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Photo Guide
for Estimating Fuel Loading in the Southern Appalachian Mountains

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Abstract

This field guide provides 74 photographs that depict observed fuel loads within the Southern Appalachian Mountains. The guide contains instructions on how to select a reference photograph and utilize the fuel loading information to aid in prescribed fire planning.

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All photos by USDA Forest Service Southern Research Station personnel.

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Consortium of Appalachian Fire Managers & Scientists

Contents

Introduction

Prescribed fire is a forest management practice used extensively throughout the Southeastern United States to accomplish a variety of land management objectives, such as hazardous fuel reduction, slash and debris reduction for site preparation, wildlife habitat enhancement, vegetative control of less-desired species, and ecosystem restoration (Waldrop and Goodrick 2012). It is well documented that wildland fire has been part of the Appalachian region for centuries (Lafon and others 2017), but much of the scientific understanding needed to utilize fire for the accomplishment of long-term management in this region is still emerging. Many managers and scientists in the region have desired a reference tool to aid in the determination of Appalachian-specific fuel loads as a means to better predict and anticipate potential fire behavior.

Fuel photo guides for the Eastern United States have been developed specifically for estimating fuel loads as a result of clearcut harvesting (Sanders and Van Lear 1988, Southern Appalachians) or post-hurricane damage in southern pine forests (Wade and others 1993). Also, a photo guide was specifically created for loblolly and longleaf pine plantations in the upper Coastal Plain Region (Scholl and Waldrop 1999). Other photo guides have included managed and unmanaged stands. For northern hardwood and oak-hickory forest types, Wilcox and others (1982) developed a guide for each forest type, also grouped by site, class, and harvest history. A more recent guide developed for the Mid-Atlantic States gives users pre- and post-prescribed fire data arranged by differing levels of fuel types including leaf litter, ericaceous shrubs, and logging slash (Brose 2009). No fuel photo guide has been developed specifically for long-unburned stands in the Southern Appalachians. It is our goal with the production of this guide to take the first step in that direction.

Methods

We developed this guide using photographs, site descriptions, and forest fuel inventories obtained from 705 research plots located on portions of Federal lands including Great Smoky Mountains National Park (Tennessee), Sumter National Forest (Andrew Pickens Ranger District, South Carolina), Chattahoochee National Forest (Chattooga River Ranger District, Georgia), and Nantahala National Forest (Nantahala Ranger District, North Carolina) (Waldrop and others 2007). All plots were located in areas where prescribed fire might be utilized to achieve forest management objectives.

Field data collection—In the field, fuel inventories were conducted using Brown's Planar Intersect Method (Brown 1974), as modified by Stottlemyer (2004) (fig. 1). Using this technique, down and dead woody debris 0–1/4 inch, 1/4–1 inch, 1–3 inches, and >3 inches in diameter was tallied as a 1-, 10-, 100-, and 1,000-hour timelag size class, respectively, along three 50-foot transects established at a 45° angle. Timelag refers to how each individual fuel-size class responds to changes in relative humidity (Brown 1974). Using this method, 1-hour and 10-hour fuels were tallied within the first 6 feet of each transect, 100-hour fuels were tallied within the first 12 feet, and 1,000-hour fuels were tallied along the entire 50-foot transect. A quality rating (sound or rotten) was additionally recorded for 1,000-hour fuels.

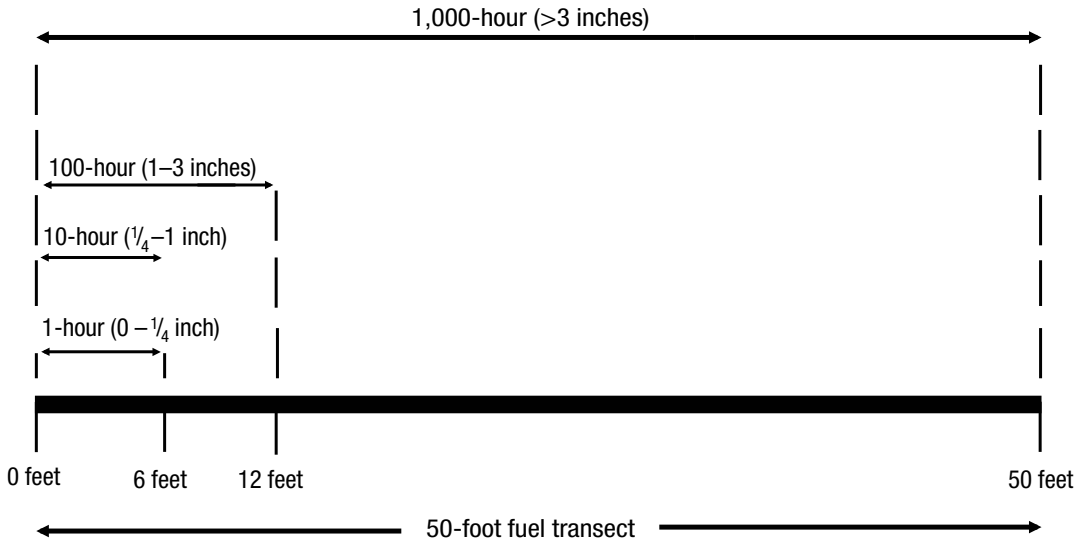

Figure 1—Sampling parameters along each 50-foot transect for the tally of woody fuel components (Stottlemyer 2004).

Estimates of fuel loading in tons per acre (W) were derived for each fuel-size class based upon these equations (Brown 1974):

For material ≤3 inches: $W = (11.64)(n*d^2*s*a*c)/N*L$
For material >3 inches: $W = (11.64)(\sum d^2*s*a*c)/N*L$

where

11.64 = conversion factor of volume to tons per acre
n = the number of woody fuels tallied per timelag size class
d = quadratic mean diameter of particles (inches)
s = specific gravity of fuels (s = 0.70 for 0–1/4-inch material, 0.58 for 1–3-inch material, 0.58 for >3-inch sound material, and 0.30 for >3-inch rotten material) (Anderson 1978)
a = non-horizontal angle correction factor
c = slope correction factor
N = number of transects at each plot (N = 3)
L = length (feet) of sampling plane (L = 6 for 1- and 10-hour fuels; L = 12 for 100-hour fuels; and L = 50 for 1,000-hour fuels)

Litter depth, duff depth, and fuel bed height (defined as the distance from the top of the litter layer to the top of any coarse woody debris crossing the transect) were measured at three locations along each 50-foot transect (at 12–13 feet, 24–25 feet, and 40–41 feet) (fig. 2). Thus, plot averages for each variable were based upon nine individual measurements.

Overstory basal area (0.05 acre) for stems >6 feet tall was calculated as a result of diameter at breast height (d.b.h.) measurements using 2-inch stem classes. Ericaceous shrub cover was calculated by measuring the canopy dimensions of each shrub using 50-foot measuring tapes within the 0.025-acre fixed-area plot. Ground cover vegetation <1 foot tall was visually estimated in the same 0.025-acre fixed-area plots (fig. 3).

The range pole in the photographs was 6 feet tall and was placed at the 40-foot mark along the center sampling transect. The camera was placed approximately 5 feet above ground when the photographs were taken.

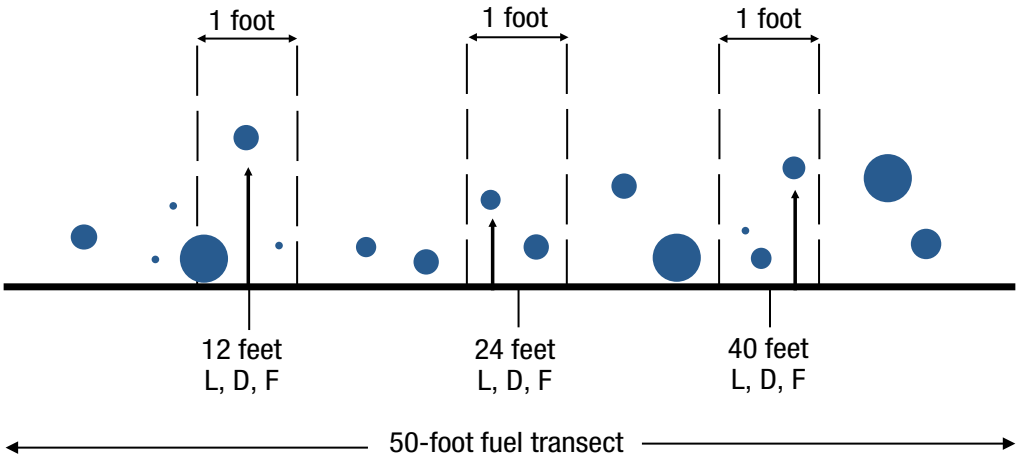

Figure 2—Sampling locations for litter (L) and duff (D) depth and fuel height (F) along the 50-foot transects (Stottlemyer 2004). The spheres above represent woody debris of differing diameters intersecting the sampling transects.

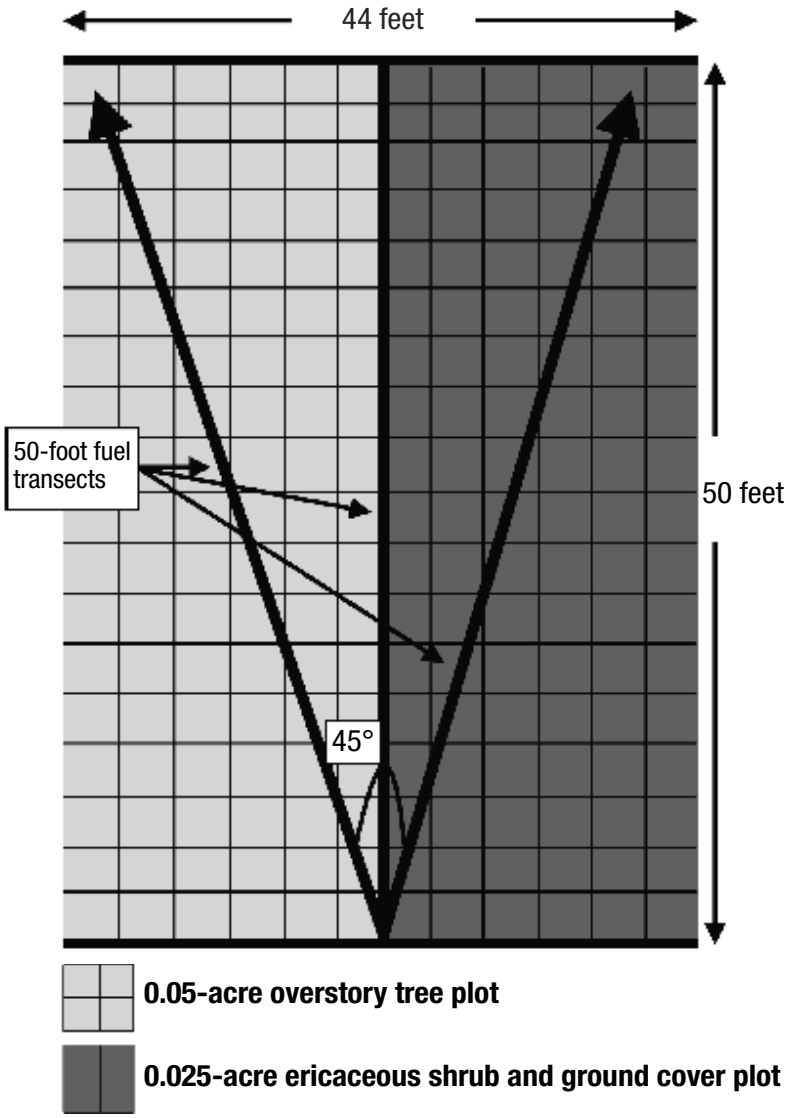

Figure 3—The orientation of fixed-area overstory, ericaceous shrub, and ground cover sampling utilized at each plot (Stottlemyer 2004).

Development of the guide—Unlike other guides, we chose to group sites by aspect and elevation instead of forest types or fuel models. Aspect and elevation, alone or in combination, are known to affect forest composition and fuel loading in the study area (McNab 1991, Simon and others 2005). Based upon 12 combinations of aspect and elevation relevant for land managers in the region, 74 photographs were selected for presentation in this guide. In general, the selected photographs were taken in the dormant season. All sites/photographs chosen for the guide are from stands that have had no active management for at least 10 years based on visual indicators and land management records. Fuel loads represented in these 74 photographs included no logging residues and assume coarse woody debris inputs from background levels of insects and diseases.

The aspect-elevation combinations presented here are:

Aspect 46–135°	Elevation 1,000–1,999 feet
	Elevation 2,000–3,499 feet
	Elevation ≥3,500 feet
Aspect 136–225°	Elevation 1,000–1,999 feet
	Elevation 2,000–3,499 feet
	Elevation ≥3,500 feet
Aspect 226–315°	Elevation 1,000–1,999 feet
	Elevation 2,000–3,499 feet
	Elevation ≥3,500 feet
Aspect 316–45°	Elevation 1,000–1,999 feet
	Elevation 2,000–3,499 feet
	Elevation ≥3,500 feet

Using the aspect-elevation combinations as a basis for differentiation, specific photographs were then selected to display a fairly wide range of coarse woody debris mass ≤3 inches in diameter. When the mass of these particles was similar between locations at a given aspect-elevation combination, ecozone, stand density, and ericaceous (*Rhododendron maximum* or *Kalmia latifolia*) shrub cover were evaluated to highlight site variability.

How to Use This Photo Guide

This guide contains 74 photographs and accompanying data obtained at each depicted location. These photographs and data are differentiated by combinations of aspect and elevation. Sections of the guide are designated with these combinations in mind, as noted in the Table of Contents. They are arranged so that when the guide is opened and turned horizontally, the image will be on the top and the information table will be on the bottom (fig. 4).

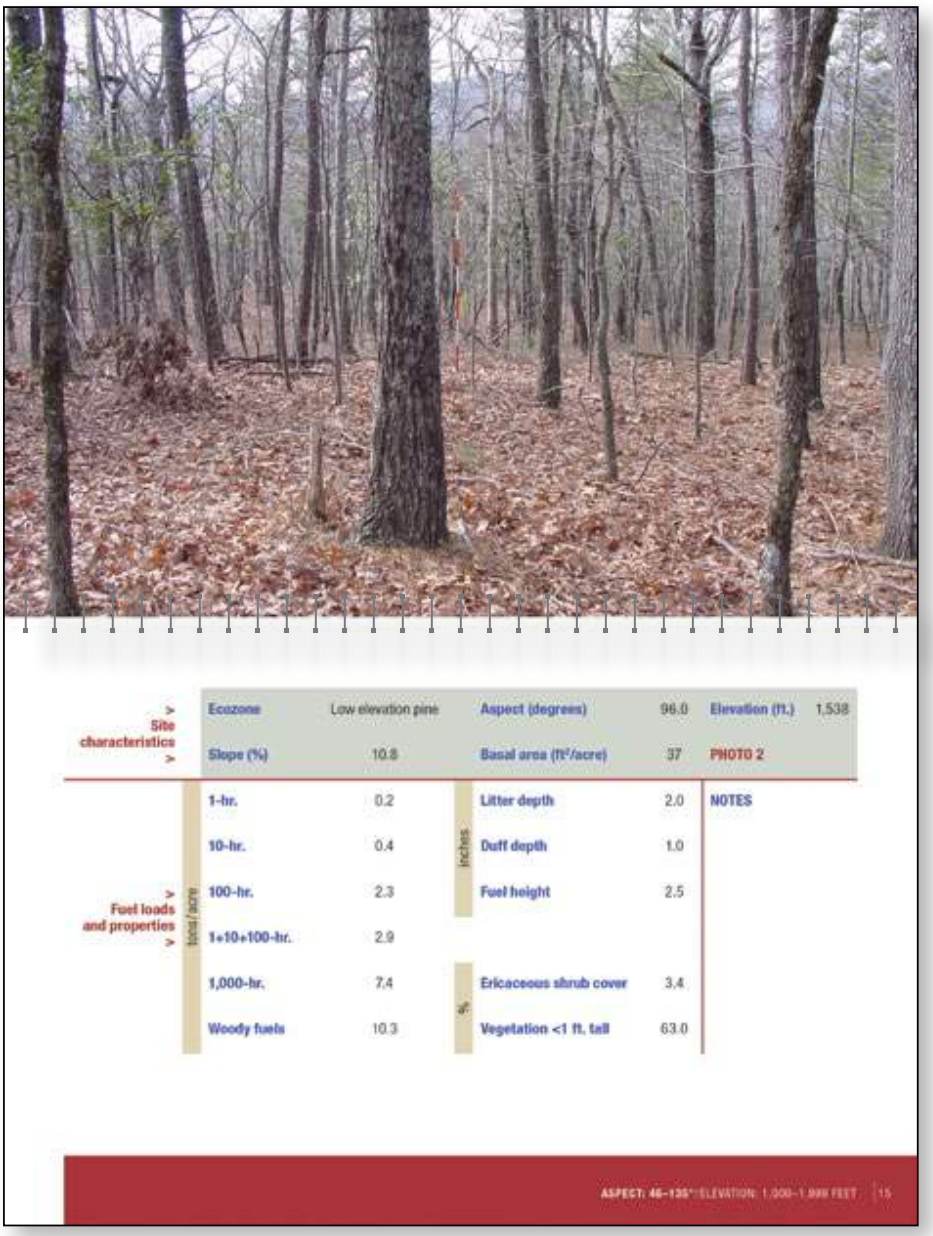

Figure 4—Photos and data are arranged by aspect and elevation combinations, followed by 1+10+100-hour fuel loads (from least to greatest).

To use the guide, select a management location of interest. Determine which aspect-elevation combination is represented at that location. Based upon what you observe at that location, determine which photograph(s) appear most similar to your location. In order to select one image when multiple photographs appear suitable, it may be necessary to narrow the selection based upon differences in ericaceous shrub cover, basal area, slope percentage, or 1,000-hour fuels.

While this tool may prove valuable to estimate fuel loading in specific locations of interest within the Southern Appalachian region, the limitations of the guide must be considered. These photographs and fuels inventories are based upon specific observations in specific locations generally during the dormant season and will not necessarily be an exact representation of the overall landscape in every situation.

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The authors wish to acknowledge several individuals who assisted with data collection and synthesis over the years this project was conducted: Dr. Aaron Stottlemyer, Dr. Sandra Rideout-Hanzak, Gregg Chapman, Eddie Gambrell, Mitch Smith, Ross Phillips, Lucy Brudnak, and Chuck Flint. The authors also thank Dr. Melissa Thomas-Van Gundy and Dr. Mike Aust for their reviews that greatly enhanced the quality of this document.

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Aspect: 46–135°

Elevation: 1,000–1,999 feet

> Site characteristics >		Ecozone	Low elevation pine		Aspect (degrees)	129.9	Elevation (ft.) 1,552
		Slope (%)	12.9		Basal area (ft.²/acre)	266	PHOTO 1
> Fuel loads and properties >	tons/acre	1-hr.	0.3	inches	Litter depth	1.5	NOTES
		10-hr.	0.8		Duff depth	2.2	
		100-hr.	1.8		Fuel height	3.0	
		1+10+100-hr.	2.9				
		1,000-hr.	3.0	%	Ericaceous shrub cover	0.9	
		Woody fuels	5.9		Vegetation <1 ft. tall	25.0	

> Site characteristics >		Ecozone	Low elevation pine		Aspect (degrees)	96.0	Elevation (ft.) 1,538
		Slope (%)	10.8		Basal area (ft.²/acre)	37	PHOTO 2
> Fuel loads and properties >	tons/acre	1-hr.	0.2	inches	Litter depth	2.0	NOTES
		10-hr.	0.4		Duff depth	1.0	
		100-hr.	2.3		Fuel height	2.5	
		1+10+100-hr.	2.9				
		1,000-hr.	7.4	%	Ericaceous shrub cover	3.4	
		Woody fuels	10.3		Vegetation <1 ft. tall	63.0	

> Site characteristics >		**Ecozone**	Low elevation pine		**Aspect (degrees)**	79.6	**Elevation (ft.)** 1,582
		Slope (%)	5.1		**Basal area (ft.²/acre)**	131	**PHOTO 3**
> Fuel loads and properties >	tons/acre	**1-hr.**	0.5	inches	**Litter depth**	1.6	**NOTES**
		10-hr.	2.2		**Duff depth**	1.8	
		100-hr.	0.7		**Fuel height**	2.3	
		1+10+100-hr.	3.4				
		1,000-hr.	16.1	%	**Ericaceous shrub cover**	25.1	
		Woody fuels	19.5		**Vegetation <1 ft. tall**	10.0	

> Site characteristics >		Ecozone	Acidic cove		Aspect (degrees)	47.1	Elevation (ft.) 1,209
		Slope (%)	32.5		Basal area (ft.²/acre)	194	PHOTO 4
> Fuel loads and properties >	tons/acre	1-hr.	0.7	inches	Litter depth	1.2	NOTES
		10-hr.	1.2		Duff depth	1.0	
		100-hr.	1.8		Fuel height	3.4	
		1+10+100-hr.	3.7				
		1,000-hr.	6.4	%	Ericaceous shrub cover	0.0	
		Woody fuels	10.1		Vegetation <1 ft. tall	0.0	

> Site characteristics >		Ecozone	Dry mesic oak		Aspect (degrees)	55.0	Elevation (ft.) 1,457
		Slope (%)	21.9		Basal area (ft.²/acre)	85	PHOTO 5
> Fuel loads and properties >	tons/acre	1-hr.	0.2	inches	Litter depth	1.8	NOTES
		10-hr.	1.1		Duff depth	0.9	
		100-hr.	3.5		Fuel height	2.3	
		1+10+100-hr.	4.8				
		1,000-hr.	7.3	%	Ericaceous shrub cover	0.0	
		Woody fuels	12.1		Vegetation <1 ft. tall	0.0	

> Site characteristics >		Ecozone	Low elevation pine		Aspect (degrees)	133.6	Elevation (ft.) 1,600
		Slope (%)	15.2		Basal area (ft.²/acre)	50	PHOTO 6
> Fuel loads and properties >	tons/acre	1-hr.	0.1	inches	Litter depth	1.2	NOTES
		10-hr.	0.5		Duff depth	0.5	
		100-hr.	5.5		Fuel height	2.5	
		1+10+100-hr.	6.1				
		1,000-hr.	14.6	%	Ericaceous shrub cover	16.0	
		Woody fuels	20.7		Vegetation <1 ft. tall	8.0	

> Site characteristics >		**Ecozone**	Low elevation pine		**Aspect (degrees)**	127.0	**Elevation (ft.)** 1,219
		Slope (%)	8.7		**Basal area (ft.²/acre)**	156	**PHOTO 7**
> Fuel loads and properties >	tons/acre	**1-hr.**	0.2	inches	**Litter depth**	1.2	**NOTES**
		10-hr.	0.9		**Duff depth**	0.9	
		100-hr.	6.3		**Fuel height**	1.9	
		1+10+100-hr.	7.4				
		1,000-hr.	2.9	%	**Ericaceous shrub cover**	0.3	
		Woody fuels	10.3		**Vegetation <1 ft. tall**	0.0	

> Site characteristics >		Ecozone	Montane oak-hickory cove		Aspect (degrees)	117.3	Elevation (ft.) 1,154
		Slope (%)	4.5		Basal area (ft.²/acre)	161	PHOTO 8
> Fuel loads and properties >	tons/acre	1-hr.	0.4	inches	Litter depth	1.0	NOTES
		10-hr.	1.5		Duff depth	1.7	
		100-hr.	5.9		Fuel height	4.5	
		1+10+100-hr.	7.8				
		1,000-hr.	40.2	%	Ericaceous shrub cover	9.4	
		Woody fuels	48.0		Vegetation <1 ft. tall	11.0	

> Site characteristics >		Ecozone	Dry oak evergreen heath		Aspect (degrees)	73.6	Elevation (ft.) 1,408
		Slope (%)	14.3		Basal area (ft.²/acre)	109	PHOTO 9
> Fuel loads and properties >	tons/acre	1-hr.	0.2	inches	Litter depth	1.5	NOTES
		10-hr.	0.9		Duff depth	1.1	
		100-hr.	7.0		Fuel height	1.9	
		1+10+100-hr.	8.1				
		1,000-hr.	2.6	%	Ericaceous shrub cover	0.0	
		Woody fuels	10.7		Vegetation <1 ft. tall	95.0	

> Site characteristics >		Ecozone	Acidic cove		Aspect (degrees)	101.0	Elevation (ft.) 1,219
		Slope (%)	23.1		Basal area (ft.²/acre)	96	PHOTO 10
> Fuel loads and properties >	tons/acre	1-hr.	0.5	inches	Litter depth	1.0	NOTES
		10-hr.	0.6		Duff depth	0.4	
		100-hr.	8.2		Fuel height	3.3	
		1+10+100-hr.	9.3				
		1,000-hr.	0.9	%	Ericaceous shrub cover	0.0	
		Woody fuels	10.1		Vegetation <1 ft. tall	4.5	

Aspect: 46–135°

Elevation: 2,000–3,499 feet

> Site characteristics >		Ecozone	Low elevation pine		Aspect (degrees)	90.9	Elevation (ft.) 2,677
		Slope (%)	13.5		Basal area (ft.²/acre)	98	PHOTO 11
> Fuel loads and properties >	tons/acre	1-hr.	0.3	inches	Litter depth	1.2	NOTES
		10-hr.	1.0		Duff depth	0.8	
		100-hr.	0.0		Fuel height	1.2	
		1+10+100-hr.	1.3				
		1,000-hr.	2.5	%	Ericaceous shrub cover	52.7	
		Woody fuels	3.8		Vegetation <1 ft. tall	1.0	

> Site characteristics >		Ecozone	Dry mesic oak		Aspect (degrees)	47.5	Elevation (ft.) 2,698
		Slope (%)	25.2		Basal area (ft.²/acre)	146	PHOTO 12
> Fuel loads and properties >	tons/acre	1-hr.	0.2	inches	Litter depth	1.1	NOTES
		10-hr.	0.4		Duff depth	1.8	
		100-hr.	0.9		Fuel height	1.7	
		1+10+100-hr.	1.5				
		1,000-hr.	32.1	%	Ericaceous shrub cover	57.6	
		Woody fuels	33.6		Vegetation <1 ft. tall	43.0	

> Site characteristics >		Ecozone	Pine-oak heath		Aspect (degrees)	85.5	Elevation (ft.) 2,027
		Slope (%)	28.6		Basal area (ft.²/acre)	144	PHOTO 13
> Fuel loads and properties >	tons/acre	1-hr.	0.5	inches	Litter depth	2.2	NOTES
		10-hr.	0.4		Duff depth	2.1	
		100-hr.	2.0		Fuel height	4.1	
		1+10+100-hr.	2.9				
		1,000-hr.	21.3	%	Ericaceous shrub cover	0.0	
		Woody fuels	24.2		Vegetation <1 ft. tall	62.5	

> Site characteristics >		Ecozone	Low elevation pine		Aspect (degrees)	114.4	Elevation (ft.) 2,675
		Slope (%)	11.2		Basal area (ft.²/acre)	117	PHOTO 14
> Fuel loads and properties >	tons/acre	1-hr.	0.2	inches	Litter depth	1.7	NOTES
		10-hr.	0.9		Duff depth	1.3	
		100-hr.	2.3		Fuel height	5.3	
		1+10+100-hr.	3.4				
		1,000-hr.	3.2	%	Ericaceous shrub cover	15.2	
		Woody fuels	6.6		Vegetation <1 ft. tall	35.0	

> Site characteristics >		Ecozone	Low elevation pine		Aspect (degrees)	109.9	Elevation (ft.) 2,692
		Slope (%)	16.4		Basal area (ft.²/acre)	134	PHOTO 15
> Fuel loads and properties >	tons/acre	1-hr.	0.3	inches	Litter depth	1.2	NOTES
		10-hr.	0.4		Duff depth	1.4	
		100-hr.	5.0		Fuel height	6.1	
		1+10+100-hr.	5.7				
		1,000-hr.	47.7	%	Ericaceous shrub cover	0.0	
		Woody fuels	53.4		Vegetation <1 ft. tall	75.0	

> Site characteristics >		Ecozone	Low elevation pine		Aspect (degrees)	50.0	Elevation (ft.) 2,463
		Slope (%)	13.1		Basal area (ft.²/acre)	210	PHOTO 16
> Fuel loads and properties >	tons/acre	1-hr.	0.4	inches	Litter depth	2.1	NOTES
		10-hr.	0.7		Duff depth	2.2	
		100-hr.	6.4		Fuel height	7.1	
		1+10+100-hr.	7.5				
		1,000-hr.	3.9	%	Ericaceous shrub cover	1.3	
		Woody fuels	11.4		Vegetation <1 ft. tall	27.0	

> Site characteristics >		Ecozone	Dry mesic oak		Aspect (degrees)	125.1	Elevation (ft.) 2,581
		Slope (%)	18.8		Basal area (ft.²/acre)	63	PHOTO 17
> Fuel loads and properties >	tons/acre	1-hr.	0.4	inches	Litter depth	1.8	NOTES
		10-hr.	3.0		Duff depth	0.7	
		100-hr.	14.7		Fuel height	2.6	
		1+10+100-hr.	15.4				
		1,000-hr.	24.3	%	Ericaceous shrub cover	0.0	
		Woody fuels	39.7		Vegetation <1 ft. tall	2.0	

Aspect: 46–135°

Elevation: ≥3,500 feet

> Site characteristics >		Ecozone	High elevation red oak		Aspect (degrees)	80.4	Elevation (ft.) 5,009
		Slope (%)	27.9		Basal area (ft.²/acre)	88	PHOTO 18
> Fuel loads and properties >	tons/acre	1-hr.	0.2	inches	Litter depth	3.0	NOTES
		10-hr.	1.6		Duff depth	2.8	
		100-hr.	0.0		Fuel height	3.9	
		1+10+100-hr.	1.8				
		1,000-hr.	43.5	%	Ericaceous shrub cover	0.0	
		Woody fuels	45.3		Vegetation <1 ft. tall	1.0	

> Site characteristics >		Ecozone	Acidic cove		Aspect (degrees)	108.5	Elevation (ft.) 3,727
		Slope (%)	21.9		Basal area (ft.²/acre)	87	PHOTO 19
> Fuel loads and properties >	tons/acre	1-hr.	0.5	inches	Litter depth	1.3	NOTES
		10-hr.	0.4		Duff depth	2.0	
		100-hr.	1.2		Fuel height	4.1	
		1+10+100-hr.	2.1				
		1,000-hr.	6.3	%	Ericaceous shrub cover	84.3	
		Woody fuels	8.4		Vegetation <1 ft. tall	0.0	

> Site characteristics >		Ecozone	Northern hardwood cove		Aspect (degrees)	81.6	Elevation (ft.) 4,049
		Slope (%)	17.9		Basal area (ft.²/acre)	61	PHOTO 20
> Fuel loads and properties >	tons/acre	1-hr.	0.1	inches	Litter depth	1.5	NOTES
		10-hr.	0.8		Duff depth	2.1	
		100-hr.	4.0		Fuel height	4.3	
		1+10+100-hr.	4.9				
		1,000-hr.	38.0	%	Ericaceous shrub cover	0.0	
		Woody fuels	42.9		Vegetation <1 ft. tall	0.0	

> Site characteristics >		Ecozone	Acidic cove		Aspect (degrees)	64.2	Elevation (ft.) 3,580
		Slope (%)	6.8		Basal area (ft.²/acre)	144	PHOTO 21
> Fuel loads and properties >	tons/acre	1-hr.	0.5	inches	Litter depth	1.9	NOTES
		10-hr.	1.3		Duff depth	3.7	
		100-hr.	3.5		Fuel height	8.3	
		1+10+100-hr.	5.3				
		1,000-hr.	0.0	%	Ericaceous shrub cover	43.2	
		Woody fuels	5.3		Vegetation <1 ft. tall	0.0	

Aspect: 136–225°

Elevation: 1,000–1,999 feet

> Site characteristics >		Ecozone	Acidic cove		Aspect (degrees)	147.7	Elevation (ft.) 1,086
		Slope (%)	9.8		Basal area (ft.²/acre)	95	PHOTO 22
> Fuel loads and properties >	tons/acre	1-hr.	0.2	inches	Litter depth	2.1	1.9
		10-hr.	0.0		Duff depth	0.6	
		100-hr.	1.2		Fuel height	3.9	
		1+10+100-hr.	1.4				
		1,000-hr.	3.4	%	Ericaceous shrub cover	0.0	
		Woody fuels	4.8		Vegetation <1 ft. tall	1.5	

> Site characteristics >		Ecozone	Dry oak evergreen heath		Aspect (degrees)	197.2	Elevation (ft.) 1,856
		Slope (%)	23.1		Basal area (ft.²/acre)	232	PHOTO 23
> Fuel loads and properties >	tons/acre	1-hr.	0.3	inches	Litter depth	1.8	NOTES
		10-hr.	0.7		Duff depth	1.8	
		100-hr.	0.9		Fuel height	4.3	
		1+10+100-hr.	1.9				
		1,000-hr.	63.9	%	Ericaceous shrub cover	9.2	
		Woody fuels	65.8		Vegetation <1 ft. tall	0.0	

> Site characteristics >		Ecozone	Low elevation pine		Aspect (degrees)	140.0	Elevation (ft.) 1,577
		Slope (%)	6.6		Basal area (ft.²/acre)	94	PHOTO 24
> Fuel loads and properties >	tons/acre	1-hr.	0.4	inches	Litter depth	0.6	NOTES
		10-hr.	1.5		Duff depth	0.3	
		100-hr.	1.2		Fuel height	1.0	
		1+10+100-hr.	3.1				
		1,000-hr.	4.9	%	Ericaceous shrub cover	0.0	
		Woody fuels	8.0		Vegetation <1 ft. tall	0.0	

> Site characteristics >	Ecozone	Dry oak evergreen heath	Aspect (degrees)	196.6	Elevation (ft.)	1,416
	Slope (%)	18.8	Basal area (ft.²/acre)	74	PHOTO 25	
> Fuel loads and properties >	1-hr.	0.2	Litter depth (inches)	1.6	NOTES	
	10-hr.	0.6	Duff depth (inches)	2.1		
	100-hr.	4.7	Fuel height (inches)	3.4		
	1+10+100-hr. (tons/acre)	5.5				
	1,000-hr. (tons/acre)	22.7	Ericaceous shrub cover (%)	74.6		
	Woody fuels (tons/acre)	28.2	Vegetation <1 ft. tall (%)	2.0		

> Site characteristics >		Ecozone	Low elevation pine		Aspect (degrees)	196.7	Elevation (ft.) 1,541
		Slope (%)	8.6		Basal area (ft.²/acre)	91	PHOTO 26
> Fuel loads and properties >	tons/acre	1-hr.	0.2	inches	Litter depth	1.6	NOTES
		10-hr.	1.2		Duff depth	1.8	
		100-hr.	4.7		Fuel height	3.8	
		1+10+100-hr.	6.1				
		1,000-hr.	0.0	%	Ericaceous shrub cover	14.7	
		Woody fuels	6.1		Vegetation <1 ft. tall	10.0	

> Site characteristics >		Ecozone	Dry mesic oak		Aspect (degrees)	185.9	Elevation (ft.) 1,171
		Slope (%)	24.0		Basal area (ft.²/acre)	96	PHOTO 27
> Fuel loads and properties >	tons/acre	1-hr.	0.3	inches	Litter depth	0.7	NOTES
		10-hr.	1.3		Duff depth	0.7	
		100-hr.	9.4		Fuel height	2.2	
		1+10+100-hr.	11.0				
		1,000-hr.	2.2	%	Ericaceous shrub cover	0.0	
		Woody fuels	13.2		Vegetation <1 ft. tall	7.0	

Aspect: 136–225°

Elevation: 2,000–3,499 feet

> Site characteristics >		Ecozone	Low elevation pine		Aspect (degrees)	183.8	Elevation (ft.) 2,564
		Slope (%)	4.1		Basal area (ft.²/acre)	183	PHOTO 28
> Fuel loads and properties >	tons/acre	1-hr.	0.2	inches	Litter depth	1.2	NOTES
		10-hr.	0.4		Duff depth	1.1	
		100-hr.	0.0		Fuel height	1.7	
		1+10+100-hr.	0.6				
		1,000-hr.	0.6	%	Ericaceous shrub cover	0.0	
		Woody fuels	1.2		Vegetation <1 ft. tall	20.0	

> Site characteristics >		Ecozone	Dry oak evergreen heath		Aspect (degrees)	220.4	Elevation (ft.) 2,662
		Slope (%)	14.4		Basal area (ft.²/acre)	54	PHOTO 29
> Fuel loads and properties >	tons/acre	1-hr.	0.3	inches	Litter depth	2.1	NOTES
		10-hr.	0.7		Duff depth	1.3	
		100-hr.	0.0		Fuel height	5.4	
		1+10+100-hr.	1.0				
		1,000-hr.	48.8	%	Ericaceous shrub cover	0.0	
		Woody fuels	49.8		Vegetation <1 ft. tall	0.0	

> Site characteristics >		Ecozone	Low elevation pine		Aspect (degrees)	209.7	Elevation (ft.) 2,457
		Slope (%)	13.7		Basal area (ft.²/acre)	194	PHOTO 30
> Fuel loads and properties >	tons/acre	1-hr.	0.2	inches	Litter depth	1.1	NOTES
		10-hr.	0.7		Duff depth	1.7	
		100-hr.	3.5		Fuel height	3.1	
		1+10+100-hr.	4.4				
		1,000-hr.	1.4	%	Ericaceous shrub cover	29.0	
		Woody fuels	5.8		Vegetation <1 ft. tall	2.0	

> Site characteristics >		Ecozone	Acidic cove		Aspect (degrees)	225.1	Elevation (ft.) 3,490
		Slope (%)	1.9		Basal area (ft.²/acre)	225	PHOTO 31
> Fuel loads and properties >	tons/acre	1-hr.	0.3	inches	Litter depth	2.1	NOTES
		10-hr.	0.9		Duff depth	3.1	
		100-hr.	3.5		Fuel height	5.6	
		1+10+100-hr.	4.7				
		1,000-hr.	6.3	%	Ericaceous shrub cover	39.3	
		Woody fuels	11.0		Vegetation <1 ft. tall	3.0	

Aspect: 136–225°

Elevation: ≥3,500 feet

> Site characteristics >		Ecozone	Montane oak-hickory slope		Aspect (degrees)	220.5	Elevation (ft.) 3,705
		Slope (%)	24.9		Basal area (ft.²/acre)	186	PHOTO 32
> Fuel loads and properties >	tons/acre	1-hr.	0.4	inches	Litter depth	1.8	NOTES
		10-hr.	1.5		Duff depth	0.5	
		100-hr.	1.2		Fuel height	3.4	
		1+10+100-hr.	3.1				
		1,000-hr.	11.9	%	Ericaceous shrub cover	0.0	
		Woody fuels	15.0		Vegetation <1 ft. tall	27.0	

> Site characteristics >		Ecozone	Acidic cove		Aspect (degrees)	216.7	Elevation (ft.) 3,529
		Slope (%)	17.7		Basal area (ft.²/acre)	89	PHOTO 33
> Fuel loads and properties >	tons/acre	1-hr.	0.1	inches	Litter depth	1.3	NOTES
		10-hr.	0.1		Duff depth	1.1	
		100-hr.	3.5		Fuel height	1.3	
		1+10+100-hr.	3.7				
		1,000-hr.	21.3	%	Ericaceous shrub cover	63.3	
		Woody fuels	25.0		Vegetation <1 ft. tall	1.0	

> Site characteristics >		Ecozone	Acidic cove		Aspect (degrees)	225.3	Elevation (ft.) 3,742
		Slope (%)	23.3		Basal area (ft.²/acre)	295	PHOTO 34
> Fuel loads and properties >	tons/acre	1-hr.	0.4	inches	Litter depth	1.9	NOTES
		10-hr.	1.4		Duff depth	2.2	
		100-hr.	2.6		Fuel height	4.8	
		1+10+100-hr.	4.4				
		1,000-hr.	5.4	%	Ericaceous shrub cover	0.0	
		Woody fuels	9.8		Vegetation <1 ft. tall	19.0	

> Site characteristics >		Ecozone	Dry oak evergreen heath		Aspect (degrees)	196.6	Elevation (ft.) 4,194
		Slope (%)	27.9		Basal area (ft.²/acre)	70	PHOTO 35
> Fuel loads and properties >	tons/acre	1-hr.	0.2	inches	Litter depth	3.1	NOTES
		10-hr.	1.0		Duff depth	1.3	
		100-hr.	5.5		Fuel height	6.9	
		1+10+100-hr.	6.7				
		1,000-hr.	48.9	%	Ericaceous shrub cover	0.0	
		Woody fuels	55.6		Vegetation <1 ft. tall	3.0	

Aspect: 226–315°

Elevation: 1,000–1,999 feet

> Site characteristics >		Ecozone	Low elevation pine		Aspect (degrees)	294.2	Elevation (ft.) 1,050
		Slope (%)	12.3		Basal area (ft.²/acre)	86	PHOTO 36
> Fuel loads and properties >	tons/acre	1-hr.	0.2	inches	Litter depth	1.8	NOTES
		10-hr.	0.7		Duff depth	0.9	
		100-hr.	0.0		Fuel height	2.0	
		1+10+100-hr.	0.9				
		1,000-hr.	4.3	%	Ericaceous shrub cover	7.9	
		Woody fuels	5.2		Vegetation <1 ft. tall	0.0	

> Site characteristics >		Ecozone	Dry mesic oak		Aspect (degrees)	245.4	Elevation (ft.) 1,467
		Slope (%)	7.8		Basal area (ft.²/acre)	175	PHOTO 37
> Fuel loads and properties >	tons/acre	1-hr.	0.5	inches	Litter depth	1.4	NOTES
		10-hr.	1.0		Duff depth	1.2	
		100-hr.	0.0		Fuel height	6.8	
		1+10+100-hr.	1.5				
		1,000-hr.	0.0	%	Ericaceous shrub cover	3.7	
		Woody fuels	1.5		Vegetation <1 ft. tall	72.0	

> Site characteristics >		Ecozone	Dry mesic oak		Aspect (degrees)	245.4	Elevation (ft.) 1,426
		Slope (%)	7.8		Basal area (ft.²/acre)	175	PHOTO 38
> Fuel loads and properties >	tons/acre	1-hr.	0.2	inches	Litter depth	1.4	NOTES
		10-hr.	0.6		Duff depth	0.5	
		100-hr.	5.9		Fuel height	1.9	
		1+10+100-hr.	6.7				
		1,000-hr.	3.3	%	Ericaceous shrub cover	28.8	
		Woody fuels	10.0		Vegetation <1 ft. tall	51.0	

Aspect: 226–315°

Elevation: 2,000–3,499 feet

> Site characteristics >		Ecozone	Low elevation pine		Aspect (degrees)	243.5	Elevation (ft.) 3,411
		Slope (%)	9.4		Basal area (ft.²/acre)	47	PHOTO 39
> Fuel loads and properties >	tons/acre	1-hr.	0.2	inches	Litter depth	1.4	NOTES
		10-hr.	0.3		Duff depth	1.0	
		100-hr.	0.0		Fuel height	3.2	
		1+10+100-hr.	0.5				
		1,000-hr.	20.2	%	Ericaceous shrub cover	30.5	
		Woody fuels	20.7		Vegetation <1 ft. tall	0.0	

> Site characteristics >		Ecozone	Rich cove		Aspect (degrees)	242.3	Elevation (ft.) 3,435
		Slope (%)	18.9		Basal area (ft.²/acre)	89	PHOTO 40
> Fuel loads and properties >	tons/acre	1-hr.	0.2	inches	Litter depth	1.2	NOTES
		10-hr.	0.0		Duff depth	1.5	
		100-hr.	1.5		Fuel height	5.5	
		1+10+100-hr.	1.7				
		1,000-hr.	77.3	%	Ericaceous shrub cover	44.6	
		Woody fuels	79.0		Vegetation <1 ft. tall	4.0	

> Site characteristics >		Ecozone	Dry mesic oak		Aspect (degrees)	280.7	Elevation (ft.) 3,395
		Slope (%)	13.8		Basal area (ft.²/acre)	203	PHOTO 41
> Fuel loads and properties >	tons/acre	1-hr.	0.1	inches	Litter depth	0.6	NOTES
		10-hr.	1.7		Duff depth	0.4	
		100-hr.	0.5		Fuel height	3.2	
		1+10+100-hr.	2.3				
		1,000-hr.	24.4	%	Ericaceous shrub cover	2.0	
		Woody fuels	26.7		Vegetation <1 ft. tall	0.0	

> Site characteristics >		Ecozone	Montane oak-hickory slope		Aspect (degrees)	242.9	Elevation (ft.) 2,200
		Slope (%)	32.7		Basal area (ft.²/acre)	110	PHOTO 42
> Fuel loads and properties >	tons/acre	1-hr.	0.2	inches	Litter depth	3.0	NOTES
		10-hr.	0.2		Duff depth	1.2	
		100-hr.	2.6		Fuel height	6.9	
		1+10+100-hr.	3.0				
		1,000-hr.	77.1	%	Ericaceous shrub cover	44.5	
		Woody fuels	80.1		Vegetation <1 ft. tall	0.0	

> Site characteristics >		Ecozone	Dry mesic oak		Aspect (degrees)	253.5	Elevation (ft.) 2,142
		Slope (%)	13.2		Basal area (ft.²/acre)	301	PHOTO 43
> Fuel loads and properties >	tons/acre	1-hr.	0.3	inches	Litter depth	0.9	NOTES
		10-hr.	0.7		Duff depth	2.2	
		100-hr.	2.3		Fuel height	3.4	
		1+10+100-hr.	3.3				
		1,000-hr.	1.3	%	Ericaceous shrub cover	70.4	
		Woody fuels	4.6		Vegetation <1 ft. tall	1.0	

> Site characteristics >		Ecozone	Dry mesic oak		Aspect (degrees)	230.7	Elevation (ft.) 3,065
		Slope (%)	19.2		Basal area (ft.²/acre)	97	PHOTO 44
> Fuel loads and properties >	tons/acre	1-hr.	0.3	inches	Litter depth	1.6	NOTES
		10-hr.	0.7		Duff depth	0.6	
		100-hr.	3.5		Fuel height	3.9	
		1+10+100-hr.	4.5				
		1,000-hr.	2.7	%	Ericaceous shrub cover	0.0	
		Woody fuels	7.2		Vegetation <1 ft. tall	77.0	

> Site characteristics >		Ecozone	Low elevation pine		Aspect (degrees)	278.1	Elevation (ft.) 3,459
		Slope (%)	32.2		Basal area (ft.²/acre)	86	PHOTO 45
> Fuel loads and properties >	tons/acre	1-hr.	0.3	inches	Litter depth	3.3	NOTES
		10-hr.	0.4		Duff depth	4.8	
		100-hr.	4.7		Fuel height	4.7	
		1+10+100-hr.	5.4				
		1,000-hr.	10.9	%	Ericaceous shrub cover	68.4	
		Woody fuels	16.3		Vegetation <1 ft. tall	0.0	

> Site characteristics >		Ecozone	Acidic cove		Aspect (degrees)	249.5	Elevation (ft.) 3,491
		Slope (%)	21.2		Basal area (ft.²/acre)	98	PHOTO 46
> Fuel loads and properties >	tons/acre	1-hr.	0.2	inches	Litter depth	1.5	NOTES
		10-hr.	0.2		Duff depth	1.7	
		100-hr.	6.0		Fuel height	2.2	
		1+10+100-hr.	6.4				
		1,000-hr.	12.7	%	Ericaceous shrub cover	0.0	
		Woody fuels	19.1		Vegetation <1 ft. tall	4.0	

Aspect: 226–315°

Elevation: ≥3,500 feet

> Site characteristics >		Ecozone	Montane oak-hickory slope		Aspect (degrees)	272.5	Elevation (ft.) 4,152
		Slope (%)	23.5		Basal area (ft.²/acre)	82	PHOTO 47
> Fuel loads and properties >	tons/acre	1-hr.	0.2	inches	Litter depth	2.2	NOTES
		10-hr.	0.4		Duff depth	0.6	
		100-hr.	0.0		Fuel height	3.1	
		1+10+100-hr.	0.6				
		1,000-hr.	3.6	%	Ericaceous shrub cover	0.0	
		Woody fuels	4.2		Vegetation <1 ft. tall	1.0	

> Site characteristics >		Ecozone	Montane oak-hickory slope		Aspect (degrees)	245.5	Elevation (ft.) 4,056
		Slope (%)	41.6		Basal area (ft.²/acre)	61	PHOTO 48
> Fuel loads and properties >	tons/acre	1-hr.	0.1	inches	Litter depth	2.4	NOTES
		10-hr.	0.3		Duff depth	2.5	
		100-hr.	1.2		Fuel height	3.4	
		1+10+100-hr.	1.6				
		1,000-hr.	0.0	%	Ericaceous shrub cover	107.7	
		Woody fuels	1.6		Vegetation <1 ft. tall	3.0	

> Site characteristics >		Ecozone	Dry oak evergreen heath		Aspect (degrees)	273.3	Elevation (ft.) 3,790
		Slope (%)	19.7		Basal area (ft.²/acre)	164	PHOTO 49
> Fuel loads and properties >	tons/acre	1-hr.	0.2	inches	Litter depth	1.8	NOTES
		10-hr.	0.1		Duff depth	0.6	
		100-hr.	2.0		Fuel height	10.2	
		1+10+100-hr.	2.3				
		1,000-hr.	8.4	%	Ericaceous shrub cover	0.0	
		Woody fuels	10.7		Vegetation <1 ft. tall	76.0	

> Site characteristics >		Ecozone	Rich cove		Aspect (degrees)	256.9	Elevation (ft.) 3,858
		Slope (%)	29.7		Basal area (ft.²/acre)	26	PHOTO 50
> Fuel loads and properties >	tons/acre	1-hr.	0.3	inches	Litter depth	2.5	NOTES
		10-hr.	1.2		Duff depth	1.5	
		100-hr.	2.5		Fuel height	4.5	
		1+10+100-hr.	4.0				
		1,000-hr.	9.5	%	Ericaceous shrub cover	0.0	
		Woody fuels	13.5		Vegetation <1 ft. tall	5.0	

> Site characteristics >	Ecozone	Northern hardwood cove		Aspect (degrees)	280.4	Elevation (ft.) 4,768
	Slope (%)	8.7		Basal area (ft.²/acre)	76	PHOTO 51
> Fuel loads and properties >	1-hr.	0.3	inches	Litter depth	2.2	NOTES
	10-hr.	0.7		Duff depth	1.6	
	100-hr.	4.2		Fuel height	17.4	
	1+10+100-hr.	5.2				
	1,000-hr.	36.8	%	Ericaceous shrub cover	0.0	
	Woody fuels	42.0		Vegetation <1 ft. tall	10.0	

tons/acre

> Site characteristics >		Ecozone	Acidic cove		Aspect (degrees)	296.5	Elevation (ft.) 3,693
		Slope (%)	17.0		Basal area (ft.²/acre)	168	PHOTO 52
> Fuel loads and properties >	tons/acre	1-hr.	0.1	inches	Litter depth	1.6	NOTES
		10-hr.	0.8		Duff depth	1.1	
		100-hr.	4.5		Fuel height	1.2	
		1+10+100-hr.	5.4				
		1,000-hr.	19.1	%	Ericaceous shrub cover	41.8	
		Woody fuels	24.5		Vegetation <1 ft. tall	2.0	

> Site characteristics >		Ecozone	Mixed oak rhododendron		Aspect (degrees)	254.5	Elevation (ft.) 3,895
		Slope (%)	27.1		Basal area (ft.²/acre)	148	PHOTO 53
> Fuel loads and properties >	tons/acre	1-hr.	0.4	inches	Litter depth	1.8	NOTES
		10-hr.	1.0		Duff depth	0.4	
		100-hr.	6.3		Fuel height	2.9	
		1+10+100-hr.	7.7				
		1,000-hr.	15.4	%	Ericaceous shrub cover	55.5	
		Woody fuels	23.1		Vegetation <1 ft. tall	0.0	

> Site characteristics >		Ecozone	Northern hardwood slope		Aspect (degrees)	255.4	Elevation (ft.) 4,590
		Slope (%)	26.4		Basal area (ft.²/acre)	106	PHOTO 54
> Fuel loads and properties >	tons/acre	1-hr.	0.2	inches	Litter depth	2.2	NOTES
		10-hr.	1.4		Duff depth	0.7	
		100-hr.	8.2		Fuel height	4.6	
		1+10+100-hr.	9.8				
		1,000-hr.	25.3	%	Ericaceous shrub cover	0.0	
		Woody fuels	35.1		Vegetation <1 ft. tall	7.0	

> Site characteristics >		Ecozone	High elevation red oak		Aspect (degrees)	288.8	Elevation (ft.) 4,997
		Slope (%)	17.1		Basal area (ft.²/acre)	92	PHOTO 55
> Fuel loads and properties >	tons/acre	1-hr.	0.2	inches	Litter depth	1.6	NOTES
		10-hr.	1.4		Duff depth	1.6	
		100-hr.	13.7		Fuel height	7.5	
		1+10+100-hr.	15.3				
		1,000-hr.	56.4	%	Ericaceous shrub cover	0.0	
		Woody fuels	71.7		Vegetation <1 ft. tall	10.0	

> Site characteristics >		Ecozone	Acidic cove		Aspect (degrees)	279.8	Elevation (ft.) 4,009
		Slope (%)	16.2		Basal area (ft.²/acre)	81	PHOTO 56
> Fuel loads and properties >	tons/acre	1-hr.	0.3	inches	Litter depth	1.9	NOTES
		10-hr.	2.3		Duff depth	1.0	
		100-hr.	23.8		Fuel height	4.3	
		1+10+100-hr.	26.4				
		1,000-hr.	40.2	%	Ericaceous shrub cover	0.0	
		Woody fuels	66.6		Vegetation <1 ft. tall	7.0	

Aspect: 316–45°

Elevation: 1,000–1,999 feet

> Site characteristics >		Ecozone	Pine-oak heath		Aspect (degrees)	317.0	Elevation (ft.) 1,859
		Slope (%)	19.9		Basal area (ft.²/acre)	60	PHOTO 57
> Fuel loads and properties >	tons/acre	1-hr.	0.1	inches	Litter depth	2.4	NOTES
		10-hr.	0.3		Duff depth	1.1	
		100-hr.	4.7		Fuel height	2.5	
		1+10+100-hr.	5.1				
		1,000-hr.	1.1	%	Ericaceous shrub cover	0.0	
		Woody fuels	6.2		Vegetation <1 ft. tall	5.5	

> Site characteristics >		Ecozone	Dry mesic oak		Aspect (degrees)	8.7	Elevation (ft.) 1,296
		Slope (%)	31.0		Basal area (ft.²/acre)	113	PHOTO 58
> Fuel loads and properties >	tons/acre	1-hr.	0.2	inches	Litter depth	2.9	NOTES
		10-hr.	1.9		Duff depth	1.0	
		100-hr.	3.5		Fuel height	7.9	
		1+10+100-hr.	5.6				
		1,000-hr.	9.4	%	Ericaceous shrub cover	2.3	
		Woody fuels	15.0		Vegetation <1 ft. tall	14.0	

> Site characteristics >		Ecozone	Dry mesic oak		Aspect (degrees)	28.2	Elevation (ft.) 1,270
		Slope (%)	25.0		Basal area (ft.²/acre)	121	PHOTO 59
> Fuel loads and properties >	tons/acre	1-hr.	0.2	inches	Litter depth	1.4	NOTES
		10-hr.	1.5		Duff depth	1.3	
		100-hr.	6.1		Fuel height	4.1	
		1+10+100-hr.	7.8				
		1,000-hr.	13.1	%	Ericaceous shrub cover	0.0	
		Woody fuels	20.9		Vegetation <1 ft. tall	35.0	

> Site characteristics >		Ecozone	Low elevation pine		Aspect (degrees)	38.0	Elevation (ft.) 1,267
		Slope (%)	19.7		Basal area (ft.²/acre)	145	PHOTO 60
> Fuel loads and properties >	tons/acre	1-hr.	0.3	inches	Litter depth	1.6	NOTES
		10-hr.	2.1		Duff depth	2.8	
		100-hr.	6.3		Fuel height	6.8	
		1+10+100-hr.	8.7				
		1,000-hr.	22.7	%	Ericaceous shrub cover	37.9	
		Woody fuels	31.4		Vegetation <1 ft. tall	0.0	

Aspect: 316–45°

Elevation: 2,000–3,499 feet

> Site characteristics >		Ecozone	Dry mesic oak		Aspect (degrees)	22.4	Elevation (ft.) 2,769
		Slope (%)	21.3		Basal area (ft.²/acre)	137	PHOTO 61
> Fuel loads and properties >	tons/acre	1-hr.	0.4	inches	Litter depth	2.1	NOTES
		10-hr.	0.7		Duff depth	1.7	
		100-hr.	1.2		Fuel height	5.7	
		1+10+100-hr.	2.3				
		1,000-hr.	6.3	%	Ericaceous shrub cover	6.7	
		Woody fuels	8.6		Vegetation <1 ft. tall	100.0	

> Site characteristics >		Ecozone	Acidic cove		Aspect (degrees)	42.5	Elevation (ft.) 2,084
		Slope (%)	11.5		Basal area (ft.²/acre)	232	PHOTO 62
> Fuel loads and properties >	tons/acre	1-hr.	0.4	inches	Litter depth	1.5	NOTES
		10-hr.	1.0		Duff depth	2.3	
		100-hr.	1.2		Fuel height	6.5	
		1+10+100-hr.	2.6				
		1,000-hr.	2.9	%	Ericaceous shrub cover	42.0	
		Woody fuels	5.5		Vegetation <1 ft. tall	0.0	

> Site characteristics >		Ecozone	Rich cove		Aspect (degrees)	352.5	Elevation (ft.) 2,244
		Slope (%)	22.2		Basal area (ft.²/acre)	222	PHOTO 63
> Fuel loads and properties >	tons/acre	1-hr.	0.2	inches	Litter depth	2.2	NOTES
		10-hr.	0.7		Duff depth	1.8	
		100-hr.	2.3		Fuel height	3.2	
		1+10+100-hr.	3.2				
		1,000-hr.	4.3	%	Ericaceous shrub cover	0.0	
		Woody fuels	7.5		Vegetation <1 ft. tall	0.0	

> Site characteristics >		Ecozone	Acidic cove		Aspect (degrees)	320.9	Elevation (ft.) 3,428
		Slope (%)	3.3		Basal area (ft.²/acre)	267	PHOTO 64
> Fuel loads and properties >	tons/acre	1-hr.	0.2	inches	Litter depth	2.4	NOTES
		10-hr.	0.3		Duff depth	2.2	
		100-hr.	5.5		Fuel height	7.9	
		1+10+100-hr.	6.0				
		1,000-hr.	51.3	%	Ericaceous shrub cover	43.1	
		Woody fuels	57.3		Vegetation <1 ft. tall	26.0	

> Site characteristics >		Ecozone	Low elevation pine		Aspect (degrees)	38.8	Elevation (ft.) 2,782
		Slope (%)	17.4		Basal area (ft.²/acre)	177	PHOTO 65
> Fuel loads and properties >	tons/acre	1-hr.	0.3	inches	Litter depth	1.5	NOTES
		10-hr.	1.5		Duff depth	1.9	
		100-hr.	4.7		Fuel height	3.1	
		1+10+100-hr.	6.5				
		1,000-hr.	9.3	%	Ericaceous shrub cover	0.0	
		Woody fuels	15.8		Vegetation <1 ft. tall	83.0	

> Site characteristics >		Ecozone	Acidic cove		Aspect (degrees)	318.8	Elevation (ft.) 3,442
		Slope (%)	4.7		Basal area (ft.²/acre)	122	PHOTO 66
> Fuel loads and properties >	tons/acre	1-hr.	0.7	inches	Litter depth	2.5	NOTES
		10-hr.	0.9		Duff depth	2.4	
		100-hr.	7.9		Fuel height	6.1	
		1+10+100-hr.	9.5				
		1,000-hr.	9.4	%	Ericaceous shrub cover	32.6	
		Woody fuels	18.9		Vegetation <1 ft. tall	1.0	

Aspect: 316–45°

Elevation: ≥3,500 feet

> Site characteristics >		Ecozone	Acidic cove		Aspect (degrees)	17.6	Elevation (ft.) 3,555
		Slope (%)	24.1		Basal area (ft.²/acre)	109	PHOTO 67
> Fuel loads and properties >	tons/acre	1-hr.	0.1	inches	Litter depth	2.7	NOTES
		10-hr.	0.4		Duff depth	1.2	
		100-hr.	0.0		Fuel height	4.2	
		1+10+100-hr.	0.5				
		1,000-hr.	18.1	%	Ericaceous shrub cover	0.0	
		Woody fuels	18.6		Vegetation <1 ft. tall	0.0	

> Site characteristics >		Ecozone	Northern hardwood cove		Aspect (degrees)	28.9	Elevation (ft.) 4,031
		Slope (%)	21.1		Basal area (ft.²/acre)	125	PHOTO 68
> Fuel loads and properties >	tons/acre	1-hr.	0.2	inches	Litter depth	2.7	NOTES
		10-hr.	0.2		Duff depth	2.7	
		100-hr.	0.7		Fuel height	2.2	
		1+10+100-hr.	1.1				
		1,000-hr.	17.2	%	Ericaceous shrub cover	0.0	
		Woody fuels	18.3		Vegetation <1 ft. tall	0.0	

> Site characteristics >		Ecozone	Acidic cove		Aspect (degrees)	317.9	Elevation (ft.) 4,043
		Slope (%)	7.9		Basal area (ft.²/acre)	96	PHOTO 69
> Fuel loads and properties >	tons/acre	1-hr.	0.3	inches	Litter depth	2.6	NOTES
		10-hr.	0.1		Duff depth	2.3	
		100-hr.	1.4		Fuel height	4.2	
		1+10+100-hr.	1.8				
		1,000-hr.	4.1	%	Ericaceous shrub cover	29.3	
		Woody fuels	5.9		Vegetation <1 ft. tall	0.0	

> Site characteristics >		Ecozone	Montane oak-hickory slope		Aspect (degrees)	25.6	Elevation (ft.) 4,138
		Slope (%)	23.0		Basal area (ft.²/acre)	141	PHOTO 70
> Fuel loads and properties >	tons/acre	1-hr.	0.6	inches	Litter depth	2.1	NOTES
		10-hr.	1.3		Duff depth	1.6	
		100-hr.	2.3		Fuel height	4.2	
		1+10+100-hr.	4.2				
		1,000-hr.	26.1	%	Ericaceous shrub cover	0.0	
		Woody fuels	30.3		Vegetation <1 ft. tall	0.0	

> Site characteristics >		Ecozone	Acidic cove		Aspect (degrees)	355.7	Elevation (ft.) 3,638
		Slope (%)	14.1		Basal area (ft.²/acre)	241	PHOTO 71
> Fuel loads and properties >	tons/acre	1-hr.	0.4	inches	Litter depth	1.8	NOTES
		10-hr.	2.1		Duff depth	1.9	
		100-hr.	2.6		Fuel height	6.7	
		1+10+100-hr.	5.1				
		1,000-hr.	3.0	%	Ericaceous shrub cover	0.0	
		Woody fuels	8.1		Vegetation <1 ft. tall	3.0	

> Site characteristics >		Ecozone	Acidic cove		Aspect (degrees)	26.4	Elevation (ft.) 3,683
		Slope (%)	18.1		Basal area (ft.²/acre)	105	PHOTO 72
> Fuel loads and properties >	tons/acre	1-hr.	0.4	inches	Litter depth	1.9	NOTES
		10-hr.	0.9		Duff depth	1.6	
		100-hr.	7.0		Fuel height	3.6	
		1+10+100-hr.	8.3				
		1,000-hr.	1.5	%	Ericaceous shrub cover	74.2	
		Woody fuels	9.8		Vegetation <1 ft. tall	7.0	

> Site characteristics >		Ecozone	Rich cove		Aspect (degrees)	37.7	Elevation (ft.) 3,867
		Slope (%)	31.2		Basal area (ft.²/acre)	184	PHOTO 73
> Fuel loads and properties >	tons/acre	1-hr.	0.4	inches	Litter depth	1.7	NOTES
		10-hr.	1.6		Duff depth	1.5	
		100-hr.	6.8		Fuel height	3.5	
		1+10+100-hr.	8.8				
		1,000-hr.	51.8	%	Ericaceous shrub cover	0.0	
		Woody fuels	60.6		Vegetation <1 ft. tall	1.0	

> Site characteristics >	Ecozone	Northern hardwood slope	Aspect (degrees)	356.4	Elevation (ft.)	5,314
	Slope (%)	24.6	Basal area (ft.²/acre)	251	PHOTO 74	
> Fuel loads and properties >	1-hr.	0.3	Litter depth (inches)	2.0	NOTES	
	10-hr.	1.2	Duff depth (inches)	2.7		
	100-hr.	9.7	Fuel height (inches)	16.1		
	1+10+100-hr.	11.2				
	1,000-hr.	23.3	Ericaceous shrub cover (%)	0.0		
	Woody fuels	34.5	Vegetation <1 ft. tall (%)	1.0		

Coates, T. Adam; Waldrop, Thomas A.; Hutchinson, Todd F.; Mohr, Helen H. 2019. Photo guide for estimating fuel loading in the Southern Appalachian Mountains. Gen. Tech. Rep. SRS-241. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 180 p.

This field guide provides 74 photographs that depict observed fuel loads within the Southern Appalachian Mountains. The guide contains instructions on how to select a reference photograph and utilize the fuel loading information to aid in prescribed fire planning.

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