4 possible	Little or no experience in this type
Shrub swamp with heaths (blueberry, rhodora, azalea leatherleaf)	SH6, SH7	Little or no experience in this type
Logging slash/Blowdown	SB1, SB2, SB3, SB4	Shawangunks

C. New Hampshire Cooperative Extension Survey

In 2007, the New Hampshire Cooperative Extension office completed an extensive survey of both fuel models and weather and other conditions during which practitioners burned in the northeast. There is quite a bit of overlap with Table 1, though the Scott and Burgan models had not received the wider use they currently do.

Table 2. Fuel models associated with fuel groups. Source: Fast et al. 2007		
Fuel/Vegetation Type	Fuel Type	Comments/Notes
Grass Fuel Group	SFM 1, 2, 3; GR3, 4, 6, 7	
Shrub Fuel Group	SFM 4, 5, 6, 7; SH3, 6, 8, 9; CFM 60, 61, 63; MV-UOW and USO[2]	Custom models developed by Patterson for Ossipee and for Martha's Vineyard
Timber Fuel Group	SFM 8, 9, 10; TU, TL 6, 8	
Slash Fuel Group	SFM 8; MV-MSO[3]	Custom models developed by Patterson for Martha's Vineyard

The LANDFIRE (2013) program provides geospatial data layers including vegetation cover, canopy cover, canopy height as well as fuel models (both the 13 and the 40) for the continental United States. Data are available from www.LANDFIRE.org and can be used in ArcGIS and FarSite for fire behavior prediction at large scales. I used ArcGIS to characterize fuel types within cover types provided by The Nature Conservancy in 2014, excluding developed types. Appendix III shows the results by treatment unit and a summary is provided below in Table 3. Interestingly, the LANDFIRE types seem to be predominantly timber litter (TL) and timber understory (TU) types, even in areas where shrub or timber understory fuels would be more appropriate. I attribute this to the coarse resolution (30 m^2) of the data being used on a relatively small area and likely problems in how these data are interpreted as fuel types.

[2] Martha's Vineyard Untreated Oak Woodland and Untreated Scrub Oak
[3] Martha's Vineyard Mowed Scrub Oak

Table 3. Comparison of predominant LANDFIRE fuel types with Ossipee mapping. Source: GIS analyses of LANDFIRE and Jeff Lougee, The Nature Conservancy.	
Ossipee Mapped	Predominant LANDFIRE
Closed Timber Litter SFM 8	TL2, TL6, TL9
Hardwood Litter SFM9	TL2, TL6, TL9, TU1
Low Shrub SH5	TU1, TL6, SH3
Intermediate Shrub	TU1, SH3
Open Scrub Oak SFM 5 or CFM 63	Limited area mapped
Southern Rough SFM7	Limited area mapped
Pitch pine-scrub oak thicket CFM 63	TL6, TL9, TU1
Pitch pine-scrub oak thicket SFM 4	TL6, TL3
Pitch pine-scrub oak woodland CFM 61	TL6, TU3, TL3, TL9, TL2, TL3
Pitch pine-scrub oak woodland/thicket CFM60	TL6, TL9, TU1, TL2
Pitch Pine Bog SFM 5 or 6	TL6, TU1
Young pitch pine CFM 61	TL6
Forested Wetlands SFM 5, 6, 8	TU1, SH3
Shrub Wetlands SFM6	SH3, TU1, TL6
Wetlands SFM3	SH3, GR3
Slash SFM 11	TL9, TL6
Burned sites (2007 -2013)	TL6, SH3, TL9, TU1
WUI Buffer SFM or 11	TL6, TU3
Short Grass SFM1	GR1, NB1
Tall Graminoid	GR3

VI. Recommendations on Fuel Models

Assigning fuel models is more art than science. I used the thoughts of other practitioners as a filter through which I sifted the results of the above field data and GIS analyses. The results are shown in Table 4 below for each of the plot groupings. As stated above, vegetation at Ossipee is highly variable, and the results of treatments have varied due to the variation in both the types of treatment, the timing of application of fire, fire behavior and effects and time.

I relied mostly on the Scott and Burgan (2005) models as they incorporate types found in humid climates where the moisture of extinction is high (25-40%), compared with the standard models. In addition to what is listed below, the combined model of SFM5/11 seems to predict fire behavior well for areas that have been mechanically treated, based on observation from the after action reviews (Jeff Lougee provided these summaries).

In addition to the plot data and descriptions of the models, I ran numerous models in BehavePlus, including selected custom models. The results are shown in Appendix V for growing season burns, as these are when past burns have been implemented at Ossipee. I eliminated models from consideration where fire behavior was minimal or nil at higher fine fuel

moistures as several of the after action reports indicated burns had been completed in relatively high humidity levels, and the lower moistures of extinction did not seem appropriate for Ossipee. I compared the behavior of Scott and Burgan with that of custom models to make other selections, as the custom models seemed to have relatively similar fire behavior characteristics and were developed for specific pine barrens sites.

In general, I would recommend continuing to use the custom models in untreated pitch pine-scrub oak communities, though I did note that in one of the after action reviews it was reported that one of the models predicted fire behavior that was less intense than actually observed. I would also recommend a mixture of timber understory, timber litter and shrub fuel types as applicable. The shrub and timber understory would be primary, but the litter will capture the variation across a unit where shrub fuels may be minimal. SB2 along with one of the shrub types may also have applicability instead of the SFM5/11 fuel. SB2 also represents an even cross section of time lag fuels that may be representative of post-mechanical treatments

Finally, given the widespread use of the Martha's Vineyard models, I would recommend these be used as an alternative to the SFM5/11 models where appropriate. Interestingly, the fuel loads of several of the treated types were far less than for the standard or Scott and Burgan slash models. I would have expected relatively high loads after mechanical treatment and prior to burning. I would recommend collecting post-mechanical treatment fuel load data to see how that compares to other models.

Table 4. Recommended potential fuel models for Ossipee

Treatment	Plot Types	Other Potential Types
Mechanical (harvested but not mowed)	TU2, TU3, TL6, SH3, SH6	CFM 60, 61, 63 MFCSF Pitch pine-scrub oak control, SFM5, SFM6, SH5
Mechanical (mowed)	TU2, TU3, TL6, SH3, SH6	MFCSF scrub oak mow/burn 1 &2 MFCSF scrub oak mow/burn 2 &3 SB
Burned	TL6, TL9, SH1, SH6, TU1, TU3	SB
Burned/Mowed	TL2,TL6, TU2, TU3, SH6, SB2	MFCSF scrub oak mow/burn 1 &2 MFCSF scrub oak mow/burn 2 &3 SB
Untreated Pitch Pine-Scrub Oak Barrens	CFM 60, 61, 63, TL6, TU2, TU4, SH3, SH6, SH8	MFCSF Pitch pine-scrub oak control

Table 4. Recommended potential fuel models for Ossipee		
Treatment	Plot Types	Other Potential Types
Untreated Hardwood Forests	TL2, TL6,	SFM 8
Untreated Oak Forest (litter)	TL2, TL6	MFCSF Oak Forest Untreated, SFM9
Untreated Oak Forests with shrub understory	TL2, TL6, SH5, SH6?	SFM9, TU3, TU5
Untreated White Pine	TL1, TL6, TU2, SH6	SFM 8
Untreated Hemlock	TL2	SFM 8

In the plan, I will do more detailed BehavePlus runs, along with some mixed models, which may eliminate some of the above types.

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B. Personal Communication Sources

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Jeff Lougee, Director of Stewardship and Ecological Management, The Nature Conservancy, Green Hills Preserve, PO Box 310, North Conway, NH 03860. Phone: 603-356-8833;
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Appendix I. Plot groupings based on treatments at Ossipee. Source: GIS data and plot data provided by Jeff Lougee of the New Hampshire Chapter of The Nature Conservancy. Note that some units did not have plots and some plots were not in units.

2013 Plot	Management Unit	Acres	Treatment Unit	Past Treatment	Treatment Group
1	West Branch	41.572	West Branch 8	1. Scrub oak mowed within 20' of unit perimeter and several ignition lines mowed into unit in 2009 2. Burned 9/8/2009 3. White pine > 6" DBH harvested April/May 2010	Mechanical and burn
2	West Branch	23.561	West Branch 4-2	1. Scrub oak mowed within 20' of unit perimeter and one ignition line mowed into unit in 2010 2. Burned 9/22/2010	Burned
3	West Branch	23.268	West Branch 5-1	1. Scrub oak mowed within 20' of unit perimeter and several ignition lines mowed into unit in 2008 2. Burned 9/4/2008	Burned
4	West Branch	13.805	West Branch 5-2	1. Scrub oak mowed within 20' of unit perimeter and several ignition lines mowed into unit in 2008 2. Burned 9/4/2008	Burned
5	West Branch	11.953	West Branch 1-2	1. Scrub oak mowed with a rotary mower leaving much of the *V. angustifolium* and leaf litter intact in June 2007 2. Burned 9/22/2007	Mechanical and burn
6	Triangles	43.302	West Branch 11	Burned 2010	Burned
7	East Shore Drive	27.871	East Shore Drive Buffer 2	1. Stand basal area reduced in March and scrub oak mowed within 100' of northern boundary in October/November 2005 2. Scrub oak mowed in May 2009 3. Burned 8/27/2009 4. All scrub oak and white pine and hardwoods up to 6 inches DBH mowed in late August 2013	Mechanical and burn

Appendix I. Plot groupings based on treatments at Ossipee. Source: GIS data and plot data provided by Jeff Lougee of the New Hampshire Chapter of The Nature Conservancy. Note that some units did not have plots and some plots were not in units.

2013 Plot	Management Unit	Acres	Treatment Unit	Past Treatment	Treatment Group
8	East Shore Drive	6.029	East Shore Drive Buffer 1	1.50% of basal area removed from the canopy and all scrub oak mowed within 100' of the northern boundary (the mower head was run into the duff to maximize fuel reduction). Harvesting completed in March and mowing completed in October/November 2005 2. Scrub oak mowed with a rotary mower leaving much of the *V. angustifolium* and leaf litter intact. Mowed in June 2007. 3. Burned 9/3/2008 4. All scrub oak and white pine and hardwoods up to 6 inches DBH mowed in late August 2013	Mechanical and burn
10	Route 41	13.112	Route 41 Buffer	1. Stand basal area reduced to 40-50 square feet per acre In April/May and scrub oak mowed in August/September for first 50 feet from boundary line in 2007 2. All scrub oak and small diameter hardwoods and white pine mowed for fuel reduction purposes. Mowing completed in August 2011	Mechanical
15	Thicket	34.69	Thicket 7-1	Burned 9/21/2010	Burned
18	Lower West Branch	23.652	Hobbs Buffer	50% of the stand basal area removed and a majority of scrub oak also removed during harvest in 2010	Mechanical
24	Madison	31.29	Madison 2	All white pine and hardwoods harvested in 2011	Mechanical
36	Thicket	22.673	Thicket 8	1. Scrub oak mowed within 20' of unit perimeter and several ignition lines mowed into unit 2009 2. Scrub oak, white pine and hardwoods mowed in November/December 2012 3. Burned 8/8/2009 4. Burned 8/19/2013	Mechanical and burn
40	Madison	42.586	Madison 1	All white pine and hardwoods harvested in April/May 2010	Mechanical

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2013 Plot	Management Unit	Acres	Treatment Unit	Past Treatment	Treatment Group
44	Madison	51.941	Madison 3	All white pine and hardwoods harvested in 2011	Mechanical
49	Jackman Ridge	10.973	South Jackman Ridge 2	1. Scrub oak mowed within 20' of the unit perimeter and several ignition lines mowed into unit in 2008 2. Burned 9/5/2008	Burned
53	Cooks Pond	38.003	Goodwin 3	Untreated	Untreated pitch pine
53	Cooks Pond	14.478	Goodwin 4	Untreated	Untreated pitch pine
63	Lower West Branch	23.075	Hobbs 3	Untreated	Untreated pitch pine
64	Lower West Branch	30.812	Hobbs 7	Untreated	Untreated pitch pine
56	West Branch	59.658	West Branch 3	Untreated	Untreated pitch pine
58	West Branch		West Branch 3	Untreated	Untreated pitch pine
59	West Branch		West Branch 3	Untreated	Untreated pitch pine
	Lower West Branch	9.719	Bacon 1	All white pine and hardwoods harvested prior to TNC ownership - harvest conducted in February/March 2004	Harvested
	Lower West Branch	21.407	Bacon 2	1. All white pine and hardwoods harvested prior to TNC ownership - harvest conducted in February/March 2004 2. Burned 2013	
	Calumet	12.663	Calumet Buffer	1. Stand basal area reduced to 30 ft^2 and scrub oak mowed within 100 feet of eastern boundary in 2007. Harvesting completed in April/May and mowing completed in late August/Early September of 2008 2. All scrub oak and small diameter hardwoods and white pine mowed for fuel reduction purposes. Mowing completed in August in 2011 3. Burned 9/17/2012	Mechanical and burn
	Cooks Pond	4.919	Goodwin 1	Untreated	Untreated
	Cooks Pond	7.018	Goodwin 2	Untreated	Untreated
	Cooks Pond	27.237	Goodwin 4 #2	Untreated	Untreated

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2013 Plot	Management Unit	Acres	Treatment Unit	Past Treatment	Treatment Group
	Lower West Branch	6.946	Hobbs 1	Untreated	Untreated
	Lower West Branch	20.591	Hobbs 2	Untreated	Untreated
	Lower West Branch	23.509	Hobbs 4	Untreated	Untreated
	Lower West Branch	15.006	Hobbs 5	Untreated	Untreated
	Lower West Branch	16.288	Hobbs 6	Untreated	Untreated
	Jackman Ridge	15.473	Jackman Ridge 1	Untreated	Untreated
	Lower West Branch	7.095	North Atlantic Air 2	Untreated	Untreated
	Lower West Branch	30.104	North Atlantic Air 3	Untreated	Untreated
	Lower West Branch	15.182	North Atlantic Air Buffer 1	1. Stand basal area reduced to 30 square feet per acre and scrub oak mowed for first 50 feet from boundary line. Harvesting completed in April/May and mowing completed in late August/early September 2007. 2. All scrub oak and white pine and hardwoods up to 6 inches DBH mowed in late August of 2013	Mechanical
	Sand Pit	12.108	Sand pit east	Untreated	Untreated
	Sand Pit	25.334	Sand pit west	Untreated	Untreated
	Jackman Ridge	4.573	South Jackman Ridge 1	1. Interior lines mowed in middle of unit in 2005 2. All scrub oak mowed prior to burning. Mowing completed in May 2009 3. Burned 8/7/2009	Mechanical and burn

Appendix I. Plot groupings based on treatments at Ossipee. Source: GIS data and plot data provided by Jeff Lougee of the New Hampshire Chapter of The Nature Conservancy. Note that some units did not have plots and some plots were not in units.

2013 Plot	Management Unit	Acres	Treatment Unit	Past Treatment	Treatment Group
	Jackman Ridge	9.582	South Jackman Ridge 10	Untreated	
	Jackman Ridge	8.802	South Jackman Ridge 3	Untreated	Untreated
	Jackman Ridge	8.785	South Jackman Ridge 6	Untreated	Untreated
	Jackman Ridge	56.145	South Jackman Ridge 7	Burned 10/3/2013	Burned
	Jackman Ridge	4.949	South Jackman Ridge 8	Untreated	Untreated
	Jackman Ridge	10.063	South Jackman Ridge 9	Untreated	Untreated
	Thicket	9.884	Thicket 3	1. Scrub oak mowed with a 3' lifter on the mower head to minimize sand and duff mixing in order to reduce lag time needed before burning. Mowing completed in October/November 2005 2. Burned 9/19/2007	Mechanical and burn
	Thicket	6.673	Thicket 4	1. Scrub oak mowed with a rotary mower leaving much of the *V. angustifolium* and leaf litter intact in June 2007 2. Burned 9/19/2007	Mechanical and burn
	Thicket	31.021	Thicket 6	Untreated	Untreated
	Thicket	4.722	Thicket 7-2	1. All scrub oak and small diameter hardwoods and white pine mowed prior to burning. Mowing completed in late July/early August 2010 2. Burned 9/21/2010	Mechanical and burn
	Thicket	6.657	Thicket West 1	1. Scrub oak mowed prior to burning in May 2009 2. Burned 8/28/2009	Mechanical and burn

Appendix I. Plot groupings based on treatments at Ossipee. Source: GIS data and plot data provided by Jeff Lougee of the New Hampshire Chapter of The Nature Conservancy. Note that some units did not have plots and some plots were not in units.

2013 Plot	Management Unit	Acres	Treatment Unit	Past Treatment	Treatment Group
	Thicket	15.567	Thicket West 2	1. All scrub oak mowed prior to burning. Mowing completed in May 2009 2. All scrub oak and small diameter hardwoods and white pine mowed prior to burning. Mowing completed in August 2011 2. Burned 9/12/2011	Mechanical and burn
	West Shore	26.851	Tragenza	Untreated	Untreated
	Triangles	13.103	Triangle 1	All White pine removed in March 2005	Mechanical
	Triangles	24.055	Triangle 2	All White pine removed in April/May 2007	
	Triangles	4.26	Triangle 3	White pine removed 2008	
	Triangles	8.245	Triangle 3 #2	Untreated	Untreated
	Triangles	2.077	Triangle 4	Untreated	Untreated
	Triangles	3.817	Triangle 5	Untreated	Untreated
	Triangles	24.413	West Branch 10	Untreated	Untreated
	West Branch	5.745	West Branch 1-1	1. Scrub oak mowed with a rotary mower leaving much of the *V. angustifolium* and leaf litter intact in June 2007 2. Burned 9/21/2007	Mechanical and burn
	West Branch	23.9	West Branch 4-1	1. White pine >6" DBH harvested and scrub oak mowed within 20' of unit perimeter in 2010 2. Burned 9/22/2010	Mechanical and burn
	Lower West Branch	12.616	Windsock Village 1-1	1. All scrub oak and small diameter hardwoods and white pine mowed prior to burning. Mowing completed in May 2009 2. Burned 9/13/2011	Mechanical and burn

Appendix I. Plot groupings based on treatments at Ossipee. Source: GIS data and plot data provided by Jeff Lougee of the New Hampshire Chapter of The Nature Conservancy. Note that some units did not have plots and some plots were not in units.

2013 Plot	Management Unit	Acres	Treatment Unit	Past Treatment	Treatment Group
	Lower West Branch	18.835	Windsock Village 1-2	1. 150' WUI Buffer area adjacent to houses mowed of all scrub oak and small diameter trees for fuel reduction purposes. Mowing completed in May 2009 2. All white pine > 6 inches DBH harvested in April/May 2010 3. Burned 9/14/2011	Mechanical and burn
			Windsock Village 2	1. All white pine and hardwoods harvested prior to TNC ownership - harvest conducted in February/March 2004 2. All scrub oak and white pine and hardwoods up to 6 inches DBH mowed in November/December 2012 3. Burned 9/19/2013	Mechanical and burn
	Lower West Branch	8.575	Zito 1	Untreated	Untreated
	Lower West Branch	33.814	Zito 2	Untreated	Untreated
	Lower West Branch	23.106	Zito 3	Untreated	Untreated
	Lower West Branch	4.246	Zito Buffer	All scrub oak and white pine and hardwoods up to 6 inches DBH mowed in late August of 2013	Mechanical
28				Untreated	Untreated white pine
29				Untreated	Untreated hemlock
31				Untreated	Untreated white pine

Appendix I. Plot groupings based on treatments at Ossipee. Source: GIS data and plot data provided by Jeff Lougee of the New Hampshire Chapter of The Nature Conservancy. Note that some units did not have plots and some plots were not in units.

2013 Plot	Management Unit	Acres	Treatment Unit	Past Treatment	Treatment Group
41				Untreated	Untreated hardwoods
42				Untreated	Untreated hardwoods
43				Untreated	Untreated hardwoods
52				Untreated	Untreated hardwoods
54				Untreated	Untreated hardwoods
82				Untreated	Untreated hardwoods
84				Untreated	Untreated hardwoods
87				Untreated	Untreated hardwoods

Appendix II. Field Data Summary

Summary descriptions below provide the range of the average cover and height of each stratum, along with surface measurements. These were calculated by taking the average for those parameters for each plot and then averaging that value for plots within each treatment group. So, for example, for theT2 cover in Burned Plots, the average cover ranged from 20-85% in those plots in that treatment group. Strata are described in Section II.

Name: Burned pitch pine-scrub oak woodland	
	 
Plots: 1, 2, 3, 4, 6, 15, 49	
T2 Average Cover: 20-85%	T2 Average Height: 13.5-18 m
T3 Average Cover: 1-20%	T3 Average Height: 5-10.5 m
S1 Average Cover: 5-30%	S1 Average Height: 2-3 m
S2 Average Cover: 70-90%	S2 Average Height: 0.7-1 m
H Average Cover: 1-55%	H Average Height: 0.3-0.6 m
N Average Cover: 1-5%	
Surface Characteristics: Surface cover is primarily litter and vascular plants (45-87% with small amounts of wood in each of the size classes). Average litter cover ranged from 20-92% and average depth ranged from 1.7-4.7 cm. Small amounts of cover of duff and bare soil were encountered.	
Woody Materials: Average woody material in each size class ranged from 0-8% for <1/4", 2-10 % for ¼ - 1", 2-7% for 1-3", 0-10% for 3-8" and no wood >8".	
Description: Canopy and subcanopy dominated by *Pinus rigida* and some *Pinus strobus*. Tall shrub layer dominated by *Quercus ilicifolia*, also found in the short shrub layer along with *Vaccinium angustifolium, Kalmia angustifolia*, *Aronia* sp., *Gaultheria procumbens*, *Betula populifolia, Comptonia peregrina* and small amounts of *Pinus rigida* and *P. strobus*. The herbaceous layer was very sparse with *Carex lucorum* and *Pteridium aquilinum*.	

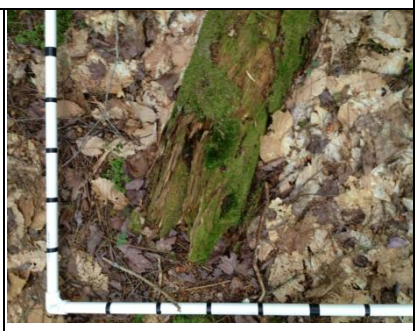
Name: Mechanical and burn		
		
Plots: 5, 7, 8, 36		
T2 Average Cover: 10-65%	T2 Average Height: 13.5-18 m	
T3 Average Cover: 1-20%	T3 Average Height: 0-10 m	
S1 Average Cover: 0-30%	S1 Average Height: 0-2.5 m	
S2 Average Cover: 40-90%	S2 Average Height: 0.3-1.5 m	
H Average Cover: 10-31%	H Average Height: 0.3-2 m	
N Average Cover: 0-10%		
Surface Characteristics: Average litter cover ranged from 42-73% and depth 1.7-3.3 cm. Vascular cover ranged from 18-80%. Small amounts of cover of duff and bare soil were encountered. Woody material was sparse in all size classes.		
Woody Materials: Woody material ranged from 1.7-8.7% for <1/4", 1.7-8.7% for ¼ - 1", 0-11.7% for 1-3"and 0-10% for 3-8'. There was no wood >8".		
Description: These plots are highly variable depending on the length of time since treatment (see photos above). The canopy and subcanopy is dominated by *Pinus rigida* with some *P. strobus*. The tall shrub layer contains *Quercus ilicifolia* which dominates the short shrub layer as well, along with *Vaccinium angustifolium*, *Viburnum* sp., *P. rigida,*, *Comptonia peregrina, Kalmia angustifolia, Gaultheria procumbens,* and *Prunus serotina.* The herbaceous layer is somewhat sparse with *Carex lucorum* and *Pteridium aquilinum.* There is some cover of moss.		

Name: Mechanical		
		
Plots: 10, 18, 24, 40, 44		
T2 Average Cover: 15-60%	T2 Average Height: 18-25 m	
T3 Average Cover: 0	T3 Average Height: NA	
S1 Average Cover: 0-25%	S1 Average Height: 0-3.5 m	
S2 Average Cover: 75-95%	S2 Average Height: 0.5-0.8 m	
H Average Cover: 40-90%	H Average Height: 0.2-0.6 m	
N Average Cover: 0-10%		
Surface Characteristics: Litter cover ranged from 42-82% and vascular cover 18-80%. Litter depth ranged from 2.3 to 5 cm. Small amounts of cover of duff and bare soil were encountered.		
Woody Materials: Wood <1/4” ranged from 0-7%, ¼ - 1” 2-9%, 1-3” from 0-12%, and 3-8” from 0-10%. There was no larger wood.		
Description: The canopy and subcanopy are dominated by *Pinus rigida*. The tall shrub layer is dominated by *Acer rubrum, Aronia* sp., *Fagus grandifolia*, and *Populus tremuloides* along with *Quercus rubra* and *Q. ilicifolia*. The short shrub layer includes several of those species plus *Vaccinium angustifolium*, *Rubus allegheniensis, R. flagellaris,* and *Kalmia angustifolium*. The herbaceous layer is primarily *Pteridium aquilinum* and *Carex lucorum.* Some areas were harvested of hardwoods and white pine and others were mowed for scrub oak, so this group is highly variable.		

Name: Untreated pitch pine woodland		
		
Plots: 53, 56, 58, 59, 63, 64		
T2 Average Cover: 10-76%	T2 Average Height: 15-23 m	
T3 Average Cover: 5-30%	T3 Average Height: 6-15.5 m	
S1 Average Cover: 20-65%	S1 Average Height: 3-4 m	
S2 Average Cover: 35-95%	S2 Average Height: 0.4-1 m	
H Average Cover: 2-50%	H Average Height: 0.2-0.8 m	
N Average Cover: 0-20%		
Surface Characteristics: Litter cover ranged from 57 to 97% and depth from 1-4.3 cm. Vascular cover ranged from 5-60% and nonvascular cover 0-20%.		
Woody Materials: All size classes were present with 2-12% for <1/4" and less than 10% for all others.		
Description: The canopy is dominated by *Pinus rigida* with smaller amounts of *Pinus strobus, Acer rubrum, Fagus grandifolia* and *Populus grandidentata*. The tall shrub layer consists of *Quercus ilicifolia, Pinus rigida* and *Pinus strobus*. These are also present in the short shrub layer along with abundant *Vaccinium angustifolium*. The herbaceous layer is primarily *Carex lucorum* and *Pteridium aquilinum* but with some *Lycopodium* sp. and *Maianthemum canadense*.		

Name: Untreated Hardwoods		
		
Plots: 41, 42, 43, 52, 54, 82, 84		
T1 Average Cover: 0-15%	T1 Average Height: 22 m	
T2 Average Cover: 30-80%	T2 Average Height: 18-25 M	
T3 Average Cover: 30-50%	T3 Average Height: 8.5-19 m	
S1 Average Cover: 1-55%	S1 Average Height: 2-3.5 m	
S2 Average Cover: 25-65%	S2 Average Height: 0.4-1 m	
H Average Cover: 3-40%	H Average Height: 0.1-0.4 m	
N Average Cover: 0-20%		
Surface Characteristics: Litter cover ranged from 35-95% and vascular cover 5-60%. Litter depth ranged from 1-4.3 cm.		
Woody Materials: Wood < ¼" ranged from 2-10%, from ¼-1" 0-7%, from 1-3" 0-5%, from 3-8" 0-23% and >8" 0-22%.		
Description: This is a diverse community with a mixed canopy of *Quercus rubra, Pinus rigida, Pinus strobus, Fagus grandifolia, Fraxinus americana, Acer rubrum, Acer pensylvanica, Abies balsamea*, and *Tsuga canadensis*. The tall shrub and short shrub layers consist of many of those species plus *Quercus ilicifolia. Vaccinium angustifolium* and *V. myrtilloides* area also found there. The herbaceous layer contains *Pteridium aquilinum, Osmunda cinnamomea, Maianthemum canadense, Aralia nudicaulis, Clintonia borealis*, several species of *Lycopodium* and *Thelypteris noveboracensis*.		

Name: Untreated hardwoods/white pine		
		
Plots: 28, 31		
T2 Average Cover: 1-75%	T2 Average Height: 18-23 m	
T3 Average Cover: 30-50%	T3 Average Height: 8.5-19 m	
S1 Average Cover: 1-55%	S1 Average Height: 2-3.5 m	
S2 Average Cover: 50-80%	S2 Average Height: 0.8-1.0 m	
H Average Cover: 25%	H Average Height: 0.3-0.8 m	
N Average Cover: 1-5%		
Surface Characteristics: Litter cover was 63% and depth 2-4 cm.		
Woody Materials: Wood <1/4" was 0-8% and 0-13% for >8". Otherwise cover was <5%.		
Description: The canopy is dominated by *Pinus strobus* and *Acer rubrum* with some *Quercus rubra*. The tall shrub layer is dominated by Quercus ilicifolia, with some Pinus strobus. The short shrub layer is more diverse with *Q. ilicifolia*, *Vaccinium angustifolium*, *P. strobus*, *Kalmia angustifolia*, and *Fagus grandifolia*. The herbaceous layer is primarily *Pteridium aquilinum* and *Carex lucorum* with some *Aralia nudicaulis* and *Mitchella repens*.		

Name: Untreated hardwoods/hemlock		
		
Plots: 29		
Name: Untreated hardwoods/hemlock	Potential Fuel Types:	
T2 Average Cover: 20%	T2 Average Height: 22.5m	
T3 Average Cover: 40	T3 Average Height: 13 m	
S1 Average Cover: 30%	S1 Average Height: 4 m	
S2 Average Cover: 35%	S2 Average Height: 0.8 m	
H Average Cover: 25%	H Average Height: 0.5 m	
N Average Cover: 30%		
Surface Characteristics: Litter cover was 92% and vascular cover 35%. Litter depth was 2.0 cm.		
Woody Materials: Wood in the smaller size classes (<1-3”) was 5% or less.		
Description: Only one plot fell into this group where the canopy is dominated by *Tsuga canadensis*, *Fagus grandifolia* and *Acer rubrum*. These are also present in the tall and short shrub layers. The dominant herbaceous plant was *Osmunda cinnamomea*.		

Appendix III. Potential fuel types and mapped types from The Nature Conservancy and LANDFIRE. Sources: GIS data and plot data provided by Jeff Lougee of the New Hampshire Chapter of The Nature Conservancy; LANDFIRE data from. Note that some units did not have plots and some plots were not in units.

2013 Plot	Management Unit	Acres	Treatment Unit	Treatment Group	Pre-treatment Models	2005 Fuel Models	LANDFIRE Fuel Models	Potential Fuel Models for Plots
1	West Branch	41.572	West Branch 8	Mechanical and burn	CFM 63	Burned 2009	TL6, TU1, TL9	TU2, TL6, SH3, SH6
2	West Branch	23.561	West Branch 4-2	Burned	CFM 61	Burned 2010	TL6	TU2, TL6, SH3, SH6
3	West Branch	23.268	West Branch 5-1	Burned	CFM 61	Burned 2008	GR2, TL6, NB1, GR1, SH1, TU1	TU2, TL6, SH3, SH6
4	West Branch	13.805	West Branch 5-2	Burned	CFM 61	Burned 2008	TL6, TU1, TL9, SH1	TU2, TL6, SH3, SH6
5	West Branch	11.953	West Branch 1-2	Mechanical and burn	CFM 61	Burned 2007	TU1, TL6, NB1, SH3	TU2, TL6, SH3, SH6
6	Triangles	43.302	West Branch 11	Burned	CFM 61	Burned 2010	TL6	TU3, TL6, SH6
7	East Shore Drive	27.871	East Shore Drive Buffer 2	Mechanical and burn	CFM 63	Burned 2009	TL6, TL9, TU1	TU3, TL6, SH6
8	East Shore Drive	6.029	East Shore Drive Buffer 1	Mechanical and burn	CFM 63	Burned 2009	TL9, TU1, TL6, SH3	TU3, TL6, SH6
10	Route 41	13.112	Route 41 Buffer	Mechanical	SFM 5, 11; NF	SFM 5, 11; NF	NB1, TL3, TL6, TU3	TU2, TL6, SH3
15	Thicket	34.69	Thicket 7-1	Burned	CFM 63 or SFM 4	Burned 2010	SH3, TL6, TU1, NB	TU2, TL6, SH3, SH6
18	Lower West Branch	23.652	Hobbs Buffer	Mechanical	SFM 5, 11	SFM 5, 11	TL6, TU3,	TU3, TL6, SH6
24	Madison	31.29	Madison 2	Mechanical	SFM 8	SFM 8	TL6, TU3, TL9	TU2, TL6, SH3
36	Thicket	22.673	Thicket 8	Mechanical and burn	CFM 63	Burned 2013	TL6, TU3, SH3, TL9, GR3	TL2, SB2

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2013 Plot	Management Unit	Acres	Treatment Unit	Treatment Group	Pre-treatment Models	2005 Fuel Models	LANDFIRE Fuel Models	Potential Fuel Models for Plots
40	Madison	42.586	Madison 1	Mechanical	CFM 60, SFM 8	CFM 60, SFM 8	TL9, TL6, GR3, TL2	TU2, TL6, SH6
44	Madison	51.941	Madison 3	Mechanical	SFM 8	SFM 8	TL6, TU1, TU3	TU3, TL6, SH6
49	Jackman Ridge	10.973	South Jackman Ridge 2	Burned	CFM 61	Burned 2008	TL6, TL9, NB9	TU3, TL6, SH6
53	Cooks Pond	38.003	Goodwin 3	Untreated pitch pine	CFM 60, SFM 9	CFM 60, SFM 9	TL6, TL9, TL2, TU1	CFM 60, TL6, SH3, TU2
53	Cooks Pond	14.478	Goodwin 4	Untreated pitch pine	CFM 60	CFM 60	TL6, TL9, TL2, TU1	CFM 60, TL6, TU2, SH3, SH6
63	Lower West Branch	23.075	Hobbs 3	Untreated pitch pine	CFM 61, CFM 60	CFM 61, CFM 60	TL6, TU3, TL2	CFM 61, TU4, SH8, SH6, TL6
64	Lower West Branch	30.812	Hobbs 7	Untreated pitch pine	CFM 60, 61	CFM 60, 61	TL6, TU3, TL2, TU1	CFM 60, TL6, SH6, TU2
56	West Branch	59.658	West Branch 3	Untreated pitch pine	CFM 61, 63	CFM 61, 63	TL6, TU1, TU3	CFM 61, TL6, TU3, SH8, SH6
58	West Branch		West Branch 3	Untreated pitch pine	CFM 61, 63	CFM 61, 63	TL6, TU1, TU3	CFM 63, TU4, SH8, SH6, TL6
59	West Branch		West Branch 3	Untreated pitch pine	CFM 61, 63	CFM 61, 63	TL6, TU1, TU3	CFM 61, TL6, TU3, SH8, SH6
	Lower West Branch	9.719	Bacon 1	Harvested	CFM 61	CFM 62	TL6, GR1, TL1	
	Lower West Branch	21.407	Bacon 2			Burned 2013		
	Calumet	12.663	Calumet Buffer	Mechanical and burn	CFM 5, 6, 7, 8, 61	Burned 2012	TL9, TL6, SH3,TL6, TL9, TL6, SH3, TL2	

Appendix III. Potential fuel types and mapped types from The Nature Conservancy and LANDFIRE. Sources: GIS data and plot data provided by Jeff Lougee of the New Hampshire Chapter of The Nature Conservancy; LANDFIRE data from. Note that some units did not have plots and some plots were not in units.

2013 Plot	Management Unit	Acres	Treatment Unit	Treatment Group	Pre-treatment Models	2005 Fuel Models	LANDFIRE Fuel Models	Potential Fuel Models for Plots
	Cooks Pond	4.919	Goodwin 1	Untreated	CFM 60	CFM 60	TL2, TL6, NB1,SH3, TU3	
	Cooks Pond	7.018	Goodwin 2	Untreated	SFM 8	SFM 8	TL6, TU1, NB1, TU3, TL9	
	Cooks Pond	27.237	Goodwin 4 #2	Untreated				
	Lower West Branch	6.946	Hobbs 1	Untreated	CFM 60	CFM 60	TL6, TL2, NB1, GR3,	
	Lower West Branch	20.591	Hobbs 2	Untreated	CFM 60, 61	CFM 60, 61	TL6, TU3, NB1, TU2	
	Lower West Branch	23.509	Hobbs 4	Untreated	CFM 61, CFM 60	CFM 61, CFM 60	TU3, TL6, TL2	
	Lower West Branch	15.006	Hobbs 5	Untreated	CFM 61	CFM 61	TL6, TL9	
	Lower West Branch	16.288	Hobbs 6	Untreated	CFM 60, 61, 63	CFM 60, 61, 63	TL6, TL3, TU3	
	Jackman Ridge	15.473	Jackman Ridge 1	Untreated	CFM 60	CFM 60	TL9, TL6, TL2, GR3	
	Lower West Branch	7.095	North Atlantic Air 2	Untreated	CFM 61, SFM 5, 6, 8	CFM 61, SFM 5, 6, 8	TL6, TU1, TU3	
	Lower West Branch	30.104	North Atlantic Air 3	Untreated	CFM 61	CFM 61	TL6, TU3	
	Lower West Branch	15.182	North Atlantic Air Buffer 1	Mechanical	SFM 5, 11, CFM 61	SFM 5, 11, CFM 61	TL6, TL2, TU1, TU3	
	Sand Pit	12.108	Sand pit east	Untreated	NF	NF	NB9	
	Sand Pit	25.334	Sand pit west	Untreated	NF	NF	NB9, NB1	

Appendix III. Potential fuel types and mapped types from The Nature Conservancy and LANDFIRE. Sources: GIS data and plot data provided by Jeff Lougee of the New Hampshire Chapter of The Nature Conservancy; LANDFIRE data from. Note that some units did not have plots and some plots were not in units.

2013 Plot	Management Unit	Acres	Treatment Unit	Treatment Group	Pre-treatment Models	2005 Fuel Models	LANDFIRE Fuel Models	Potential Fuel Models for Plots
	Jackman Ridge	4.573	South Jackman Ridge 1	Mechanical and burn	SFM 4, CFM 63	Burned 2009	TL6, SH3, NB1, TL2	
	Jackman Ridge	9.582	South Jackman Ridge 10		SFM 4, CFM 63	SFM 4, CFM 63	NB9, TL6, SH4	
	Jackman Ridge	8.802	South Jackman Ridge 3	Untreated	SFM 8,CFM 63, SFM 5, 6, 7	SFM 8,CFM 63, SFM 5, 6, 7	TL6, SH3, NB1, TL9	
	Jackman Ridge	8.785	South Jackman Ridge 6	Untreated	CFM 61	CFM 61	SH4, TL3, TL6, NB9, NB1, SH3	
	Jackman Ridge	56.145	South Jackman Ridge 7	Burned	CFM 61, 63, SFM 5, 6, 8	CFM 61, 63, SFM 5, 6, 8	TL6, TL9, TU3	
	Jackman Ridge	4.949	South Jackman Ridge 8	Untreated	CFM 61	CFM 61	TL6, TU3, TL3	
	Jackman Ridge	10.063	South Jackman Ridge 9	Untreated	CFM 61, SFM 8	CFM 61, SFM 8	TL6, TL9, TL3, NB1	
	Thicket	9.884	Thicket 3	Mechanical and burn	CFM 61, 63, SFM 5, 6, 8	CFM 61, 63, SFM 5, 6, 8	SH3, GR3, TL6	
	Thicket	6.673	Thicket 4	Mechanical and burn	CFM 61, SFM 3, 5, 6	CFM 61, SFM 3, 5, 6	TL6, TU1, GR3, TU3	
	Thicket	31.021	Thicket 6	Untreated			TL6, TU1	

Appendix III. Potential fuel types and mapped types from The Nature Conservancy and LANDFIRE. Sources: GIS data and plot data provided by Jeff Lougee of the New Hampshire Chapter of The Nature Conservancy; LANDFIRE data from. Note that some units did not have plots and some plots were not in units.

2013 Plot	Management Unit	Acres	Treatment Unit	Treatment Group	Pre-treatment Models	2005 Fuel Models	LANDFIRE Fuel Models	Potential Fuel Models for Plots
	Thicket	4.722	Thicket 7-2	Mechanical and burn	CFM 63 or SFM 4, SFM 3, 5, 6	Burned 2010, SFM 3, 5, 6	SH3, NB3, TL6	
	Thicket	6.657	Thicket West 1	Mechanical and burn	CFM 4	Burned 2009	SH3, TL6, GR3	
	Thicket	15.567	Thicket West 2	Mechanical and burn	CFM 4	Burned 2011	SH3, TL6, GR3	
	West Shore	26.851	Tragenza	Untreated	CFM 61	CFM 61	TL6, TL3, NB1, TU3	
	Triangles	13.103	Triangle 1	Mechanical	CFM 63	CFM 63	TL6, TL9, TU3, SH4, GS1	
	Triangles	24.055	Triangle 2		CFM 63	CFM 63	GR1, TL6, TL9, GR3	
	Triangles	4.26	Triangle 3		CFM 61, SFM 3, 5, 6	CFM 61, SFM 3, 5, 6	TL6, TL9, TL3, TL2, SH3	
	Triangles	8.245	Triangle 3 #2	Untreated			TL3, GR1	
	Triangles	2.077	Triangle 4	Untreated	CFM 61, SFM 3, 5, 6	CFM 61, SFM 3, 5, 6		
	Triangles	3.817	Triangle 5	Untreated	CFM 61, SFM 3, 5, 6	CFM 61, SFM 3, 5, 6	TL6, TL3	
	Triangles	24.413	West Branch 10	Untreated	CFM 61	CFM 61	TL6, TU3, TL9	

Appendix III. Potential fuel types and mapped types from The Nature Conservancy and LANDFIRE. Sources: GIS data and plot data provided by Jeff Lougee of the New Hampshire Chapter of The Nature Conservancy; LANDFIRE data from. Note that some units did not have plots and some plots were not in units.

2013 Plot	Management Unit	Acres	Treatment Unit	Treatment Group	Pre-treatment Models	2005 Fuel Models	LANDFIRE Fuel Models	Potential Fuel Models for Plots
	West Branch	5.745	West Branch 1-1	Mechanical and burn	CFM 63	Burned 2007, SFM 3, 5,6	TL6, GR3, TU1, TL9	
	West Branch	23.9	West Branch 4-1	Mechanical and burn	CFM 63	Burned 2010	TL6, TL9, GR3, TU1	
	Lower West Branch	12.616	Windsock Village 1-1	Mechanical and burn	CFM 61	Burned 2011	GR1, TL6, TL2	
	Lower West Branch	18.835	Windsock Village 1-2	Mechanical and burn	CFM 61	Burned 2011	TL6, TU3	
			Windsock Village 2	Mechanical and burn	CFM 61	CFM 63	GR1, TL6, TU3	
	Lower West Branch	8.575	Zito 1	Untreated	CFM 61	CFM 61	TL6, TL2, TL3	
	Lower West Branch	33.814	Zito 2	Untreated	CFM 61, 60, SFM 5, 6, 8	CFM 61, 60, SFM 5, 6, 8	TL6, TU1, TU3, TL3	
	Lower West Branch	23.106	Zito 3	Untreated	SFM 5, 11, CFM 63	SFM 5, 11, CFM 63	TL6, TL2, TL3, TU1	
	Lower West Branch	4.246	Zito Buffer	Mechanical		SFM5,11; CFM63	TL2, TL6, TL3, TU3	
28				Untreated white pine	SFM5	SFM5	TU3	TU2, TL1, TL6, SH6
29				Untreated hemlock	SFM8	SFM8	TU1	TL2
31				Untreated white pine	SFM8	SFM8	TL6	TL2. TL3

Appendix III. Potential fuel types and mapped types from The Nature Conservancy and LANDFIRE. Sources: GIS data and plot data provided by Jeff Lougee of the New Hampshire Chapter of The Nature Conservancy; LANDFIRE data from. Note that some units did not have plots and some plots were not in units.

2013 Plot	Management Unit	Acres	Treatment Unit	Treatment Group	Pre-treatment Models	2005 Fuel Models	LANDFIRE Fuel Models	Potential Fuel Models for Plots
41				Untreated hardwoods	SFM8	SFM8	TL2	TL6
42				Untreated hardwoods	SFM9	SFM9	TL2	TL2, TL6
43				Untreated hardwoods	SFM8	SFM8	TL6	TL2, TL6
52				Untreated hardwoods	SFM9	SFM9	TL6	TL6,
54				Untreated hardwoods	CFM60	CFM60	TU1	TL6
82				Untreated hardwoods	SFM9	SFM9	TL6	TL2, TL6
84				Untreated hardwoods	SFM8	SFM8	TL6	TL2
87				Untreated hardwoods	SFM8	SFM8	TL2	TL2

Appendix IV. Fuel Model Descriptions. Sources: Andrews 1982, Scott and Burgan 2005

Standard 13 Models. Source: Anderson 1982	
Model	Description
SFM1	Surface fires that burn fine herbaceous fuels, cured and curing fuels, little shrub or timber present, primarily grasslands and savanna
SFM2	Burns fine, herbaceous fuels, stand is curing or dead, may produce fire brands on oak or pine stands
SFM3	Most intense fire of grass group, spreads quickly with wind, one third of stand dead or cured, stands average 3 ft tall
SFM4	Fast spreading fire, continuous overstory, flammable foliage and dead woody material, deep litter layer can inhibit suppression
SFM5	Low intensity fires, young, green shrubs with little dead material, fuels consist of litter from understory
SFM6	Broad range of shrubs, fire requires moderate winds to maintain flame at shrub height, or will drop to the ground with low winds
SFM7	Foliage highly flammable, allowing fire to reach shrub strata levels, shrubs generally 2 to 6 feet high
SFM8	Slow, ground burning fires, closed canopy stands with short needle conifers or hardwoods, litter consist mainly of needles and leaves, with little undergrowth, occasional flares with concentrated fuels
SFM9	Longer flames, quicker surface fires, closed canopy stands of long-needles or hardwoods, rolling leaves in fall can cause spotting, dead-down material can cause occasional crowning
SFM10	Surface and ground fire more intense, dead-down fuels more abundant, frequent crowning and spotting causing fire control to be more difficult
SFM11	Fairly active fire, fuels consist of slash and herbaceous materials, slash originates from light partial cuts or thinning projects, fire is limited by spacing of fuel load and shade from overstory
SFM12	Rapid spreading and high intensity fires, dominated by slash resulting from heavy thinning projects and clearcuts, slash is mostly 3 inches or less
SFM13	Fire spreads quickly through smaller material and intensity builds slowly as large material ignites, continuous layer of slash larger than 3 inches in diameter predominates, resulting from clearcuts and heavy partial cuts, active flames sustained for long periods of time, fire is susceptible to spotting and weather conditions
Urban	Urban
Snow/Ice	Snow/Ice
Agriculture	Agriculture
Water	Water
Barren	Barren

Scott and Burgan 40 Models. Source: Scott and Burgan 2005	
Model	Description
NB1	Urban
NB2	Snow/Ice
NB3	Agriculture
NB8	Water
NB9	Barren
GR1	Short, Sparse Dry Climate Grass: Short grass, either naturally or from heavy grazing; predicted rate of fire spread and flame length low
GR2	Low Load, Dry Climate Grass: Primarily grass with some small amounts of fine, dead fuel; any shrubs do not affect fire behavior
GR3	Low Load, Very Coarse, Humid Climate Grass: continuous, coarse humid climate grass; any shrubs do not affect fire behavior
GR4	Moderate Load, Dry Climate Grass: continuous, dry climate grass with a fuel bed depth about 2 feet
GR5	Low Load, Humid Climate Grass: fuel load is greater than GR3 and fuel bed depth is about 1-2 feet
GR6	Moderate Load, Continuous Humid Climate Grass: load is greater than GR5, but less coarse
GR7	High Load, Continuous Dry Climate Grass: load and depth are greater than GR4 and grass is about 3 feet high
GR8	High Load, Very Coarse, Continuous, Humid Climate Grass: load and depth are greater than GR6; spread rate and flame length may be extreme if grass is fully cured
GR9	Very High Load, Dense, Tall, Humid Climate Grass: Tall, dense grass with load and depth greater than GR8; grass is about 6 feet tall and spread rate and flame length can be extreme if grass is fully cured
GS1	Low Load, Dry Climate Grass-Shrub Shrub: consists of grass and shrubs, the latter about 1 foot high; grass load low; spread rate moderate and flame length low
GS2	Moderate Load, Dry Climate Grass-Shrub: shrubs are 1-3 feet high, grass load moderate; spread rate high, and flame length is moderate
GS3	Moderate Load, Humid Climate Grass-Shrub: moderate grass/shrub load, grass/shrub depth is less than 2 feet; spread rate is high and flame length is moderate
GS4	High Load, Humid Climate Grass-Shrub: heavy grass/shrub load; depth is greater than 2 feet; spread rate is high and flame length very high
SH1	Low load dry climate shrub, woody shrubs and shrub litter, fuel bed depth about 1 foot, may be some grass; spread rate and flame low
SH2	Moderate Load Dry Climate Shrub: woody shrubs and shrub litter; fuel bed depth about 1 foot, no grass; spread rate and flame low
SH3	Moderate Load, Humid Climate Shrub: woody shrubs and shrub litter, possible pine overstory, fuel bed depth 2-3 feet; spread rate and flame low

Scott and Burgan 40 Models. Source: Scott and Burgan 2005	
Model	Description
SH4	Low Load, Humid Climate Timber Shrub: woody shrubs and shrub litter, low to moderate load, possible pine overstory; fuel bed depth about 3 feet; spread rate high and flame moderate
SH5	High Load, Humid Climate Grass-Shrub Combined: heavy load with depth greater than 2 feet; spread rate and flame very high; moisture of extinction is high
SH6	Low Load, Humid Climate Shrub: woody shrubs and shrub litter, dense shrubs, little or no herbaceous fuel, depth about 2 feet; spread rate and flame high
SH7	High Load, Humid Climate Shrub: woody shrubs and shrub litter, dense shrubs, little or no herbaceous fuel, depth about 3 feet; spread rate and flame high
SH8	High Load, Humid Climate Shrub: woody shrubs and shrub litter, dense shrubs, little or no herbaceous fuel, depth about 3 feet; spread rate and flame high
SH9	Very High Load, Humid Climate Shrub: woody shrubs and shrub litter, dense finely branched shrubs with fine dead fuel, 4-6 feet tall, herbaceous may be present; spread rate and flame high
TU1	Low Load Dry Climate Timber Grass Shrub: low load of grass and/or shrub with litter; spread rate and flame low
TU2	Moderate Load, Humid Climate Timber-Shrub: moderate litter load with some shrub; spread rate moderate and flame low
TU3	Moderate Load, Humid Climate Timber Grass Shrub: moderate forest litter with some grass and shrub; spread rate high and flame moderate
TU4	Dwarf Conifer With Understory: short conifer trees with grass or moss understory; spread rate and flame moderate
TU5	Very High Load, Dry Climate Shrub: heavy forest litter with shrub or small tree understory; spread rate and flame moderate
TL1	Low Load Compact Conifer Litter: compact forest litter, light to moderate load, 1-2 inches deep, possibly representing a recent burn; spread rate and flame low
TL2	Low Load Broadleaf Litter: broadleaf, hardwood litter; spread rate and flame low
TL3	Moderate Load Conifer Litter: moderate load conifer litter, light load of coarse fuels; spread rate and flame low
TL4	Small Downed Logs: moderate load of fine litter and coarse fuels, small diameter downed logs; spread rate and flame low
TL5	High Load Conifer Litter: light slash or dead fuel; spread rate and flame low
TL6	Moderate load broadleaf litter, spread rate and flame moderate
TL7	Large Downed Logs: heavy load forest litter, larger diameter downed logs; spread rate and flame low
TL8	Long Needle Litter: moderate load long needle pine litter, may have small amounts of herbaceous fuel; spread rate moderate and flame low
TL9	Very High Load Broadleaf Litter: may be heavy needle drape; spread rate and flame moderate
SB1	Low Load Activity Fuel: light dead and down activity fuel, fine fuel is 10-20 t/ac, 1-3 inches in diameter, depth < 1 foot; spread rate moderate and flame low

Scott and Burgan 40 Models. Source: Scott and Burgan 2005	
Model	Description
SB2	Moderate Load Activity Fuel Or Low Load Blowdown: 7-12 t/ac, 0-3 inch diameter class, depth about 1 foot, blowdown scattered with many still standing; spread rate and flame low
SB3	High Load Activity Fuel Or Moderate Load Blowdown: heavy dead down activity fuel or moderate blowdown, 7-12t/ac, 0-.25 inch diameter class, depth > 1 foot, blowdown moderate; spread rate and flame high
SB4	High Load Blowdown: heavy blowdown fuel, blowdown total, foliage and fine fuel still attached to blowdown; spread rate and flame very high

Appendix V. Fire Behavior Estimates Using BehavePlus 5.05 for Growing Season Burns. Assumptions: Slope=0%; Mid-flame wind speed=5 mph; 10 hour fuel moisture 15%; 100 hour fuel moisture 22%; live fuel moisture 150%.

	One Hour Fuel Moistures											
	4	6	8	10	12	14	4	6	8	10	12	14
Fuel Model	Head Fire Rate of Spread (fpm)						Head Fire Flame Length (ft)					
4	65.1	60.7	57.0	50.2	28.5	24.8	17.5	16.5	15.7	14.1	8.4	7.4
5	8.3	7.4	7.0	6.8	6.5	6.0	2.4	2.2	2.1	2.0	1.9	1.8
6	41.1	35.4	31.6	28.9	26.8	24.9	6.5	5.9	5.4	5.2	5.0	4.7
7	26.5	24.3	22.5	21.1	19.9	19.0	5.5	5.2	4.9	4.6	4.5	4.3
8	2.6	2.2	1.9	1.7	1.6	1.4	1.2	1.1	1.0	0.9	0.9	0.8
9	11.6	9.6	8.3	7.5	6.9	6.4	3.4	2.9	2.7	2.5	2.4	2.3
10	7.4	6.8	6.4	6.2	5.9	5.7	4.6	4.3	4.1	4.0	3.9	3.8
11	7.0	6.4	5.6	4.6	2.9	0.4	3.5	3.3	3.1	2.6	1.8	0.4
12	14.9	13.6	12.6	11.6	10.5	9.0	8.1	7.7	7.3	7.0	6.5	5.8
13	17.9	16.1	14.7	13.6	12.7	11.8	10.5	9.8	9.3	8.9	8.6	8.2
SH2	1.7	1.6	1.5	1.4	1.1	0.4	1.4	1.3	1.3	1.2	0.9	0.4
SH3	2.7	2.6	2.5	2.4	2.3	2.3	1.8	1.8	1.7	1.6	1.6	1.6
SH4	7.8	7.1	6.6	6.3	6.1	5.9	2.2	2.0	1.9	1.8	1.8	1.8
SH5	42.8	40.0	30.9	20.0	15.4	6.5	11.4	10.7	8.5	5.7	4.5	2.0
SH6	18.3	16.9	15.8	15.1	14.6	14.2	7.8	7.3	6.9	6.6	6.5	6.3
SH7	26.2	22.2	13.3	11.7	8.5	3.0	10.1	8.7	5.5	4.9	3.6	1.4
SH8	12.1	10.2	8.0	5.7	5.5	5.4	6.4	5.5	4.4	3.2	3.1	3.0
SH9	17.2	12.6	11.7	11.0	10.5	10.2	8.8	6.6	6.2	5.9	5.7	5.5
TU1	0.6	0.6	0.6	0.6	0.5	0.4	0.5	0.5	0.5	0.5	0.4	0.4
TU2	11.7	10.6	9.7	9.1	8.6	8.2	3.4	3.1	2.9	2.8	2.7	2.6
TU3	13.4	10.9	7.5	5.5	5.3	5.1	4.6	3.8	2.7	2.0	2.0	1.9
TU4	10.8	10.0	9.0	4.3	0.0	0.0	5.1	4.8	4.5	2.3	0.0	0.0
TU5	7.7	7.1	6.6	6.3	6.0	5.8	6.4	6.0	5.7	5.5	5.3	5.2
TL1	1.0	0.8	0.7	0.6	0.5	0.5	0.6	0.5	0.5	0.4	0.4	0.4

Appendix V. Fire Behavior Estimates Using BehavePlus 5.05 for Growing Season Burns. Assumptions: Slope=0%; Mid-flame wind speed=5 mph; 10 hour fuel moisture 15%; 100 hour fuel moisture 22%; live fuel moisture 150%.

	One Hour Fuel Moistures											
	4	6	8	10	12	14	4	6	8	10	12	14
Fuel Model	Head Fire Rate of Spread (fpm)						Head Fire Flame Length (ft)					
TL2	1.7	1.5	1.3	1.2	1.1	1.0	0.9	0.8	0.7	0.7	0.7	0.6
TL3	2.0	1.8	1.6	1.5	1.4	1.2	1.0	1.0	0.9	0.9	0.8	0.8
TL4	2.8	2.5	2.3	2.1	2.0	1.8	1.3	1.3	1.2	1.1	1.1	1.0
TL5	5.3	4.6	4.2	3.8	3.6	3.3	2.2	2.0	1.9	1.8	1.7	1.6
TL6	7.7	6.5	5.7	5.1	4.7	4.4	3.0	2.6	2.4	2.3	2.2	2.1
TL7	3.0	2.8	2.6	2.4	2.3	2.1	1.9	1.8	1.8	1.7	1.6	1.5
TL8	7.9	6.7	5.8	5.1	4.6	4.2	3.8	3.3	3.0	2.8	2.6	2.5
TL9	11.6	9.8	8.5	7.6	6.9	6.3	5.4	4.8	4.3	4.0	3.7	3.5
SB1	7.3	6.5	5.9	5.4	5.0	4.7	3.1	2.9	2.7	2.6	2.5	2.4
SB2	19.4	16.4	14.4	13.1	12.2	11.3	6.6	5.9	5.4	5.1	4.9	4.7
SB3	35.8	29.9	26.2	23.7	22.0	20.3	10.2	8.9	8.1	7.7	7.3	7.0
SB4	67.9	57.2	50.3	45.7	42.3	39.2	14.0	12.4	11.3	10.7	10.2	9.8
Cape Cod Mixed Forest	69.8	59.1	52.2	47.8	44.6	41.7	16.1	14.2	13.0	12.2	11.7	11.3
Hobbs 60	28.0	25.1	23.4	22.2	21.1	19.7	10.8	9.9	9.3	9.0	8.7	8.2
Hollis PPSO 1YR	18.2	16.5	15.4	14.4	12.8	9.7	3.8	3.5	3.3	3.2	2.9	2.2
Hollis PPSO 2YR	33.5	29.6	27.5	25.4	22.3	16.8	8.5	7.8	7.4	7.0	6.3	4.9
Hollis PPSO3YR	31.7	28.2	26.1	24.5	22.2	18.5	9.0	8.2	7.8	7.4	6.9	5.9
Hollis PPSO Unburned	39.1	34.8	32.2	29.8	26.0	19.5	10.9	10.0	9.5	9.0	8.0	6.3
Hollis Unburned SO	18.9	17.1	16.0	15.0	13.7	11.6	6.9	6.4	6.1	5.8	5.4	4.7
MFCSF Oak Woodland Untreated	15.3	13.8	12.6	11.8	11.3	10.8	8.1	7.4	6.9	6.6	6.3	6.2
MFCSF Pitch Pine Control	29.6	26.0	23.5	21.7	20.5	19.5	12.5	11.3	10.4	9.9	9.5	9.2
MFCSF Pitch Pine Thin Mow	0.7	0.5	0.4	0.4	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.2
Crane Scrub Oak Control	46.2	41.5	38.4	36.3	34.8	33.4	10.7	9.8	9.2	8.8	8.5	8.3
MFCSF Scrub Oak Control	21.0	19.0	17.5	16.4	15.6	15.0	10.9	10.0	9.4	9.0	8.6	8.4
MFCSF Scrub Oak Mow	2.5	2.2	2.0	1.8	1.7	1.6	1.4	1.3	1.2	1.2	1.1	1.1
MFCSF Scrub Oak Mow Burn 1 Year	6.7	6.2	5.9	5.7	5.4	4.7	2.9	2.8	2.7	2.6	2.4	2.2
MFCSF Scrub Oak Mow Burn 2 Year	15.6	14.0	12.9	12.1	11.6	11.1	6.1	5.6	5.2	5.0	4.8	4.7
MFCSF Scrub Oak Mow Burn 3 Year	36.6	33.0	30.6	29.1	28.0	26.9	10.3	9.4	8.9	8.5	8.3	8.1
Waterboro 62	19.6	17.4	15.9	14.9	14.2	13.4	10.3	9.3	8.7	8.3	8.0	7.7

Appendix V. Fire Behavior Estimates Using BehavePlus 5.05 for Growing Season Burns. Assumptions: Slope=0%; Mid-flame wind speed=5 mph; 10 hour fuel moisture 15%; 100 hour fuel moisture 22%; live fuel moisture 150%.

	One Hour Fuel Moistures											
	4	6	8	10	12	14	4	6	8	10	12	14
Fuel Model	Head Fire Rate of Spread (fpm)						Head Fire Flame Length (ft)					
Waterboro Custom[4]	30.4	26.3	23.6	21.7	20.4	19.2	10.7	9.6	8.8	8.4	8.0	7.8
West Branch 61	23.9	21.8	20.5	19.7	18.9	16.9	10.5	9.7	9.3	9.0	8.7	7.9
West Branch 63	28.9	26.4	24.9	23.9	22.8	20.2	11.5	10.6	10.1	9.8	9.5	8.5

Appendix V. Fire Behavior Estimates Using BehavePlus 5.05 for Growing Season Burns. Assumptions: Slope=0%; Mid-flame wind speed=5 mph; 10 hour fuel moisture 15%; 100 hour fuel moisture 22%; live fuel moisture 150%.

	One Hour Fuel Moistures											
	4	6	8	10	12	14	4	6	8	10	12	14
Fuel Model	Backing Fire Rate of Spread (fpm)						Backing Fire Flame Length (ft)					
4	3.6	3.3	3.1	2.8	1.6	1.4	4.6	4.4	4.1	3.7	2.2	2.2
5	0.5	0.4	0.4	0.4	0.4	0.3	0.6	0.6	0.5	0.5	0.5	0.5
6	2.3	1.9	1.7	1.6	1.5	1.4	1.7	1.5	1.4	1.4	1.3	1.2
7	1.5	1.3	1.2	1.2	1.1	1.0	1.5	1.4	1.3	1.2	1.2	1.1
8	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.2	0.2	0.2
9	0.6	0.5	0.5	0.4	0.4	0.4	0.9	0.8	0.7	0.7	0.6	0.5
10	0.4	0.4	0.4	0.3	0.3	0.3	1.2	1.1	1.1	1.0	1.0	0.9
11	0.4	0.4	0.3	0.3	0.2	0.0	0.9	0.9	0.8	0.7	0.5	0.5
12	0.8	0.7	0.7	0.6	0.6	0.5	2.1	2.0	1.9	1.8	1.7	1.6
13	1.0	0.9	0.8	0.7	0.7	0.7	2.8	2.6	2.4	2.3	2.3	2.1
SH2	0.1	0.1	0.1	0.1	0.1	0.0	0.4	0.3	0.3	0.3	0.2	0.2
SH3	0.2	0.1	0.1	0.1	0.1	0.1	0.5	0.5	0.4	0.4	0.4	0.4
SH4	0.4	0.4	0.4	0.3	0.3	0.3	0.6	0.5	0.5	0.5	0.5	0.5
SH5	2.4	2.2	1.7	1.1	0.8	0.4	3.0	2.8	2.2	1.5	1.2	0.7
SH6	1.0	0.9	0.9	0.8	0.8	0.8	2.1	1.9	1.8	1.7	1.7	1.5
SH7	1.4	1.2	0.7	0.6	0.5	0.2	2.7	2.3	1.4	1.3	1.0	0.4
SH8	0.7	0.6	0.4	0.3	0.3	0.3	1.7	1.4	1.2	0.8	0.8	0.5
SH9	0.9	0.7	0.6	0.6	0.6	0.6	2.3	1.7	1.6	1.5	1.5	1.2
TU1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
TU2	0.6	0.6	0.5	0.5	0.5	0.5	0.9	0.8	0.8	0.7	0.7	0.6
TU3	0.7	0.6	0.4	0.3	0.3	0.3	1.2	1.0	0.7	0.5	0.5	0.2
TU4	0.6	0.5	0.5	0.2	0.0	0.0	1.4	1.3	1.2	0.6	0.0	0.2
TU5	0.4	0.4	0.4	0.3	0.3	0.3	1.7	1.6	1.5	1.4	1.4	1.3
TL1	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.1	0.1	0.1
TL2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2

[4] I have reports with different fuel loadings for Waterboro

Appendix V. Fire Behavior Estimates Using BehavePlus 5.05 for Growing Season Burns.
Assumptions: Slope=0%; Mid-flame wind speed=5 mph; 10 hour fuel moisture 15%; 100 hour fuel moisture 22%; live fuel moisture 150%.

	One Hour Fuel Moistures											
	4	6	8	10	12	14	4	6	8	10	12	14
Fuel Model	Backing Fire Rate of Spread (fpm)						Backing Fire Flame Length (ft)					
TL3	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.2	0.2	0.2	0.2
TL4	0.2	0.1	0.1	0.1	0.1	0.1	0.4	0.3	0.3	0.3	0.3	0.3
TL5	0.3	0.3	0.2	0.2	0.2	0.2	0.6	0.5	0.5	0.5	0.4	0.4
TL6	0.4	0.4	0.3	0.3	0.3	0.2	0.8	0.7	0.6	0.6	0.6	0.5
TL7	0.2	0.2	0.1	0.1	0.1	0.1	0.5	0.5	0.5	0.4	0.4	0.4
TL8	0.4	0.4	0.3	0.3	0.3	0.2	1.0	0.9	0.8	0.7	0.7	0.6
TL9	0.6	0.5	0.5	0.4	0.4	0.3	1.4	1.3	1.1	1.0	1.0	0.8
SB1	0.4	0.4	0.3	0.3	0.3	0.3	0.8	0.8	0.7	0.7	0.7	0.7
SB2	1.1	0.9	0.8	0.7	0.7	0.6	1.7	1.5	1.4	1.3	1.3	1.1
SB3	2.0	1.6	1.4	1.3	1.2	1.1	2.7	2.4	2.1	2.0	1.9	1.6
SB4	3.7	3.1	2.8	2.5	2.3	2.2	3.7	3.3	3.0	2.8	2.7	2.4
Cape Cod Mixed Forest	3.8	3.2	2.9	2.6	2.5	2.3	4.2	3.7	3.4	3.2	3.1	2.7
Hobbs 60	1.5	1.4	1.3	1.2	1.2	1.1	2.8	2.6	2.5	2.4	2.3	2.2
Hollis PPSO 1YR	1.0	0.9	0.8	0.8	0.7	0.5	1.0	0.9	0.9	0.8	0.8	0.7
Hollis PPSO 2YR	1.8	1.6	1.5	1.4	1.2	0.9	2.2	2.0	1.9	1.8	1.6	1.5
Hollis PPSO3YR	1.7	1.5	1.4	1.3	1.2	1.0	2.4	2.2	2.0	1.9	1.8	1.6
Hollis PPSO Unburned	2.2	1.9	1.8	1.6	1.4	1.1	2.9	2.6	2.5	2.4	2.1	2.0
Hollis Unburned SO	1.0	0.9	0.9	0.8	0.8	0.6	1.8	1.7	1.6	1.5	1.4	1.3
MFCSF Oak Woodland Untreated	0.8	0.8	0.7	0.7	0.6	0.6	2.1	1.9	1.8	1.7	1.7	1.5
MFCSF Pitch Pine Control	1.6	1.4	1.3	1.2	1.1	1.1	3.3	3.0	2.7	2.6	2.5	2.2
MFCSF Pitch Pine Thin Mow	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Crane Scrub Oak Control	2.5	2.3	2.1	2.0	1.9	1.8	2.8	2.6	2.4	2.3	2.2	2.0
MFCSF Scrub Oak Control	1.2	1.0	1.0	0.9	0.9	0.8	2.9	2.6	2.5	2.4	2.3	2.1
MFCSF Scrub Oak Mow	0.1	0.1	0.1	0.1	0.1	0.1	0.4	0.3	0.3	0.3	0.3	0.3
MFCSF Scrub Oak Mow Burn 1 Year	0.4	0.3	0.3	0.3	0.3	0.3	0.8	0.7	0.7	0.7	0.6	0.6
MFCSF Scrub Oak Mow Burn 2 Year	0.9	0.8	0.7	0.7	0.6	0.6	1.6	1.5	1.4	1.3	1.3	1.2
MFCSF Scrub Oak Mow Burn 3 Year	2.0	1.8	1.7	1.6	1.5	1.5	2.7	2.5	2.3	2.3	2.2	2.0
Waterboro 62	1.1	1.0	0.9	0.8	0.8	0.7	2.7	2.5	2.3	2.2	2.1	1.9
Waterboro Custom	1.7	1.4	1.3	1.2	1.1	1.1	2.8	2.5	2.3	2.2	2.1	1.9
West Branch 61	1.3	1.2	1.1	1.1	1.0	0.9	2.8	2.6	2.4	2.4	2.3	2.1
West Branch 63	1.6	1.5	1.4	1.3	1.3	1.1	3.0	2.8	2.7	2.6	2.5	2.4