APPENDIX E: EXISTING VEGETATION REFERENCES AND CODES

February 2014

Existing Vegetation References

Code	Name	Author
FSHR8	**Forest Service Handbook.** Atlanta, Georgia. R8 FSH 2409.26d. Silvicultural Examination and Prescription Handbook. R8 Amendment No. 2409.26d-93-1.	USDA Forest Service

Existing FSHR8 Vegetation Codes

Code	Description	Mgt Type		Code	Description	Mgt Type
2	Red pine	Y		36	Pond pine	Y
3	White pine	Y		37	Spruce pine	
4	White pine-hemlock			38	Pitch pine	Y
5	Hemlock			39	Table Mountain pine	Y
6	Fraser fir			40	Hardwood-pond pine	
7	Red spruce-frasier fir	Y		41	Cove hardwoods-white pine-hemlock	Y
8	Hemlock-hardwood	Y		42	Upland hardwoods-white pine	Y
9	White pine-cove hardwood	Y		43	Oak-Eastern redcedar	
10	White pine-upland hardwood	Y		44	Southern red oak-yellow pine	Y
11	Eastern redcedar - hardwood			45	Chestnut oak-scarlet oak-yellow pine	Y
12	Shortleaf pine-oak	Y		46	Bottomland hardwood-yellow pine	Y
13	Loblolly pine-hardwood	Y		47	White oak-black oak-yellow pine	Y
14	Slash pine-hardwood	Y		48	Northern red oak-hickory-yellow pine	Y
15	Pitch pine-oak	Y		49	Bear oak-southern scrub oak-yellow pine	Y
16	Virginia pine-oak	Y		50	Yellow poplar	Y
17	Red spruce-northern hardwood			51	Post oak-black oak	Y
18	Pond pine-hardwood			52	Chestnut oak	Y
19	Sand pine-hardwood			53	White oak-northern red oak-hickory	Y
20	Table Mountain pine-hardwood	Y		54	White oak	Y
21	Longleaf pine	Y		55	Northern red oak	Y
22	Slash pine	Y		56	Yellow poplar-white oak-northern red oak	Y
23	Pondcypress	Y		57	Scrub oak	Y
24	Baldcypress	Y		58	Sweetgum-yellow poplar	Y
25	Yellow pine	Y		59	Scarlet oak	Y
26	Longleaf pine-hardwood	Y		60	Chestnut oak-scarlet oak	Y
27	Longleaf pine – slash pine			61	Swamp chestnut oak-cherrybark oak	Y
28	Shortleaf pine – loblolly pine			62	Sweetgum-oak	Y
29	Loblolly pine – longleaf pine			63	Sugarberry-American elm-green ash	Y
30	Longlead pine – shortleaf pine			64	Laurel oak-willow oak	Y
31	Loblolly pine	Y		65	Overcup oak-water hickory	
32	Shortleaf pine	Y		66	Atlantic white cedar	
33	Virginia pine	Y		67	Baldcypress-water tupelo	Y
34	Sand pine	Y		68	Sweetbay-swamp tupelo-red maple	Y
35	Eastern red- cedar	Y		69	Beech-magnolia	Y

FSHR8 Existing Vegetation Codes (cont.)

Code	Description	Mgt Type		Code	Description	Mgt Type
70	Black cherry	Y		87	Red maple	
71	Black ash-American elm-red maple			88	Black locust	
72	River birch-sycamore	Y		90	Non-forest	
73	Cottonwood			97	Live oak	Y
74	Willow			98	Undrained flatwoods	
75	Sycamore-pecan-American elm	Y		99	Brush species	
76	Silver maple-American elm			800	Novaculite Glade (includes talus)	
77	Oak hammock	Y		801	Cliff and Talus (Sandstone, Shale)	
78	American chestnut			802	Glade and Barrens (Sandstone, Shale)	
79	Slash pine - cypress			803	Calcareous Prairie	
80	Upland oak			804	Seep/Spring	
81	Sugar maple-beech-yellow birch	Y		805	Montane Oak	
82	Black walnut			806	Ozark Clacareous Glade and Barren (Ozark)	
83	Black birch			807	Sinkhole and Depression Pond (Ozark)	
84	Chestnut oak – white oak – scarlet oak			808	Calcareous Cliff and Talus (Ozark)	
85	White oak – black oak - hickory			809	Prarie and Woodland (Ozark)	

The Existing Vegetation type code is a classification of the forest overstory cover type currently existing on the stand. These codes are also used to identify management type. Existing Vegetation type is based on one or more species of trees that comprise the main crown canopy (i.e., the dominants and co-dominants). These codes generally conform to definitions in "Forest Cover Types of the United States and Canada," Society of American Foresters (1980) with some notable exceptions. They are divided into four broad groups as follows:

Pine Types: Stands in which 70 percent or more of the basal area of trees with dominant and co-dominant crowns are softwoods, the specific name represents the species comprising the plurality.

Pine-Hardwood Types: Stands in which 51-69 percent of the basal area of trees with dominant and co-dominant crowns are softwood species. Use the type name associated with the softwood species comprising the plurality.

Hardwood-Pine Types: Stands in which 51-69 percent of the basal area of trees with dominant and co-dominant crowns are hardwoods. Use the type name associated with the hardwood species comprising the plurality.

Hardwood Types: Stands in which 70 percent or more of the basal area of trees with dominant and co-dominant crowns are hardwoods. Use the type name associated with the hardwood species comprising the plurality.

The SAF cover type classification requires a stand to exceed 80 percent in one species to be considered pure as opposed to the 70 percent threshold used in the Region 8 classification. The SAF cover type classification considers all mixtures of pine and hardwood that have less than 80 percent stocking of one species group as pine hardwood types. The Region 8 approach divides the group into Pine-Hardwood and Hardwood-Pine.

The percentage of softwood and hardwood in the Region 8 classification applies to the particular mixture of trees at any single sample point. This is not the same as, and should not be confused with intermingling of less-than-stand size areas of pine type in a hardwood stand or of a hardwood type in a pine stand. These less-than-stand-size areas should be treated as pine inclusions in hardwood stands or hardwood inclusions in pine stands. In heterogenous areas with neither type being of stand size, forest type should be assigned on the basis of the type occupying the plurality of the area. Such situations should not be assigned a pine-hardwood or hardwood-pine forest type unless individual plot classifications for a plurality of the area are a mixed type.

Management Type: Existing Vegetation codes are used to identify management type. The management type classification reflects the vegetation type that should be produced on the site to best meet the goals and objectives of the Forest Plan. For areas classified as suitable for timber production and allocated to management prescriptions with timber production management emphasis, the management type is the vegetation type that optimizes the productive capability of the site to produce high quality material. These same criteria also apply to all other areas unless the Forest Plan requires occupying the site with another, less productive vegetation type, to meet some other resource goal or objective.

Assigning a Management Type code to a stand implies that you expect the Existing Vegetation type to be this code after the next regeneration. For example: **74 Willow** is not an acceptable Management Type because we would not regenerate a stand and expect to see Willow as the resulting Existing Vegetation Type.

Note: CISC used four levels of Management Type. Those levels have been removed from use as of the transition to FSVeg. If this causes a problem for you, please let me know.

David Belcher

APPENDIX F: POTENTIAL VEGETATION REFERENCES

Region 8 does not support the use ofPotential Vegetation References.

APPENDIX G: POTENTIAL VEGETATION CODES

Region 8 does not support Potential Vegetation Codes.

APPENDIX H: FUEL PHOTO REFERENCES AND CODES

Fuel Photo References

Code	Reference
19	Ottmar, Roger D. and R.E. Vihnanek. 2000. **Stereo Photo Series for Quantifying Natural Fuels in Longleaf Pine, Pocosin, and Marshgrass Types in the Southeast United States**.
24	Christine M. Lynch and L.J. Horton. 1983. **Photo Series for Quantifying Forest Residues in: Loblolly Pine, Eastern White Pine, Pitch Pine and Virginia Pine.** USDA Forest Service, NA-FR-25.
26	Eric R. Scholl and Thomas A. Waldrop. 1999. **Photos for Estimating Fuel Loadings Before and After Prescribed Burning in the Upper Coastal Plain of the Southeast**. USDA Forest Service, SRS-26
29	Bradford M. Sanders and David H. Van Lear. 1988. **Photos for Estimating Residue Loadings Before and After Burning in Southern Appalachian Mixed Pine - Hardwood Clearcuts.** USDA Forest Service GTR SE-49.
30	Wade et. al. 1993. **Photo Series for Estimating Post-Hurricane Residues and Fire Behavior in Southern Pine.** 1993. USDA Forest Service GTR SE-82. 1993

Fuel Photo Codes

Fuel Photo Codes For Reference 19

LLP01	LLP05	MG01	MG05	MG09	PS04	PW02	
LLP02	LLP06	MG02	MG06	PS01	PS05		
LLP03	LLP07	MG03	MG07	PS02	PS06		
LLP04	LLP08	MG04	MG08	PS03	PW01		

Fuel Photo Codes For Reference 24

1-LL-2-N	6-LL-3-H	2-WP-2-P	7-WP-3-N	5-PP-2-N	2-VP-2-N
2-LL-2-H	7-LL-3-H	3-WP-3-N	1-PP-1-N	6-PP-2-N	3-VP-3-N
3-LL-3-N	8-LL-3-N	4-WP-3-H	2-PP-2-N	7-PP-3-H	4-VP-2-N
4-LL-2-H	9-LL-3-H	5-WP-3-H	3-PP-1-N	1-VP-2-N	
5-LL-1-P	1-WP-3-N	6-WP-2-H	4-PP-1-N		

Fuel Photo Codes For Reference 26

FC1-PRE	FC2-POST	FC4-PRE	FC5-POST	FC7-PRE	FC8-POST	
FC1-POST	FC3-PRE	FC4-POST	FC6-PRE	FC7-POST		
FC2-PRE	FC3-POST	FC5-PRE	FC6-POST	FC8-PRE		

Fuel Photo Codes For Reference 29

6B	8A	12B	14A	18B	20A
6A	10B	12A	16B	18A	
8B	10A	14B	16A	20B	

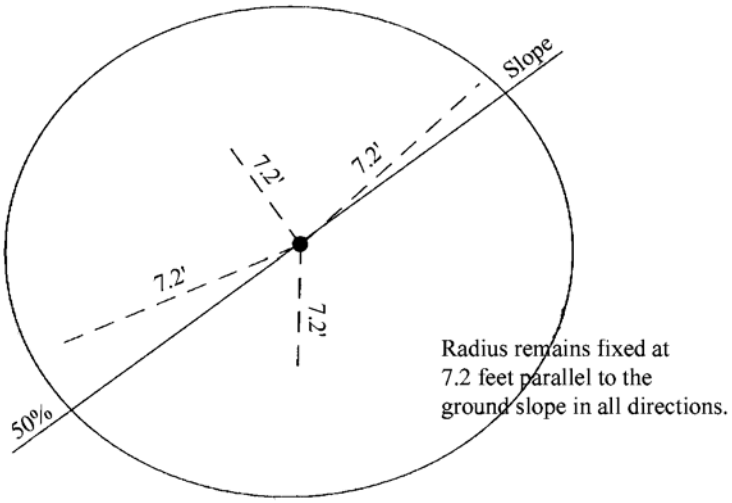
Fuel Photo Codes For Reference 30

3D	3B	2D	1C
2A	2C	1A	1D

APPENDIX I: FIXED RADIUS PLOT

1. Correct the fixed plot radius for slope percent using the "Circular Plot Radii Corrected for Slope" table and then measuring distances parallel to the ground line. This method always results in a circular plot on the slope.

   Example - 1/300 acre fixed plot on 50 percent slope. Corrected fixed plot radius is 7.2 feet.



Circular Plot Radii Corrected for Slope

	Plot Size in Acres					
SLOPE %	**1/300**	**1/100**	**1/50**	**1/20**	**1/10**	**1/5**
0-9	6.8	11.8	16.7	26.3	37.2	52.7
10-17	6.8	11.8	16.7	26.5	37.4	52.9
18-22	6.9	11.9	16.8	26.6	37.6	53.2
23-26	6.9	12.0	16.9	26.7	37.8	53.4
27-30	6.9	12.0	17.0	26.9	38.0	53.7
31-33	7.0	12.1	17.1	27.0	38.2	54.0
34-36	7.0	12.1	17.1	27.1	38.3	54.2
37-39	7.0	12.2	17.2	27.2	38.5	54.5
40-42	7.1	12.2	17.3	27.4	38.7	54.7
43-44	7.1	12.3	17.4	27.5	38.9	55.0
45-47	7.1	12.3	17.5	27.6	39.1	55.2
48-49	7.2	12.4	17.5	27.7	39.2	55.5
50-51	7.2	12.5	17.6	27.9	39.4	55.7
52-53	7.2	12.5	17.7	28.0	39.6	56.0
54-55	7.3	12.6	17.8	28.1	39.8	56.2
56-57	7.3	12.6	17.9	28.2	39.9	56.5
58-59	7.3	12.7	17.9	28.4	40.1	56.7
60-61	7.4	12.7	18.0	28.5	40.3	57.0

Circular Plot Radii Corrected for Slope (cont.)

	Plot Size in Acres					
SLOPE %	**1/300**	**1/100**	**1/50**	**1/20**	**1/10**	**1/5**
62-63	7.4	12.8	18.1	28.6	40.4	57.2
64-65	7.4	12.8	18.2	28.7	40.6	57.4
66-67	7.4	12.9	18.2	28.8	40.8	57.7
68-69	7.5	13.0	18.3	29.0	41.0	57.9
70	7.5	13.0	18.4	29.1	41.1	58.2
71-72	7.5	13.1	18.5	29.2	41.3	58.4
73-74	7.6	13.1	18.5	29.3	41.5	58.6
75	7.6	13.2	18.6	29.4	41.6	58.7
76-77	7.6	13.2	18.7	29.6	41.8	59.1
78-79	7.7	13.3	18.8	29.7	42.0	59.3
80	7.7	13.3	18.8	29.8	42.1	59.6
81-82	7.7	13.4	18.9	29.9	42.3	59.8
83	7.8	13.4	19.0	30.0	42.5	60.0
84-85	7.8	13.5	19.1	30.1	42.6	60.3
86	7.8	13.5	19.1	30.3	42.8	60.5
87-88	7.8	13.6	19.2	30.4	42.9	60.7
89	7.9	13.6	19.3	30.5	43.1	61.0
90-91	7.9	13.7	19.3	30.6	43.3	61.2
92	7.9	13.7	19.4	30.7	43.4	61.4
93-94	8.0	13.8	19.5	30.8	43.6	61.6
95	8.0	13.8	19.6	30.9	43.7	61.9
96-97	8.0	13.9	19.6	31.0	43.9	62.1
98	8.0	13.9	19.7	31.2	44.1	62.3
99-100	8.1	14.0	19.8	31.3	44.2	62.5
101	8.1	14.0	19.8	31.4	44.4	62.8
102	8.1	14.1	19.9	31.5	44.5	63.0
103-104	8.2	14.1	20.0	31.6	44.7	63.2
105	8.2	14.2	20.1	31.7	44.8	63.4
106-107	8.2	14.2	20.1	31.8	45.0	63.6
108	8.2	14.3	20.2	31.9	45.1	63.8
109	8.3	14.3	20.3	32.0	45.3	64.1
110-111	8.3	14.4	20.3	32.1	45.5	64.3
112	8.3	14.4	20.4	32.2	45.6	64.5
113	8.4	14.5	20.5	32.4	45.8	64.7
114-115	8.4	14.5	20.5	32.5	45.9	64.9
116	8.4	14.6	20.6	32.6	46.1	65.1
117	8.4	14.6	20.7	32.7	46.2	65.3
118-119	8.5	14.7	20.7	32.8	46.4	65.6
120	8.5	14.7	20.8	32.9	46.5	65.8
121	8.5	14.8	20.9	33.0	46.7	66.0
122	8.5	14.8	20.9	33.1	46.8	66.2
123-124	8.6	14.8	21.0	33.2	47.0	66.4
125	8.6	14.9	21.1	33.3	47.1	66.6
130	8.7	15.1	21.3	33.7	47.7	67.4

Circular Plot Radii Corrected for Slope (cont.)

	Plot Size in Acres					
SLOPE %	**1/300**	**1/100**	**1/50**	**1/20**	**1/10**	**1/5**
135	8.8	15.3	21.6	34.1	48.3	68.3
140	8.9	15.4	21.8	34.5	48.8	69.1
145	9.0	15.6	22.1	34.9	49.4	69.9
150	9.1	15.8	22.3	35.3	50.0	70.7

2. Determine the slope limiting distance to borderline trees by using the "Slope Correction Table" (The slope being corrected is the slope from plot center to the tree, not the overall plot slope.). Measure the distance parallel to the ground line to the borderline tree. This method always results in an oval plot on the slope. Following is a list of fixed plot sizes and the specific radius for each:

Plot Size	Plot Radius	Plot Size	Plot Radius	Plot Size	Plot Radius
1/1000	3.7 feet	1/250	7.4 feet	1/5	52.7 feet
1/500	5.3 feet	1/150	9.6 feet	1/4	58.9 feet
1/400	5.9 feet	1/100	11.8 feet	1/3	68.0 feet
1/300	6.8 feet	1/50	16.7 feet	1/2	83.3 feet
1/250	7.4 feet	1/20	26.3 feet	1	117.8 feet
1/200	8.3 feet	1/10	37.2 feet		

To determine the slope limiting distance, multiply the plot radius for the appropriate plot size by the appropriate slope correction factor.

Slope Correction Table

Percent of Slope	Degree of Slope	Correction Factor	Percent of Slope	Degree of Slope	Correction Factor	Percent of Slope	Degree of Slope	Correction Factor
0 to 9	0-6	1.00	78 to 79	38	1.27	117	49	1.54
10 to 17	7-10	1.01	80	39	1.28	118 to 119	50	1.55
18 to 22	11-12	1.02	81 to 82	39	1.29	120	50	1.56
23 to 26	13-14	1.03	83	40	1.30	121	50	1.57
27 to 30	15-17	1.04	84 to 85	40	1.31	122	51	1.58
31 to 33	18	1.05	86	41	1.32	123 to 124	51	1.59
34 to 36	19-20	1.06	87 to 88	41	1.33	125	51	1.60
37 to 39	21	1.07	89	42	1.34	126	52	1.61
40 to 42	22	1.08	90 to 91	42	1.35	127 to 128	52	1.62
43 to 44	23	1.09	92	43	1.36	129	52	1.63
45 to 47	24	1.10	93 to 94	43	1.37	130	52	1.64
48 to 49	25-26	1.11	95	44	1.38	131	53	1.65
50 to 51	27	1.12	96 to 97	44	1.39	132 to 133	53	1.66
52 to 53	28	1.13	98	44	1.40	134	53	1.67

Slope Correction Table (cont.)

Percent of Slope	Degree of Slope	Correction Factor	Percent of Slope	Degree of Slope	Correction Factor	Percent of Slope	Degree of Slope	Correction Factor
54 to 55	29	1.14	99 to 100	45	1.41	135	53	1.68
56 to 57	29	1.15	101	45	1.42	136	54	1.69
58 to 59	30	1.16	102	46	1.43	137 to 138	54	1.70
60 to 61	31	1.17	103 to104	46	1.44	139	54	1.71
62 to 63	32	1.18	105	46	1.45	140	54	1.72
64 to 65	33	1.19	106 to107	47	1.46	141	55	1.73
66 to 67	34	1.20	108	47	1.47	142 to 143	55	1.74
68 to 69	34	1.21	109	47	1.48	144	55	1.75
70	35	1.22	110 to 111	48	1.49	145	55	1.76
71 to 72	36	1.23	112	48	1.50	146	56	1.77
73 to 74	37	1.24	113	48	1.51	147	56	1.78
75	37	1.25	114 to 115	49	1.52	148 to 149	56	1.79
76 to 77	38	1.26	116	49	1.53	150	56	1.80

APPENDIX J: VARIABLE RADIUS PLOT

Table J-1: BAF 10 Plot Radii in Feet and Tenths of Feet from Plot Center to Face of Tree at DBH for 0% Slope

Inches	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
5	13.5	13.8	14.1	14.4	14.6	14.9	15.2	15.4	15.7	16.0
6	16.2	16.5	16.8	17.1	17.3	17.6	17.9	18.1	18.4	18.7
7	19.0	19.2	19.5	19.8	20.0	20.3	20.6	20.9	21.1	21.4
8	21.7	21.9	22.2	22.5	22.7	23.0	23.3	23.6	23.8	24.1
9	24.4	24.6	24.9	25.2	25.5	25.7	26.0	26.3	26.5	26.8
10	27.1	27.4	27.6	27.9	28.2	28.4	28.7	29.0	29.2	29.5
11	29.8	30.1	30.3	30.6	30.9	31.1	31.4	31.7	32.0	32.2
12	32.5	32.8	33.0	33.3	33.6	33.9	34.1	34.4	34.7	34.9
13	35.2	35.5	35.7	36.0	36.3	36.6	36.8	37.1	37.4	37.6
14	37.9	38.2	38.5	38.7	39.0	39.3	39.5	39.8	40.1	40.3
15	40.6	40.9	41.2	41.4	41.7	42.0	42.2	42.5	42.8	43.1
16	43.3	43.6	43.9	44.1	44.4	44.7	45.0	45.2	45.5	45.8
17	46.0	46.3	46.6	46.8	47.1	47.4	47.7	47.9	48.2	48.5
18	48.7	49.0	49.3	49.6	49.8	50.1	50.4	50.6	50.9	51.2
19	51.5	51.7	52.0	52.3	52.5	52.8	53.1	53.3	53.6	53.9
20	54.2	54.4	54.7	55.0	55.2	55.5	55.8	56.1	56.3	56.6
21	56.9	57.1	57.4	57.7	58.0	58.2	58.5	58.8	59.0	59.3
22	59.6	59.8	60.1	60.4	60.7	60.9	61.2	61.5	61.7	62.0
23	62.3	62.6	62.8	63.1	63.4	63.6	63.9	64.2	64.5	64.7
24	65.0	65.3	65.5	65.8	66.1	66.3	66.6	66.9	67.2	67.4
25	67.7	68.0	68.2	68.5	68.8	69.1	69.3	69.6	69.9	70.1
26	70.4	70.7	70.9	71.2	71.5	71.8	72.0	72.3	72.6	72.8
27	73.1	73.4	73.7	73.9	74.2	74.5	74.7	75.0	75.3	75.6
28	75.8	76.1	76.4	76.6	76.9	77.2	77.4	77.7	78.0	78.3
29	78.5	78.8	79.1	79.3	79.6	79.9	80.2	80.4	80.7	81.0
30	81.2	81.5	81.8	82.1	82.3	82.6	82.9	83.1	83.4	83.7
31	83.9	84.2	84.5	84.8	85.0	85.3	85.6	85.8	86.1	86.4
32	86.7	86.9	87.2	87.5	87.7	88.0	88.3	88.6	88.8	89.1
33	89.4	89.6	89.9	90.2	90.4	90.7	91.0	91.3	91.5	91.8
34	92.1	92.3	92.6	92.9	93.2	93.4	93.7	94.0	94.2	94.5
35	94.8	95.1	95.3	95.6	95.9	96.1	96.4	96.7	96.9	97.2
36	97.5	97.8	98.0	98.3	98.6	98.8	99.1	99.4	99.7	99.9
37	100.2	100.5	100.7	101.0	101.3	101.6	101.8	102.1	102.4	102.6
38	102.9	103.2	103.4	103.7	104.0	104.3	104.5	104.8	105.1	105.3
39	105.6	105.9	106.2	106.4	106.7	107.0	107.2	107.5	107.8	108.0
40	108.3	108.6	108.9	109.1	109.4	109.7	109.9	110.2	110.5	110.8
41	111.0	111.3	111.6	111.8	112.1	112.4	112.7	112.9	113.2	113.5
42	113.7	114.0	114.3	114.5	114.8	115.1	115.4	115.6	115.9	116.2
43	116.4	116.7	117.0	117.3	117.5	117.8	118.1	118.3	118.6	118.9
44	119.2	119.4	119.7	120.0	120.2	120.5	120.8	121.0	121.3	121.6
45	121.9	122.1	122.4	122.7	122.9	123.2	123.5	123.8	124.0	124.3
46	124.6	124.8	125.1	125.4	125.7	125.9	126.2	126.5	126.7	127.0
47	127.3	127.5	127.8	128.1	128.4	128.6	128.9	129.2	129.4	129.7
48	130.0	130.3	130.5	130.8	131.1	131.3	131.6	131.9	132.2	132.4
49	132.7	133.0	133.2	133.5	133.8	134.0	134.3	134.6	134.9	135.1
50	135.4	135.7	135.9	136.2	136.5	136.8	137.0	137.3	137.6	137.8

Prepared by multiplying the BAF 10 Plot Radius Factor 2.708 * DBH
For example, if DBH = 14.3 inches, then 14.3 * 2.708 = 38.

Table J-2: BAF 20 Plot Radii in Feet and Tenths of Feet from Plot Center to Face of Tree at DBH for 0% Slope

Inches	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
5	9.5	9.7	9.9	10.1	10.3	10.5	10.7	10.8	11.0	11.2
6	11.4	11.6	11.8	12.0	12.2	12.4	12.6	12.8	12.9	13.1
7	13.3	13.5	13.7	13.9	14.1	14.3	14.5	14.7	14.8	15.0
8	15.2	15.4	15.6	15.8	16.0	16.2	16.4	16.6	16.7	16.9
9	17.1	17.3	17.5	17.7	17.9	18.1	18.3	18.5	18.6	18.8
10	19.0	19.2	19.4	19.6	19.8	20.0	20.2	20.4	20.6	20.7
11	20.9	21.1	21.3	21.5	21.7	21.9	22.1	22.3	22.5	22.6
12	22.8	23.0	23.2	23.4	23.6	23.8	24.0	24.2	24.4	24.5
13	24.7	24.9	25.1	25.3	25.5	25.7	25.9	26.1	26.3	26.5
14	26.6	26.8	27.0	27.2	27.4	27.6	27.8	28.0	28.2	28.4
15	28.5	28.7	28.9	29.1	29.3	29.5	29.7	29.9	30.1	30.3
16	30.4	30.6	30.8	31.0	31.2	31.4	31.6	31.8	32.0	32.2
17	32.4	32.5	32.7	32.9	33.1	33.3	33.5	33.7	33.9	34.1
18	34.3	34.4	34.6	34.8	35.0	35.2	35.4	35.6	35.8	36.0
19	36.2	36.3	36.5	36.7	36.9	37.1	37.3	37.5	37.7	37.9
20	38.1	38.3	38.4	38.6	38.8	39.0	39.2	39.4	39.6	39.8
21	40.0	40.2	40.3	40.5	40.7	40.9	41.1	41.3	41.5	41.7
22	41.9	42.1	42.2	42.4	42.6	42.8	43.0	43.2	43.4	43.6
23	43.8	44.0	44.1	44.3	44.5	44.7	44.9	45.1	45.3	45.5
24	45.7	45.9	46.1	46.2	46.4	46.6	46.8	47.0	47.2	47.4
25	47.6	47.8	48.0	48.1	48.3	48.5	48.7	48.9	49.1	49.3
26	49.5	49.7	49.9	50.0	50.2	50.4	50.6	50.8	51.0	51.2
27	51.4	51.6	51.8	52.0	52.1	52.3	52.5	52.7	52.9	53.1
28	53.3	53.5	53.7	53.9	54.0	54.2	54.4	54.6	54.8	55.0
29	55.2	55.4	55.6	55.8	55.9	56.1	56.3	56.5	56.7	56.9
30	57.1	57.3	57.5	57.7	57.9	58.0	58.2	58.4	58.6	58.8
31	59.0	59.2	59.4	59.6	59.8	59.9	60.1	60.3	60.5	60.7
32	60.9	61.1	61.3	61.5	61.7	61.8	62.0	62.2	62.4	62.6
33	62.8	63.0	63.2	63.4	63.6	63.8	63.9	64.1	64.3	64.5
34	64.7	64.9	65.1	65.3	65.5	65.7	65.8	66.0	66.2	66.4
35	66.6	66.8	67.0	67.2	67.4	67.6	67.7	67.9	68.1	68.3
36	68.5	68.7	68.9	69.1	69.3	69.5	69.6	69.8	70.0	70.2
37	70.4	70.6	70.8	71.0	71.2	71.4	71.6	71.7	71.9	72.1
38	72.3	72.5	72.7	72.9	73.1	73.3	73.5	73.6	73.8	74.0
39	74.2	74.4	74.6	74.8	75.0	75.2	75.4	75.5	75.7	75.9
40	76.1	76.3	76.5	76.7	76.9	77.1	77.3	77.5	77.6	77.8
41	78.0	78.2	78.4	78.6	78.8	79.0	79.2	79.4	79.5	79.7
42	79.9	80.1	80.3	80.5	80.7	80.9	81.1	81.3	81.4	81.6
43	81.8	82.0	82.2	82.4	82.6	82.8	83.0	83.2	83.4	83.5
44	83.7	83.9	84.1	84.3	84.5	84.7	84.9	85.1	85.3	85.4
45	85.6	85.8	86.0	86.2	86.4	86.6	86.8	87.0	87.2	87.3
46	87.5	87.7	87.9	88.1	88.3	88.5	88.7	88.9	89.1	89.3
47	89.4	89.6	89.8	90.0	90.2	90.4	90.6	90.8	91.0	91.2
48	91.3	91.5	91.7	91.9	92.1	92.3	92.5	92.7	92.9	93.1
49	93.2	93.4	93.6	93.8	94.0	94.2	94.4	94.6	94.8	95.0
50	95.2	95.3	95.5	95.7	95.9	96.1	96.3	96.5	96.7	96.9

Prepared by multiplying the BAF 20 Plot Radius Factor 1.902 * DBH.
For example, if DBH = 14.3 inches, then 14.3 * 1.903 = 27.

Table J-3: BAF 30 Plot Radii in Feet and Tenths of Feet from Plot Center to Face of Tree at DBH for 0% Slope

Inches	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
5	7.7	7.9	8.0	8.2	8.3	8.5	8.7	8.8	9.0	9.1
6	9.3	9.4	9.6	9.7	9.9	10.0	10.2	10.4	10.5	10.7
7	10.8	11.0	11.1	11.3	11.4	11.6	11.7	11.9	12.1	12.2
8	12.4	12.5	12.7	12.8	13.0	13.1	13.3	13.5	13.6	13.8
9	13.9	14.1	14.2	14.4	14.5	14.7	14.8	15.0	15.2	15.3
10	15.5	15.6	15.8	15.9	16.1	16.2	16.4	16.5	16.7	16.9
11	17.0	17.2	17.3	17.5	17.6	17.8	17.9	18.1	18.2	18.4
12	18.6	18.7	18.9	19.0	19.2	19.3	19.5	19.6	19.8	19.9
13	20.1	20.3	20.4	20.6	20.7	20.9	21.0	21.2	21.3	21.5
14	21.6	21.8	22.0	22.1	22.3	22.4	22.6	22.7	22.9	23.0
15	23.2	23.3	23.5	23.7	23.8	24.0	24.1	24.3	24.4	24.6
16	24.7	24.9	25.0	25.2	25.4	25.5	25.7	25.8	26.0	26.1
17	26.3	26.4	26.6	26.7	26.9	27.1	27.2	27.4	27.5	27.7
18	27.8	28.0	28.1	28.3	28.4	28.6	28.8	28.9	29.1	29.2
19	29.4	29.5	29.7	29.8	30.0	30.1	30.3	30.5	30.6	30.8
20	30.9	31.1	31.2	31.4	31.5	31.7	31.8	32.0	32.2	32.3
21	32.5	32.6	32.8	32.9	33.1	33.2	33.4	33.5	33.7	33.9
22	34.0	34.2	34.3	34.5	34.6	34.8	34.9	35.1	35.2	35.4
23	35.6	35.7	35.9	36.0	36.2	36.3	36.5	36.6	36.8	36.9
24	37.1	37.3	37.4	37.6	37.7	37.9	38.0	38.2	38.3	38.5
25	38.7	38.8	39.0	39.1	39.3	39.4	39.6	39.7	39.9	40.0
26	40.2	40.4	40.5	40.7	40.8	41.0	41.1	41.3	41.4	41.6
27	41.7	41.9	42.1	42.2	42.4	42.5	42.7	42.8	43.0	43.1
28	43.3	43.4	43.6	43.8	43.9	44.1	44.2	44.4	44.5	44.7
29	44.8	45.0	45.1	45.3	45.5	45.6	45.8	45.9	46.1	46.2
30	46.4	46.5	46.7	46.8	47.0	47.2	47.3	47.5	47.6	47.8
31	47.9	48.1	48.2	48.4	48.5	48.7	48.9	49.0	49.2	49.3
32	49.5	49.6	49.8	49.9	50.1	50.2	50.4	50.6	50.7	50.9
33	51.0	51.2	51.3	51.5	51.6	51.8	51.9	52.1	52.3	52.4
34	52.6	52.7	52.9	53.0	53.2	53.3	53.5	53.6	53.8	54.0
35	54.1	54.3	54.4	54.6	54.7	54.9	55.0	55.2	55.3	55.5
36	55.7	55.8	56.0	56.1	56.3	56.4	56.6	56.7	56.9	57.0
37	57.2	57.4	57.5	57.7	57.8	58.0	58.1	58.3	58.4	58.6
38	58.7	58.9	59.1	59.2	59.4	59.5	59.7	59.8	60.0	60.1
39	60.3	60.4	60.6	60.8	60.9	61.1	61.2	61.4	61.5	61.7
40	61.8	62.0	62.1	62.3	62.5	62.6	62.8	62.9	63.1	63.2
41	63.4	63.5	63.7	63.8	64.0	64.2	64.3	64.5	64.6	64.8
42	64.9	65.1	65.2	65.4	65.6	65.7	65.9	66.0	66.2	66.3
43	66.5	66.6	66.8	66.9	67.1	67.3	67.4	67.6	67.7	67.9
44	68.0	68.2	68.3	68.5	68.6	68.8	69.0	69.1	69.3	69.4
45	69.6	69.7	69.9	70.0	70.2	70.3	70.5	70.7	70.8	71.0
46	71.1	71.3	71.4	71.6	71.7	71.9	72.0	72.2	72.4	72.5
47	72.7	72.8	73.0	73.1	73.3	73.4	73.6	73.7	73.9	74.1
48	74.2	74.4	74.5	74.7	74.8	75.0	75.1	75.3	75.4	75.6
49	75.8	75.9	76.1	76.2	76.4	76.5	76.7	76.8	77.0	77.1
50	77.3	77.5	77.6	77.8	77.9	78.1	78.2	78.4	78.5	78.7

Prepared by multiplying the BAF 30 Plot Radius Factor 1.546 * DBH.
For example, if DBH = 14.3 inches, then 14.3 * 1.546 = 22.

Table J-4: BAF 40 Plot Radii in Feet and Tenths of Feet from Plot Center to Face of Tree at DBH for 0% Slope

Inches	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
5	6.7	6.8	6.9	7.1	7.2	7.3	7.5	7.6	7.7	7.9
6	8.0	8.1	8.3	8.4	8.5	8.7	8.8	8.9	9.1	9.2
7	9.3	9.5	9.6	9.7	9.9	10.0	10.1	10.3	10.4	10.5
8	10.7	10.8	10.9	11.1	11.2	11.3	11.5	11.6	11.7	11.9
9	12.0	12.1	12.3	12.4	12.5	12.7	12.8	12.9	13.1	13.2
10	13.3	13.5	13.6	13.7	13.9	14.0	14.1	14.3	14.4	14.5
11	14.7	14.8	14.9	15.1	15.2	15.3	15.5	15.6	15.7	15.9
12	16.0	16.1	16.3	16.4	16.5	16.7	16.8	16.9	17.1	17.2
13	17.3	17.5	17.6	17.7	17.9	18.0	18.1	18.3	18.4	18.5
14	18.7	18.8	18.9	19.1	19.2	19.3	19.5	19.6	19.7	19.9
15	20.0	20.1	20.3	20.4	20.5	20.7	20.8	20.9	21.1	21.2
16	21.3	21.5	21.6	21.7	21.9	22.0	22.1	22.3	22.4	22.5
17	22.7	22.8	22.9	23.1	23.2	23.3	23.5	23.6	23.7	23.9
18	24.0	24.1	24.3	24.4	24.5	24.7	24.8	24.9	25.1	25.2
19	25.3	25.5	25.6	25.7	25.9	26.0	26.1	26.3	26.4	26.5
20	26.7	26.8	26.9	27.1	27.2	27.3	27.5	27.6	27.7	27.9
21	28.0	28.1	28.3	28.4	28.5	28.7	28.8	28.9	29.1	29.2
22	29.3	29.5	29.6	29.7	29.9	30.0	30.1	30.3	30.4	30.5
23	30.7	30.8	30.9	31.1	31.2	31.3	31.5	31.6	31.7	31.9
24	32.0	32.1	32.3	32.4	32.5	32.7	32.8	32.9	33.1	33.2
25	33.3	33.5	33.6	33.7	33.9	34.0	34.1	34.3	34.4	34.5
26	34.7	34.8	34.9	35.1	35.2	35.3	35.5	35.6	35.7	35.9
27	36.0	36.1	36.3	36.4	36.5	36.7	36.8	36.9	37.1	37.2
28	37.3	37.5	37.6	37.7	37.9	38.0	38.1	38.3	38.4	38.5
29	38.7	38.8	38.9	39.1	39.2	39.3	39.5	39.6	39.7	39.9
30	40.0	40.1	40.3	40.4	40.5	40.7	40.8	40.9	41.1	41.2
31	41.3	41.5	41.6	41.7	41.9	42.0	42.1	42.3	42.4	42.5
32	42.7	42.8	42.9	43.1	43.2	43.3	43.5	43.6	43.7	43.9
33	44.0	44.1	44.3	44.4	44.5	44.7	44.8	44.9	45.1	45.2
34	45.3	45.5	45.6	45.7	45.9	46.0	46.1	46.3	46.4	46.5
35	46.7	46.8	46.9	47.1	47.2	47.3	47.5	47.6	47.7	47.9
36	48.0	48.1	48.2	48.4	48.5	48.7	48.8	48.9	49.1	49.2
37	49.3	49.5	49.6	49.7	49.9	50.0	50.1	50.3	50.4	50.5
38	50.7	50.8	50.9	51.1	51.2	51.3	51.5	51.6	51.7	51.9
39	52.0	52.1	52.2	52.4	52.5	52.7	52.8	52.9	53.1	53.2
40	53.3	53.5	53.6	53.7	53.9	54.0	54.1	54.3	54.4	54.5
41	54.7	54.8	54.9	55.1	55.2	55.3	55.5	55.6	55.7	55.9
42	56.0	56.1	56.2	56.4	56.5	56.7	56.8	56.9	57.1	57.2
43	57.3	57.5	57.6	57.7	57.9	58.0	58.1	58.3	58.4	58.5
44	58.7	58.8	58.9	59.1	59.2	59.3	59.5	59.6	59.7	59.9
45	60.0	60.1	60.2	60.4	60.5	60.7	60.8	60.9	61.1	61.2
46	61.3	61.5	61.6	61.7	61.9	62.0	62.1	62.3	62.4	62.5
47	62.7	62.8	62.9	63.1	63.2	63.3	63.5	63.6	63.7	63.9
48	64.0	64.1	64.2	64.4	64.5	64.7	64.8	64.9	65.1	65.2
49	65.3	65.5	65.6	65.7	65.9	66.0	66.1	66.3	66.4	66.5
50	66.7	66.8	66.6	67.0	67.2	67.3	67.4	67.6	67.7	67.8

Prepared by multiplying the BAF 40 Plot Radius Factor 1.333 * DBH.
For Example if DBH = 14.3 inches, then 14.3 * 1.333 = 19.1 feet.

Table J-5: BAF 60 Plot Radii in Feet and Tenths of Feet from Plot Center to Face of Tree at DBH for 0% Slope

Inches	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
5	5.4	5.5	5.6	5.7	5.8	5.9	6.1	6.2	6.3	6.4
6	6.5	6.6	6.7	6.8	6.9	7.0	7.1	7.2	7.4	7.5
7	7.6	7.7	7.8	7.9	8.0	8.1	8.2	8.3	8.4	8.5
8	8.6	8.8	8.9	9.0	9.1	9.2	9.3	9.4	9.5	9.6
9	9.7	9.8	9.9	10.1	10.2	10.3	10.4	10.5	10.6	10.7
10	10.8	10.9	11.0	11.1	11.2	11.4	11.5	11.6	11.7	11.8
11	11.9	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.8	12.9
12	13.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	13.8	13.9
13	14.1	14.2	14.3	14.4	14.5	14.6	14.7	14.8	14.9	15.0
14	15.1	15.2	15.4	15.5	15.6	15.7	15.8	15.9	16.0	16.1
15	16.2	16.3	16.4	16.5	16.6	16.8	16.9	17.0	17.1	17.2
16	17.3	17.4	17.5	17.6	17.7	17.8	17.9	18.1	18.2	18.3
17	18.4	18.5	18.6	18.7	18.8	18.9	19.0	19.1	19.2	19.3
18	19.5	19.6	19.7	19.8	19.9	20.0	20.1	20.2	20.3	20.4
19	20.5	20.6	20.8	20.9	21.0	21.1	21.2	21.3	21.4	21.5
20	21.6	21.7	21.8	21.9	22.1	22.2	22.3	22.4	22.5	22.6
21	22.7	22.8	22.9	23.0	23.1	23.2	23.3	23.5	23.6	23.7
22	23.8	23.9	24.0	24.1	24.2	24.3	24.4	24.5	24.6	24.8
23	24.9	25.0	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8
24	25.9	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9
25	27.0	27.1	27.2	27.3	27.5	27.6	27.7	27.8	27.9	28.0
26	28.1	28.2	28.3	28.4	28.5	28.6	28.8	28.9	29.0	29.1
27	29.2	29.3	29.4	29.5	29.6	29.7	29.8	29.9	30.1	30.2
28	30.3	30.4	30.5	30.6	30.7	30.8	30.9	31.0	31.1	31.2
29	31.3	31.5	31.6	31.7	31.8	31.9	32.0	32.1	32.2	32.3
30	32.4	32.5	32.6	32.8	32.9	33.0	33.1	33.2	33.3	33.4
31	33.5	33.6	33.7	33.8	33.9	34.1	34.2	34.3	34.4	34.5
32	34.6	34.7	34.8	34.9	35.0	35.1	35.2	35.3	35.5	35.6
33	35.7	35.8	35.9	36.0	36.1	36.2	36.3	36.4	36.5	36.6
34	36.8	36.9	37.0	37.1	37.2	37.3	37.4	37.5	37.6	37.7
35	37.8	37.9	38.1	38.2	38.3	38.4	38.5	38.6	38.7	38.8
36	38.9	39.0	39.1	39.2	39.3	39.5	39.6	39.7	39.8	39.9
37	40.0	40.1	40.2	40.3	40.4	40.5	40.6	40.8	40.9	41.0
38	41.1	41.2	41.3	41.4	41.5	41.6	41.7	41.8	41.9	42.1
39	42.2	42.3	42.4	42.5	42.6	42.7	42.8	42.9	43.0	43.1
40	43.2	43.3	43.5	43.6	43.7	43.8	43.9	44.0	44.1	44.2
41	44.3	44.4	44.5	44.6	44.8	44.9	45.0	45.1	45.2	45.3
42	45.4	45.5	45.6	45.7	45.8	45.9	46.1	46.2	46.3	46.4
43	46.5	46.6	46.7	46.8	46.9	47.0	47.1	47.2	47.3	47.5
44	47.6	47.7	47.8	47.9	48.0	48.1	48.2	48.3	48.4	48.5
45	48.6	48.8	48.9	49.0	49.1	49.2	49.3	49.4	49.5	49.6
46	49.7	49.8	49.9	50.1	50.2	50.3	50.4	50.5	50.6	50.7
47	50.8	50.9	51.0	51.1	51.2	51.3	51.5	51.6	51.7	51.8
48	51.9	52.0	52.1	52.2	52.3	52.4	52.5	52.6	52.8	52.9
49	53.0	53.1	53.2	53.3	53.4	53.5	53.6	53.7	53.8	53.9
50	54.1	54.2	54.3	54.4	54.5	54.6	54.7	54.8	54.9	55.0

Prepared by multiplying the BAF 60 Plot Radius Factor 1.081 * DBH.
For Example, if DBH = 14.3 inches, then 14.3 * 1.081 = 15.5 feet.

Table J-6: Limiting Distance to Face of Tree and Slope Correction Factors for Various Basal Area Factors

This table provides an expanded list of slope correction factors to the face of the tree for use with various basal area factors. To use the table, measure the slope and the distance from plot-center to the face of the tree at DBH. To obtain the corrected limiting distance to a tree multiply the trees DBH by the "combined factor" shown under the appropriate BAF heading.

% of Slope	Slope Correction Factor	Combined Factor					
		5 BAF	10 BAF	15 BAF	20 BAF	30 BAF	40 BAF
1	1.00000	3.847	2.708	2.203	1.902	1.546	1.333
2	1.00020	3.848	2.709	2.203	1.902	1.546	1.333
3	1.00045	3.849	2.709	2.204	1.903	1.547	1.334
4	1.00080	3.850	2.710	2.205	1.904	1.547	1.334
5	1.00125	3.852	2.711	2.206	1.904	1.548	1.335
6	1.00180	3.854	2.713	2.207	1.905	1.549	1.335
7	1.00245	3.856	2.715	2.208	1.907	1.550	1.336
8	1.00319	3.859	2.717	2.210	1.908	1.551	1.337
9	1.00404	3.863	2.719	2.212	1.910	1.552	1.338
10	1.00499	3.866	2.722	2.214	1.911	1.554	1.340
11	1.00603	3.870	2.724	2.216	1.912	1.555	1.341
12	1.00717	3.875	2.727	2.219	1.916	1.557	1.343
13	1.00841	3.879	2.731	2.222	1.918	1.559	1.344
14	1.00975	3.884	2.734	2.224	1.921	1.567	1.346
15	1.01119	3.890	2.738	2.228	1.923	1.563	1.348
16	1.01272	3.896	2.742	2.231	1.926	1.566	1.350
17	1.01435	3.902	2.747	2.235	1.921	1.568	1.352
18	1.01607	3.909	2.752	2.238	1.933	1.571	1.354
19	1.01789	3.916	2.756	2.245	1.936	1.574	1.357
20	1.01980	3.923	2.762	2.245	1.940	1.577	1.359
21	1.02181	3.931	2.767	2.251	1.943	1.580	1.362
22	1.02391	3.939	2.773	2.256	1.947	1.583	1.365
23	1.02611	3.947	2.779	2.261	1.952	1.586	1.368
24	1.02840	3.956	2.785	2.266	1.956	1.590	1.371
25	1.03078	3.965	2.791	2.271	1.967	1.594	1.374
26	1.03325	3.975	2.798	2.276	1.965	1.597	1.377
27	1.03581	3.985	2.805	2.282	1.970	1.601	1.381
28	1.03846	3.995	2.812	2.288	1.975	1.605	1.384
29	1.04120	4.005	2.820	2.294	1.980	1.610	1.388
30	1.04403	4.016	2.827	2.300	1.986	1.614	1.392
31	1.04695	4.028	2.835	2.306	1.991	1.619	1.396
32	1.04995	4.039	2.843	2.313	1.997	1.623	1.400
33	1.05304	4.051	2.852	2.320	2.003	1.628	1.404
34	1.05622	4.063	2.960	2.327	2.009	1.633	1.408
35	1.05948	4.076	2.869	2.334	2.015	1.638	1.412
36	1.06283	4.089	2.878	2.341	2.022	1.643	1.417
37	1.06626	4.102	2.887	2.349	2.028	1.648	4.421
38	1.06977	4.115	2.897	2.357	2.035	1.654	1.426
39	1.07336	4.129	2.907	2.365	2.042	1.659	1.431
40	1.07703	4.143	2.917	2.373	2.049	1.665	1.436
41	1.08079	4.158	2.927	2.381	2.056	1.671	1.441
42	1.08462	4.173	2.937	2.389	2.063	1.677	1.446
43	1.08853	4.188	2.948	2.398	2.070	1.683	1.451

Table J-6: Limiting Distance to Face of Tree and Slope Correction Factors for Various Basal Area Factors (cont.)

% of Slope	Slope Correction Factor	Combined Factor					
		5 BAF	10 BAF	15 BAF	20 BAF	30 BAF	40 BAF
44	1.09252	4.203	2.959	2.407	2.078	1.689	1.456
45	1.09659	4.219	2.970	2.416	2.086	1.695	1.462
46	1.10073	4.235	2.981	2.425	2.094	1.702	1.467
47	1.10494	4.251	2.992	2.434	2.102	1.708	1.473
48	1.10923	4.267	3.004	2.444	2.110	1.715	1.479
49	1.11360	4.284	3.016	2.453	2.118	1.723	1.484
50	1.11803	4.301	3.028	2.463	2.126	1.728	1.490
51	1.12254	4.318	3.040	2.473	2.135	1.735	1.496
52	1.12712	4.336	3.052	2.483	2.144	1.743	1.502
53	1.13177	4.354	3.065	2.493	2.153	1.750	1.509
54	1.13649	4.372	3.078	2.504	2.162	1.757	1.515
55	1.14127	4.390	3.091	2.514	2.171	1.764	1.521
56	1.14612	4.409	3.104	2.525	2.180	1.772	1.528
57	1.15104	4.428	3.117	2.536	2.189	1.780	1.534
58	1.15603	4.447	3.131	2.547	2.199	1.788	1.541
59	1.16108	4.467	3.144	2.558	2.208	1.795	1.548
60	1.16619	4.486	3.158	2.569	2.218	1.803	1.555
61	1.17137	4.506	3.172	2.581	2.228	1.811	1.561
62	1.17661	4.526	3.186	2.592	2.238	1.819	1.568
63	1.18191	4.547	3.201	2.604	2.248	1.827	1.575
64	1.18727	4.567	3.215	2.616	2.258	1.836	1.583
65	1.19269	4.588	3.230	2.627	2.268	1.844	1.590
66	1.19817	4.609	3.245	2.640	2.279	1.852	1.597
67	1.20370	4.631	3.260	2.652	2.289	1.861	1.605
68	1.20930	4.652	3.275	2.664	2.300	1.870	1.612
69	1.21949	4.691	3.302	2.687	2.319	1.885	1.626
70	1.22066	4.696	3.306	2.689	2.322	1.887	1.627
71	1.22642	4.718	3.321	2.702	2.333	1.896	1.635
72	1.23223	4.740	3.337	2.715	2.344	1.905	1.643
73	1.23810	4.763	3.353	2.728	2.355	1.914	1.650
74	1.24403	4.786	3.369	2.741	2.366	1.923	1.658
75	1.25000	4.809	3.385	2.754	2.378	1.933	1.666
76	1.25603	4.832	3.401	2.767	2.389	1.942	1.674
77	1.26210	4.855	3.418	2.780	2.401	1.951	1.682
78	1.26823	4.879	3.434	2.794	2.412	1.961	1.691
79	1.27440	4.903	3.451	2.808	2.424	1.970	1.699
80	1.28062	4.927	3.468	2.821	2.436	1.980	1.707
81	1.28690	4.951	3.485	2.835	2.448	1.990	1.715
82	1.29321	4.975	3.502	2.849	2.460	1.999	1.724
83	1.29958	4.999	3.519	2.863	2.472	2.009	1.732
84	1.30599	5.024	3.537	2.877	2.484	2.019	1.741
85	1.31244	5.049	3.554	2.891	2.496	2.029	1.749
86	1.31894	5.074	3.572	2.906	2.509	2.039	1.758
87	1.32548	5.099	3.589	2.920	2.521	2.049	1.767
88	1.33207	5.124	3.607	2.935	2.534	2.059	1.776
89	1.33870	5.150	3.625	2.949	2.546	2.070	1.784
90	1.34536	5.176	3.643	2.964	2.559	2.080	1.793
91	1.35207	5.201	3.661	2.979	2.572	2.090	1.802

Table J-6: Limiting Distance to Face of Tree and Slope Correction Factors for Various Basal Area Factors (cont.)

% of Slope	Slope Correction Factor	Combined Factor					
		5 BAF	10 BAF	15 BAF	20 BAF	30 BAF	40 BAF
92	1.35882	5.227	3.680	2.993	2.584	2.101	1.811
93	1.36561	5.254	3.698	3.008	2.597	2.111	1.820
94	1.37244	5.280	3.717	3.023	2.610	2.122	1.829
95	1.37931	5.306	3.735	3.039	2.623	2.132	1.839
96	1.38622	5.333	3.754	3.054	2.637	2.143	1.848
97	1.39316	5.359	3.773	3.069	2.650	2.154	1.857
98	1.40014	5.386	3.792	3.085	2.663	2.165	1.866
99	1.40716	5.413	3.811	3.100	2.676	2.175	1.876
100	1.41421	5.440	3.830	3.116	2.690	2.186	1.885
102	1.42843	5.495	3.868	3.147	2.717	2.208	1.904
103	1.43558	5.523	3.888	3.163	5.730	2.219	1.914
104	1.44278	5.550	3.907	3.178	2.744	2.231	1.923
105	1.45000	5.578	3.927	3.194	2.758	2.242	1.933
106	1.45726	5.606	3.946	3.210	2.772	2.253	1.943
107	1.46455	5.634	3.966	3.226	2.786	2.264	1.952
108	1.47187	5.662	3.986	3.243	2.799	2.276	1.962
109	1.47922	5.691	4.006	3.259	2.813	2.287	1.972
110	1.48661	5.719	4.026	3.275	2.828	2.298	1.982
111	1.49402	5.747	4.046	3.291	2.842	2.310	1.992
112	1.50147	5.776	4.066	3.308	2.856	2.321	2.001
113	1.50894	5.805	4.086	3.324	2.870	2.333	2.011
114	1.51644	5.834	4.107	3.341	2.884	2.344	2.021
115	1.52498	5.863	4.127	3.357	2.899	2.356	2.031
116	1.53154	5.892	4.147	3.374	2.913	2.368	2.042
117	1.53912	5.921	4.168	3.391	2.927	2.379	2.052
118	1.54674	5.950	4.189	3.407	2.942	2.391	2.062
119	1.55438	5.980	4.209	3.424	2.956	2.403	2.072
120	1.56205	6.000	4.230	3.441	2.971	2.415	2.082
121	1.56975	6.039	4.251	3.458	2.985	2.427	2.092
122	1.57747	6.069	4.272	3.475	3.000	2.439	2.103
123	1.58521	6.098	4.293	3.492	3.015	2.451	2.113
124	1.59298	6.128	4.314	3.509	3.030	2.463	2.123
125	1.60078	6.158	4.335	3.527	3.045	2.475	2.134
126	1.60860	6.188	4.356	3.544	3.060	2.487	2.144
127	1.61645	6.218	4.377	3.561	3.074	2.499	2.155
128	1.62432	6.249	4.399	3.578	3.089	2.511	2.165
129	1.63221	6.279	4.420	3.595	3.104	2.523	2.176
130	1.64012	6.310	4.441	3.613	3.120	2.536	2.186
131	1.64806	6.340	4.463	3.631	3.135	2.546	2.197
132	1.65602	4.370	4.485	3.648	3.150	2.560	2.207
133	1.66400	6.401	4.506	3.666	3.165	2.573	2.218
134	1.67200	6.432	4.528	3.683	3.180	2.585	2.229
135	1.68003	6.463	4.550	3.701	3.195	2.597	2.239
136	1.68808	6.494	4.571	3.719	3.211	2.261	2.250
137	1.69614	6.525	4.593	3.737	3.226	2.622	2.261
138	1.70423	6.556	4.615	3.754	3.241	2.635	2.272
139	1.71234	6.587	4.637	3.772	3.257	2.647	2.283
140	1.72047	6.619	4.659	3.790	3.272	2.660	2.293

Table J-6: Limiting Distance to Face of Tree and Slope Correction Factors for Various Basal Area Factors (cont.)

% of Slope	Slope Correction Factor	Combined Factor					
		5 BAF	10 BAF	15 BAF	20 BAF	30 BAF	40 BAF
141	1.72861	6.650	4.681	3.808	3.288	2.672	2.304
142	1.73678	6.681	4.703	3.826	3.303	2.685	2.315
143	1.74497	6.713	4.725	3.844	3.319	2.698	2.326
144	1.75317	6.744	4.748	3.862	3.335	2.710	2.337
145	1.76139	6.776	4.770	3.880	3.350	2.723	2.348
146	1.76963	6.808	4.792	3.898	3.366	2.736	2.359
147	1.77789	6.840	4.815	3.917	3.382	2.749	2.370
148	1.78617	6.871	4.837	3.935	3.397	2.761	2.381
149	1.79446	6.903	4.859	3.953	3.413	2.774	2.392

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APPENDIX K: DAMAGE CATEGORIES, AGENTS, SEVERITY RATINGS, AND TREE PARTS

Damage Categories

Code	Description
10	General Insects
11	Bark Beetles
12	Defoliators
13	Chewing Insects
14	Sucking Insects
15	Boring Insects
16	Seed/Cone/Flower/Fruit Insects
17	Gallmaker Insects
18	Insect Predators
19	General Diseases
20	Biotic Damage
21	Root/Butt diseases
22	Stem Decays/Cankers
23	Parasitic/Epiphytic Plants
24	Decline Complexes/Dieback/Wilts
25	Foliage Diseases
26	Stem Rusts
27	Broom Rusts
30	Fire
40	Animal damage, source unknown
41	Wild animals
42	Domestic Animals
50	Abiotic Damage
60	Competition
70	Human Activities
71	Harvest
80	Multi-Damage (Insect-Disease)
90	Unknown
99	Physical Effects

Damage Agents

Category	Agent	Common Name	Scientific Name
10	**000**	**General Insects**	
SEVERITY RATING 1 = minor 2 = severe			
	001	Thrips	
	002	Tip moth	
	003	Wasp	
	007	Clerid beetle	*Cleridae*
	008	Weevil	*Curculionidae*
	011	Ant	*Formicidae*
	017	Bagworm moth	*Psychidae*
11	**000**	**Bark Beetles**	
SEVERITY RATING 1 = Unsuccessful bole attack: pitchout and beetle brood absent 2 = Strip attacks: galleries and brood present 3 = Successful bole attack: galleries and brood present 4 = Topkill 5 = Successful attack last year 6 = Older dead			
	003	Southern pine beetle	*Dendroctonus frontalis*
	011	Black turpentine beetle	*Dendroctonus terebrans*
	012	Red turpentine beetle	*Dendroctonus valens*
	018	Native elm bark beetle	*Hylurgopinus rufipes*
	020	Small southern pine engraver	*Ips avulsus*
	021	Sixspined ips	*Ips calligraphus*
	023	Southern pine engraver beetle	*Ips grandicollis*
	030	Ips engraver beetles	*Ips spp.*
	035	Cedar bark beetles	*Phloeosinus spp.*
	037	Tip beetles	*Pityogenes spp.*
	039	Twig beetles	*Pityophthorus spp.*
	045	Small European elm bark beetle	*Scolytus multistriatus*
	047	Hickory bark beetle	*Scolytus quadrispinosus*
	053	Four-eyed bark beetle	*Polygraphus spp.*
	055	Spruce ips	*Ips pilifrons*
	056	Mexican pine beetle	*Dendroctonus mexicanus*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
12	**000**	**Defoliators**	
SEVERITY RATING 1 = Light defoliation (1-25%), no topkill 2 = Light defoliation (1-25%), topkill ≤10% 3 = Light defoliation (1-25%), topkill >10% 4 = Moderate defoliation (26-75%), no topkill 5 = Moderate defoliation (26-75%), topkill ≤10% 6 = Moderate defoliation (26-75%), topkill >10% 7 = Heavy defoliation (76-100%), no topkill 8 = Heavy defoliation (76-100%), topkill ≤10% 9 = Heavy defoliation (76-100%), topkill >10%			
	002	Leaftier	
	003	Looper	
	004	Needleminer	
	005	Sawfly	
	006	Skeletonizer	
	007	Larger elm leaf beetle	*Monocesta coryli*
	008	Spanworm	
	009	Webworm	
	013	Whitefly	*Aleyrodoidae*
	014	Fall cankerworm	*Alsophila pometaria*
	018	Oak worms	*Anisota spp.*
	019	Orange-striped oakworm	*Anisota senatoria*
	021	Fruit tree leafroller	*Archips argyrospila*
	028	Texas leafcutting ant	*Atta texana*
	029	Oak skeletonizer	*Bucculatrix ainsliella*
	031	Scarlet oak sawfly	*Caliroa quercuscoccineae*
	034	Maple petiole borer	*Caulocampus acericaulis*
	044	Cottonwood leaf beetle	*Chrysomela scripta*
	045	Leafhopper	*Cicadellidae*
	053	Sycamore lace bug	*Corythucha ciliata*
	054	Lace bugs	*Corythucha spp.*
	055	Oak leaftier	*Croesia semipurpurana*
	057	Walnut caterpillar	*Datana integerrima*
	058	Yellownecked caterpillar	*Datana ministra*
	059	Walkingstick	*Diapheromera femorata*
	061	Introduced pine sawfly	*Diprion similis*
	062	Greenstriped mapleworm	*Dryocampa rubicunda*
	064	Elm spanworm	*Ennomos subsignaris*
	065	Maple trumpet skeletonizer	*Epinotia aceriella*
	067	Linden looper	*Erannis tiliaria*
	072	Geometrid moth	*Geometridae*
	075	Pale tussock moth	*Halisidota tessellaris*
	078	Buck moth	*Hemileuca maia*
	079	Saddled prominent	*Heterocampa guttivitta*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
12 (cont.)	080	Variable oakleaf caterpillar	*Heterocampa manteo*
	081	Cherry scallop shell moth	*Hydria prunivorata*
	082	Fall webworm	*Hyphantria cunea*
	083	Hemlock looper	*Lambdina fiscellaria*
	085	Tent caterpillar moth	*Lasiocampidae*
	089	Gypsy moth	*Lymantria dispar*
	090	Cottonwood leafminers	*Lyonetia spp.*
	092	Rose chafer	*Macrodactylus subspinosus*
	093	Eastern tent caterpillar	*Malacosoma americanum*
	096	Forest tent caterpillar	*Malacosoma disstria*
	098	Leafcutting bees	*Megachilidae*
	099	Blister beetle	*Meloidae*
	102	Willow sawfly	*Nematus spp.*
	105	Blackheaded pine sawfly	*Neodiprion excitans*
	107	Redheaded pine sawfly	*Neodiprion lecontei*
	110	White pine sawfly	*Neodiprion pinetum*
	112	Virginia pine sawfly	*Neodiprion pratti pratti*
	114	Loblolly pine sawfly	*Neodiprion taedae linearis*
	119	Locust leafminer	*Odontota dorsalis*
	122	Whitemarked tussock moth	*Orgyia leucostigma*
	125	Spring cankerworm	*Paleacrita vernata*
	127	Maple leafcutter	*Paraclemensia acerifoliella*
	130	Half-wing geometer	*Phigalia titea*
	138	Japanese beetle	*Popillia japonica*
	141	Elm leaf beetle	*Pyrrhalta luteola*
	143	Giant silkworm moth	*Saturniidae*
	144	Redhumped caterpillar	*Schizura concinna*
	151	Maple webworm	*Tetralopha asperatella*
	152	Pine webworm	*Tetralopha robustella*
	154	Bagworm	*Thyridopteryx ephemeraeformis*
	155	Leafroller/seed moth	*Tortricidae*
	161	Cypress looper	*Anacamptodes pergracilis*
	162	Cottonwood leaf beetle	*Chrysomela spp.*
	163	Pine colaspis	*Colaspis pini*
	180	Tent caterpillar	*Malacosoma spp.*
	181	Abbot's sawfly	*Neodiprion abbotii*
	182	Slash pine sawfly	*Neodiprion merkell*
	183	Sand pine sawfly	*Neodiprion pratti*
	185	Cypress leaf beetle	*Systena marginalis*
	190	Hickory tussock moth	*Halisidota caryae*
	191	Pin oak sawfly	*Caliroa lineata*
	192	Palmerworm	*Dichomeris ligulella*
	193	Pitch pine looper	*Lambdina athasaria pellucidaria*
	194	Red pine sawfly	*Neodiprion nanulus nanulus*
	195	Pine tip moth	*Argyrotaenia pinatubana*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
12 (cont.)	196	Baldcypress leafroller	*Archips goyerana*
	197	Winter moth	*Operophtera*
	198	Basswood thrips	*Neohydatothrips*
	199	Noctuid moth	*Xylomyges simplex (walker)*
	200	Pyralid moth	*Palpita magniferalis*
	201	Pacific silver fir budmoth	*Zeiraphera sp. destitutana*
13	**000**	**Chewing Insects**	
SEVERITY RATING 1 = Minor: bottlebrush or shortened leaders, 0-2 forks on stem, OR <20% of branches affected 2 = Severe: 3 or more forks on bole, OR 20% or more branches affected, OR terminal leader dead			
	001	Grasshopper	
	002	Shorthorn grasshoppers	*Acrididae*
	006	Cicadas	*Cicadidae*
	009	Whitefringed beetles	*Graphognathus spp.*
	010	Pales weevil	*Hylobius pales*
	012	Periodical cicada	*Magicicada septendecim*
	028	Pitch-eating weevil	*Pachylobius picivorus*
	029	Deodar weevil	*Pissodes nemorensis*
	030	Adana tip moth	*Rhyacionia adana*
14	**000**	**Sucking Insects**	
SEVERITY RATING 1 = Minor: bottlebrush or shortened leaders, 0-2 forks on stem, OR <20% of branches affected 2 = Severe: 3 or more forks on bole, OR 20% or more branches affected, OR terminal leader dead			
	001	Scale insect	
	003	Balsam woolly adelgid	*Adelges piceae*
	004	Hemlock woolly adelgid	*Adelges tsugae*
	006	Aphid	*Aphididae*
	007	Pine spittlebug	*Aphrophora parallela*
	011	Wax scale	*Ceroplastes spp.*
	012	Pine needle scale	*Chionaspis pinifoliae*
	015	White pine aphid	*Cinara strobi*
	016	Beech scale	*Cryptococcus fagisuga*
	018	Woolly apple aphid	*Eriosoma lanigerum*
	020	Elongate hemlock scale	*Fiorinia externa*
	022	Pine thrips	*Gnophothrips spp.*
	024	Honeysuckle aphids	*Hyadaphis tataricae*
	026	Lecanium scale	*Lecanium spp.*
	027	Common falsepit scale	*Lecanodiaspis prosopidis*
	028	Oystershell scale	*Lepidosaphes ulmi*
	035	Treehoopers	*Membracidae*
	037	Balsam twig aphid	*Mindarus abietinus*
	040	Spruce spider mite	*Oligonychus ununquis*
	041	Twig girdler	*Oncideres cingulata*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
14 (cont.)	042	Woolly alder aphid	*Paraprociphilus tessellatus*
	043	Maple aphids	*Periphyllus spp.*
	046	Pine leaf adelgid	*Pineus pinifoliae*
	047	White pine adelgid	*Pineus spp.*
	048	Pine bark adelgid	*Pineus strobi*
	050	Mealybug	*Pseudococcidae*
	051	Cottony maple scale	*Pulvinaria innumerabilis*
	059	Mulberry whitefly	*Tetraleurodes mori*
	060	Tuliptree scale	*Toumeyella liriodendri*
	061	Pine tortoise scale	*Toumeyella parvicornis*
	065	Casuarina spittlebug	*Clastoptera undulata*
	066	Giant bark aphid	*Longistigma caryae*
	067	Woolly pine scale	*Pseudophilippia quaintancii*
	069	Elm scurfy scale	*Chionaspis americana*
15	**000**	**Boring Insects**	
SEVERITY RATING 1 = Minor: bottlebrush or shortened leaders, 0-2 forks on stem, OR <20% of branches affected 2 = Severe: 3 or more forks on bole, OR 20% or more branches affected, OR terminal leader dead			
	001	Shoot borer	
	002	Termite	
	004	Bronze birch borer	*Agrilus anxius*
	005	Twolined chestnut borers	*Agrilus bilineatus*
	007	Carpenter bees	*Apidae*
	008	Flatheaded borer	*Buprestidae*
	010	Carpenter ants	*Camponotus spp.*
	011	Gouty pitch midge	*Cecidomyia piniinopis*
	016	Columbian timber beetle	*Corthylus columbianus*
	017	Pitted ambrosia beetle	*Corthylus punctatissimus*
	018	Carpenterworm moths	*Cossidae*
	019	Poplar and willow borer	*Cryptorphynchus lapathi*
	023	Oak twig pruners	*Elaphidionoides spp.*
	024	Twig pruner	*Elaphidionoides villosus*
	025	Lesser cornstalk borer	*Elasmopalpus lignosellus*
	026	Red oak borer	*Enaphalodes rufulus*
	031	Sugar maple borer	*Glycobius speciosus*
	032	Goes borers	*Goes spp.*
	033	Pine root collar weevil	*Hylobius radicis*
	034	Warren's collar weevil	*Hylobius warreni*
	035	Powderpost beetle	*Lyctidae*
	036	Tarnished plant bug	*Lygus lineolaris*
	038	White pine bark miner	*Marmara fasciella*
	039	Locust borer	*Megacyllene robiniae*
	042	Whitespotted sawyer	*Monochamus scutellatus*
	043	Redheaded ash borer	*Neoclytus acuminutus*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
15 (cont.)	050	White pine weevil	*Pissodes strobi*
	052	Ambrosia beetles	*Platypus spp.*
	053	Cottonwood borer	*Plectrodera scalator*
	055	Pine gall weevil	*Podapion gallicola*
	056	Ash borer	*Podesesia syringae fraxini*
	057	Lilac borer	*Podosesia syringae*
	058	Carpenterworm	*Prionoxystus robiniae*
	065	Nantucket pine tip moth	*Rhyacionia frustrana*
	068	Poplar borer	*Saperda calcarata*
	069	Roundheaded appletree borer	*Saperda candida*
	070	Saperda shoot borer	*Saperda spp.*
	071	Clearwing moths	*Sesiidae*
	072	Dogwood borer	*Synanthedon scitula*
	078	Black twig borer	*Xylosandrus compactus*
	080	Subtropical pine tip moth	*Rhyacionia subtropica*
	081	Asian ambrosia beetle	*Xylosandrus crassiusculus*
	082	Asian longhorned beetle	*Anoplophora glabripennis*
	087	Emerald ash borer	*Agrilus planipennis*
16	**000**	**Seed/Cone/Flower/Fruit Insects**	
SEVERITY RATING 1 = minor 2 = severe			
	008	White pine cone beetle	*Conopthorus coniperda*
	012	Pecan	*Curculio spp.*
	016	Southern pine cone worm	*Dioryctria amatella*
	018	Loblolly pine cone worm	*Dioryctria merkeli*
	021	Dioryctria moths	*Dioryctria spp.*
	023	Seed chalcid	*Eurytomidae*
	024	Slash pine flower thrips	*Gnophothrips fuscus*
	026	Longleaf pine seed worm/moth	*Laspeyresia ingens*
	029	Boxelder bug	*Leptocoris trivittatus*
	030	Leaffooted pine seed bug	*Leptoglossus corculus*
	038	Yellow poplar weevil	*Odontopus calceatus*
	049	Prairie tent caterpillar	*Malacosoma lutescens*
	050	Jack pine tip beetle	*Conophthorus banksianae*
17	**000**	**Gallmaker Insects**	
SEVERITY RATING 1 = minor 2 = severe			
	003	Cooley spruce gall adelgid	*Adelges cooleyi*
	005	Gouty oak gall	*Callirhytis quercuspunctata*
	006	Gall midge	*Cecidomyiidae*
	008	Gall mite	*Eriophyidae*
	010	Hackberry nipplegall maker	*Pachypsylla celtidismamma*
	012	Leaf stem gall adelgid	*Phylloxera caryaecaulis*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
17 (cont.)	013	Gall aphid	*Phylloxeridae*
	015	Psyllid	*Psyllidae*
	018	Gouty pitch midge	*Cedidomyia piniinopsis*
	019	Spider mites	*Oligonychus spp.*
	020	Cypress gall midges	*Taxodiomyia spp.*
18	**000**	**Insect Predators**	
SEVERITY RATING 1 = minor 2 = severe			
	001	Lacewing	
19	**000**	**General Diseases**	
SEVERITY RATING 1 = minor 2 = severe			
20	**000**	**Biotic Damage**	
SEVERITY RATING 1 = minor 2 = severe			
	001	Damping off	
21	**000**	**Root/Butt Diseases**	
SEVERITY RATING for trees 1 = Tree within 30 feet of tree with deteriorating crown, tree with diagnostic symptoms or signs, or tree killed by root disease 2 = Pathogen (sign) or diagnostic symptom detected - no crown deterioration 3 = Crown deterioration detected - no diagnostic symptoms or signs 4 = Both crown deterioration and diagnostic signs symptoms detected 5 = Bleeding present on bole 6 = Bleeding present on bole and adjacent mortality present 7 = Laboratory confirmed Sudden Oak Death			
SEVERITY RATING for Setting Level G2 = Minor evidence of RDS on plot G3 = RDS present, canopy reduction less then 20% G4 = RDS present, canopy reduction 20-30 % G5 = RDS present, canopy reduction 30-50% G6 = RDS present, canopy reduction 50-57%, most ground area infested G7 = RDS present, 76+% canopy reduction G8 = Entire area infested with RDS, one or very few susceptible overstory trees G9 = Entire area infested with RDS, no susceptible overstory trees present			
	001	Armillaria root disease	*Armillaria spp.*
	003	Cylindrocladium root disease	*Cylindrocladium spp.*
	004	Brown crumbly rot	*Fomitopsis pinicola*
	005	Black root rot of pine	*Fusarium oxysporum*
	006	Fusarium root rot	*Fusarium spp.*
	007	White mottled rot	*Ganoderma applanatum*
	008	Ganoderma rot of hardwoods	*Ganoderma lucidum*
	009	Ganoderma rot of conifers	*Ganoderma tsugae*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
21 (cont.)	010	Annosus root disease	*Heterobasidion annosum*
	011	Circinatus root rot	*Inonotus circinatus*
	012	Tomentosus root disease	*Inonotus tomentosus*
	013	Charcoal root rot	*Macrophomina phaseolina*
	015	Schweinitzii butt rot	*Phaeolus schweinitzii*
	018	Phytophthora root rot	*Phytophthora cinnamomi*
	019	Littleleaf disease	*Phytophthora cinnamomi/Pythium*
	022	Pythium root rot	*Pythium spp.*
	023	Procera root disease of conifers	*Verticicladiella procera*
	024	Crown gall	*Agrobacterium tumefaciens*
	027	Brown cubical rot	*Laetiporus sulphureus*
22	**000**	**Stem Decays/Cankers**	
SEVERITY RATING 0 = 0-4% rotten 1 = 5-15% rotten 2 = 16-25% rotten 3 = 26-35% rotten 4 = 36-45% rotten 5 = 46-55% rotten 6 = 56-65% rotten 7 = 66-75% rotten 8 = 76-85% rotten 9 = 86-100% rotten			
	001	Heart rot	
	002	Stem rot	
	003	Sap rot	
	004	Slime flux	
	005	Virus	
	006	Black knot of cherry	*Apiosporina morbosa*
	007	Atropellis canker	*Atropellis piniphila*
	009	Botryosphaeria canker	*Botryosphaeria ribis*
	023	Chestnut blight	*Cryphonectria parasitica*
	030	Eutypella canker	*Eutypella parasitica*
	032	Pitch canker	*Fusarium subglutinans*
	036	Cedar apple rust	*Gymnosporangium juniperi-virginianae*
	037	Hypoxylon canker of oak	*Hypoxylon atropunctatum*
	039	Canker rot of oak	*Inonotus hispidus*
	042	Beech bark disease	*Nectria coccinea*
	043	Nectria canker	*Nectria galligena*
	047	Red ring rot	*Phellinus pini*
	049	Stem decay of black walnut	*Phellinus weirianus*
	051	Phomopsis canker	*Phomopsis spp.*
	052	Leyland cypress canker	*Seiridium cardinale*
	053	Butternut canker	*Sirococcus clavigignenti-jugl.*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
22 (cont.)	054	Maple canker	*Steganosporium spp.*
	056	Citrus canker	*Xanthomonas citri*
	058	Dothichiza canker	*Dothichiza populae*
	062	Brown heartrot	*Fomitopsis Officinalis*
	063	unknown	*Coniophora puteana*
	064	Tinder fungus	*Fomes fomentarius*
	068	False tinder fungus	*Phellinus igniarius*
	071	Oyster mushroom	*Pleurotus ostreatus*
	074	Cedar brown pocket rot	*Poria sericeomollis*
	075	Lachnellula canker	*Lachnellula flavovirens*
	076	Strumella canker	*Strumella coryneoidea*
	077	Phomopsis blight	*Phomopsis juniperovora*
	078	Fusarium canker of yellow poplar	*Fusarium solani*
	079	Sterile conk of maple and beech	*Inonotus glomeratus*
	080	Canker of spruce	*Aleurodiscus spp.*
	081	Birch conk	*Piptoporus betulinusai*
	082	Canker	*Discocainia treleasei*
23	**000**	**Parasitic/Epiphytic Plants**	
SEVERITY RATING 1 = Hawksworth tree DMR rating = 1; light infection 2 = Hawksworth tree DMR rating = 2; light infection 3 = Hawksworth tree DMR rating = 3; medium infection 4 = Hawksworth tree DMR rating = 4; medium infection 5 = Hawksworth tree DMR rating = 5; heavy infection 6 = Hawksworth tree DMR rating = 6; heavy infection 7 = Vine damage: less than 50% of crown involved 8 = Vine damage: 50% or more of crown involved			
	001	Mistletoe	
	002	Parasitic plants	
	003	Vine damage	
	018	Dodder	*Cuscuta spp.*
24	**000**	**Decline Complexes/Dieback/Wilts**	
SEVERITY RATING 1 = Minor: minor crown symptoms 2 = Severe: severe crown symptoms			
	002	Norfolk Island pine decline	
	003	Stillwell's syndrome	
	004	Ash decline/yellows	
	008	Decline	
	014	Oak decline	
	019	Pinewood nematode	*Bursaphelenchus xylophilus*
	021	Oak wilt	*Ceratocystis fagacearum*
	022	Dutch elm disease	*Ceratocystis ulmi*
	023	Bacterial wetwood	*Erwinia nimipressuralis*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
24 (cont.)	024	Mimosa wilt	*Fusarium oxysporum f. sp. perniciosum*
	025	Verticillium wilt	*Verticilium albo-atrum*
	026	unknown	*Xylella fastidiosa*
	027	Wetwood	
	030	Elm phloem necrosis	*Mycoplasma*
25	**000**	**Foliage Diseases**	
SEVERITY RATING 1 = Minor: <20% of foliage affected or <20% of crown in brooms 2 = Severe: >20% of foliage affected or >20% of crown in brooms			
	001	Blight	
	002	Broom rust	
	003	Juniper blights	
	004	Leaf spots	
	005	Needlecast	
	006	Powdery mildew	
	007	Tobacco mosaic virus	
	010	Sycamore anthracnose	*Apiognomonia veneta*
	011	Cercospora blight of juniper	*Cercospora sequoiae*
	015	Pine needle rust	*Coleosporium spp.*
	016	Anthracnose on Russian olive	*Colletotrichum spp.*
	020	Dogwood anthracnose	*Discula spp.*
	023	Fire blight	*Erwinia amylovora*
	024	Walnut anthracnose	*Gnomonia leptostyla*
	025	Anthracnose	*Gnomonia spp.*
	029	Hardwood anthracnose	*Kabatiella apocrypta*
	030	Cone damage	*Lasiodiplodia spp.*
	033	White pine needle cast	*Lophodermella arcuata*
	034	Lophodermella needle cast	*Lophodermella spp.*
	035	Lophodermium needle cast	*Lophodermium spp.*
	036	Marssonina blight	*Marssonina populi*
	037	Melampsora rusts	*Melampsora medusae*
	040	Dothistroma needle blight	*Mycosphaerella pini*
	045	Phyllosticta leaf spot	*Phyllosticta spp.*
	051	Rhizoctonia needle blight	*Rhizoctonia spp.*
	054	Brown spot needle blight	*Scirrhia acicola*
	055	Septoria leaf spot	*Septoria alnifolia*
	056	Septoria leaf spot and canker	*Septoria musiva*
	058	Diplodia blight	*Sphaeropsis sapinea*
	059	Leaf blister of oak	*Taphrina caerulescens*
	064	Broom rust	*Chrysomyxa arctostaphyli*
	068	Hardwood leaf rusts	*Melampsora spp.*
	074	Delphinella shoot blight	*Delphinella abietis*
	075	Tar spot	*Rhytisma acerinum*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
26	**000**	**Stem Rusts**	
SEVERITY RATING 1 = Branch infections located greater than 2 feet from tree bole 2 = Branch infections located between 6 inches and 2 feet from tree bole 3 = Bole infections or branch infections located within 6 inches of bole 4 = Topkill			
	001	White pine blister rust	*Cronartium ribicola*
	004	Comandra blister rust	*Cronartium comandrae*
	006	Eastern gall rust	*Cronartium quercuum*
	008	Gall rust of shortleaf pine	*Cronartium quercuumf. sp. echinatae*
	009	Fusiform rust	*Cronartium quercuumf. sp. fusiforme*
	010	Gall rust of virginia pine	*Cronartium quercuumf. sp. virginianae*
	013	Southern cone rust	*Cronartium strobilinum*
27	**000**	**Broom Rusts**	
SEVERITY RATING 1 = Minor: <20% of crown in brooms 2 = Severe >20% of crown in brooms			
30	**000**	**Fire**	
SEVERITY RATING 1 = minor 2 = severe			
	031	Wild-fire	
	032	Human caused fire	
	033	Crown fire damage	
	034	Ground fire damage	
40	**000**	**Animal damage, source unknown**	
SEVERITY RATING 1 = minor 2 = severe			
41	**000**	**Wild Animals**	
SEVERITY RATING 1 = Minor: <20% of crown affected, bole damage is <50% circumference 2 = Severe: >20% of crown affected, bole damage is >50% circumference, upper 1/3 of crown is killed 4 = Earthworms are present 5 = Earthworms are absent			
	001	Bear	
	002	Beaver	
	003	Big game (deer)	
	004	Mice or voles	
	005	Pocket gophers	
	006	Porcupines	
	007	Rabbits or hares	
	008	Sapsucker	

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
41 (cont.)	009	Squirrels	
	010	Woodpeckers	
	011	Moose	
	012	Elk	
	013	Deer	
	014	Feral pigs	
	015	Mountain beaver	
	016	Deer or elk	
	017	Earthworm	*Lumbricidae*
42	**000**	**Domestic Animals**	
SEVERITY RATING 1 = Minor <20% of crown affected, bole damage is <50% circumference 2 = Severe: >20% of crown affected, bole damage is >50% circumference, upper 1/3 of crown is killed			
	001	Cattle	
	002	Goats	
	003	Horses	
	004	Sheep	
50	**000**	**Abiotic Damage**	
SEVERITY RATING 1 = Minor: <20% of crown affected, bole damage is <50% circumference 2 = Severe: >20% of crown affected, bole damage is >50% circumference, upper 1/3 of crown is killed			
	001	Air pollutants	
	002	Chemical	
	003	Drought	
	004	Flooding/high water	
	005	Frost	
	006	Hail	
	007	Heat	
	008	Lightning	
	009	Nutrient imbalances	
	010	Radiation	
	011	Snow/ice	
	013	Wind-tornado	
	014	Winter injury	
	018	Other geologic events	
	019	Mechanical (non-human caused)	
60	**000**	**Competition**	
SEVERITY RATING 1 = Minor: tree slightly deformed and has some live, terminal growth 2 = Severe: tree extremely deformed or has no live terminal, growth severely reduced relative to neighbors			

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
70	**000**	**Human Activities**	
SEVERITY RATING 1 = minor 2 = severe			
	001	Herbicides	
	003	Imbedded objects	
	004	Improper planting technique	
	005	Land clearing	
	006	Land use conversion	
	007	Logging damage	
	008	Mechanical	
	009	Pesticides	
	010	Roads	
	011	Soil compaction	
	012	Suppression	
	013	Vehicle damage	
	014	Road salt	
71	**000**	**Harvest**	
SEVERITY RATING 1 = minor 2 = severe			
80	**000**	**Multi-Damage (Insect/Disease)**	
SEVERITY RATING 801 = minor 802 = severe			
90	**000**	**Unknown**	
SEVERITY RATING 0 = 0 – 9% affected 1 = 10 – 19% affected 2 = 20 – 29% affected 3 = 30 – 39% affected 4 = 40 - 49% affected 5 = 50 - 59% affected 6 = 60 - 69% affected 7 = 70 - 79% affected 8 = 80 - 89% affected 9 = 90 - 100% affected			
99		**Physical Effects**	
	001	Broken top	% of original height that is missing. For example, if a tree was originally 100 feet high, but 15 feet of the top is broken or missing, enter “15” in the severity code.
	002	Dead top	% of total tree height that is dead
	003	Limby (large limbs top to bottom)	% of total tree height with many limbs/knots

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
99 (cont.)	004	Forked top	% of total tree height above fork
	005	Forked below merch top	% of the total length of the bole affected
	006	Crook or sweep	% of total tree height, which contains the crook or sweep
	007	Checks, bole cracks	% of total tree height, which contains a crack or check
	008	Foliage discoloration	% of foliage discolored
	009	Mortality (for plantation surveys only)	1 = dead tree
	010	Lack of seed source (for plantation surveys only)	If present, 100%
	011	Poor planting stock source (for plantation surveys only)	If present, 100%
	012	Poor growth/fading/foliage is yellowing and loss of needles is occurring	1 = minor (reduced growth) 2 = severe (affecting survival)
	013	Total board foot volume loss	% of total board foot volume loss
	014	Total cubic foot volume loss	% of total cubic foot volume loss
	015	Bark removal	% of tree circumference missing bark
	016	Foliage loss	1 = minor 2 = severe
	017	Sunscald	1 = minor 2 = severe
	018	Uproot	1 = uprooted tree
	019	Scorched foliage	% of foliage scorched
	020	Scorched bark	% of bark scorched
	021	Dieback source (for plantation surveys only)	1 = minor 2 = severe
	022	Poor crown form	1 = minor 2 = severe
	023	Severe forking	% of bole with forks
	026	Open wound	% of bole or trunk affected using the height and width of the wound. For example, if a tree is 100 feet tall and the wound covers 15 feet of the bole, enter a value of "15."
	031	Broken or dead branches	% of branches broken or dead
	033	Damaged shoots, buds, or foliage (for plantation surveys only)	1 = minor 2 = severe
	034	Excessively deformed sapling	% of sapling deformed
	036	Fire scar	% of bole covered by fire scar
	037	Leaning tree	% lean from vertical
	038	Charred bark	Not recorded unless cambium is killed from heating

Tree Parts

Code	Description
UN	Unspecified
TO	Top
FO	Foliar (crown)
LI	Limb
BO	Bole, other than Top or Base
BA	Base
RO	Roots
WT	Whole Tree
TT	Top Third of Crown
MT	Middle Third of Crown
BT	Bottom Third of Crown

APPENDIX L: ACCURACY STANDARDS

Settings Measurements

Field	Tolerance
Project Name	No Errors
Region	No Errors
Proclaimed Forest	No Errors
District	No Errors
Location	No Errors
Stand Number	No Errors
Ownership	No Errors
State	No Errors
County	No Errors
Administrative Forest	No Errors
Date	No Errors
Photo ID	No Errors
Exam Level	No Errors
Exam Purpose	No Errors
Stratum	No Errors
Existing Vegetation Composition Type	No Errors
Potential Vegetation Reference	No Errors
Potential Vegetation	No Errors
Structure	No Errors
Capable Growing Area	± 10 Percent
Fuel Model	No Errors
Elevation	± 2 Contour Intervals
Aspect	± 45 degrees
Slope	± 10 Percent
Slope Position	± 1 class
Acres	No Errors
Radial Growth Interval	No Errors
Radial Growth Interval #2	No Errors
Height Growth Interval	No Errors
Fuel Photo Reference	No Errors
Precision Protocol	No Errors
Examiner	No Errors
Stand Remarks	No Errors
Damage Category	No Errors
Damage Agent	No Errors
Damage Severity	No Errors
Species of Management Interest	No Errors
Sketch Map and Traverse Notes	

Sample Design Criteria

Field	Tolerance
Form Type	
Selection Method Type	No Errors
Sample Expansion Factor	No Errors
Plots Installed	No Errors
Sub population Filter	No Errors
Starting Azimuth	No Errors
Sample Design Remarks	No Errors
Selection Criteria Number	No Errors
Sub pop Variable	No Errors
Sub pop Minimum Value	No Errors
Sub pop Maximum Value	No Errors

Plot Data

Field	Tolerance
Plot Number	No Errors
Plot Latitude	No Errors
Plot Longitude	No Errors
Capable Grow Area	± 10 Percent
Plot Aspect	± 45°
Plot Slope	± 10 Percent
Slope Position	± 1 Class
Slope Horizontal Shape	± 1 Class
Slope Vertical Shape	± 1 Class
Plot Elevation	± 2 Contour Intervals
Existing Vegetation	No Errors
Potential Vegetation	Accurate to series understory union and phases
Plot History	No Errors
Plot History Date	Year required if field 12 is other than code 10 or blank
Fuel Model	No Errors
Residual Descriptive Code	No Errors
Distance to Seed wall	± 100 feet
Plot Remarks	

Tree Data

Field	Tolerance
Plot Number	No Errors
Tag ID Number	No Errors
Tree Status	No Errors allowed in recognizing and coding down trees
Site/Growth Trees	No Errors
Tree Species	No Errors
Tree Count	Height Range / Diameter Range / Trees on Point / Tolerance *All / All / 0 / 0 trees ≤0.5 feet / / 1-5 / ± 2 trees ≤0.5 feet / / 6+ / ± 50% >0.5 feet / <0.5 in. / 1-5 / ± 1 tree >0.5 feet / <0.5 in / 6+ / ± 20% All / .5" - breakpoint d.b.h / 1-5 / ± 1 tree All / .5" - breakpoint d.b.h. / 6+ / ± 10% All / breakpoint d.b.h. + / 1+ / 0 trees *There is no tolerance for recording a tree when none are actually present in any of the above size classes. The recording of a fixed plot tree when none are present will result in a single discrepancy. The recording of a variable plot tree when none are present will result in an unacceptable unit. 1/ Grouping criteria are standardized to facilitate stand exam contract inspection and payment. However, distinguishing characteristics other than tree class, species, and size class may warrant individual tree recording or more refined grouping criteria. Such characteristics include age, crown ratio, crown class, or incidence of damage.
Number Stems	No Errors
DBH/DRC	No Errors / <.5 inch ± .1 Inch / .5 inch - 13.9 inches ± .2 Inch / 14.0 inches - 23.9 inches ± .3 Inch / 24.0 inches - 34.9 inches ± .5 Inch / 35.0 inches + ± .1 Inch / Borderline variable plot trees ± 1 Inch / Estimated DRC
Height	± 10 %
Height to Crown	± 10 %
Radial Growth	± 1/20 inch
Radial Growth #2	± 1/20 inch
Height Growth	± 1 foot / trees >6 feet ± 0.1 foot / trees ≤6 feet

Tree Data (cont.)

Field	Tolerance	
Tree Age	± 10% (Based on actual tree ring count at breast height for trees ≥ 3.0" DBH otherwise based on total age recorded.)	
Crown Ratio	± 10 %	
Crown Class	No Errors	
Crown width	No Errors	
Wildlife Use	No Errors	
Log/Snag Decay	No Errors	
Cone Serotiny	No Errors	
Damage Category	No Errors	
Damage Category	**Damage Category Description**	**Tolerance**
11	Bark Beetles	No misses on live trees with a severity of 2 or greater.
12	Defoliators	No misses on live trees with a severity of 3 or greater.
13-17	Other Insects	No misses of shoot moths or weevils on live trees.
21	Root/Butt Diseases	No misses on live trees with a severity of 2 or greater.
22	Stem Decays/Cankers	No misses on live trees with a severity of 3 or greater.
25	Foliage Diseases	No misses on Elytroderma on live trees.
41-42	Animal Damage	No misses on live trees with terminal leader damage or with greater than 1/4 of bole circumference affected.
50	Abiotic Damage	No misses on wind, snow, or ice bending, breakage, or bole cracks and frost damage to shoots on trees less than 1-inch diameter and lightning.
70	Human Damage	No misses on live trees for logging damage or fire if the damage affects greater than 1/4 of the bole circumference or if an open wound is in contact with the ground.
Damage Agent		
Damage Part		
Damage Severity		
Tree Remarks		

Ground Surface Cover

Field	Tolerance
Plot Number	No Errors
Cover Type	No Errors
Cover Percent	± 10 Percent

Vegetation Composition

Field	Tolerance
Plot Number	No Errors
Live /Dead	No Errors
Layer	No Errors
Life form	No Errors
Species	No Error in species level identification for dominant, common or community type indicator plants. No plant name can be repeated within a layer.
Minimum Height	± 10% of Height
Average Height	± 10% of Height
Maximum Height	± 10% of Height
Canopy Cover	± 10 Percent
Average Diameter	No Errors
Maturity	No Errors
Cover Remarks	
User Field	

Down Woody

Field	Tolerance
Plot Number	No Errors
First Duff	± 1/2 inch
Second Duff	± 1/2 inch
Fuel Depth	No Errors
Twigs 0 - .24	± 40%
Twigs .25 - .99	± 30%
Branch 1.0 - 2.99	± 20%
Volume 1	
Weight 1	
Volume 2	
Weight 2	
Volume 3	
Weight 3	
Volume 4	
Weight 4	
Piece Count	No missed pieces
Decay Class	No Errors
Diameter	± 1 inch on measurements
Piece Length	No Errors

APPENDIX M: GLOSSARY OF TERMS

Term	Definition
Aspect	A position facing or commanding a given direction; exposure. Aspect is the compass direction of the prevailing slope with respect to true north.
Azimuth	A horizontal angular measure from true north to an object of interest.
Basal Area	The cross-sectional area of the stem or stems of a plant or of all plants in a stand, generally expressed as square units per unit area. For trees, measured at 4.5 feet above ground, for forbs and grasses, measured at the root crown.
Bole Length	The straight-line distance measured parallel to the main bole of a tree, from its base to its tip.
Breast Height	A point located on the uphill side of the main stem, by measuring 4.5 feet along the uphill side of the bole from ground level or the predominant root collar. Preclude slight, non-compacted litter accumulations when establishing breast height.
CALVEG	Classification and Assessment with LANDSAT of Visible Ecological Groupings. It is a California-wide system for classifying vegetative and non-vegetative cover types. The primary cover type relates to life form and uses a 3-character alpha code.
Canopy Cover	The percent of a fixed area covered by the crown of an individual plant species or delimited by the vertical projection of its outermost perimeter; small openings in the crown are included.
Compacted Live Crown Ratio	The percent of the total height of the tree that supports a full, live crown. For trees that have uneven length crowns, occularly transfer lower branches to fill holes in the upper portions of the crown, until a full, even crown is created.
Compartment	A land area, usually between 3,000 and 8,000 acres, easily identified on the ground by physical features. A compartment is comparable in size to a sub-watershed, or landscape management unit. It is used as a convenience for maintaining stand records and planning vegetation management projects.
Crown Class	The relative position of the tree or shrub crown with respect to the competing vegetation around it. Crown class for each tree or shrub is judged in the context of its immediate environment, that its, those trees or shrubs which are competing for sunlight with the subject tree or shrub.
Crown Length	The vertical distance from the top of the leader to the base of the crown, measured to the lowest live branch-whorl with live branches in at least 3 quadrants, and continuous with the main crown.
Crown Ratio	The ratio of compacted live crown length to bole length. Lengths are measured parallel to the bole from the base of the tree to the tip.
DEM	Digital Elevation Model. USGS geographic elevation data distributed in raster form. Digital representation of the shape of the earth's surface. Typically, digital elevation data consists of arrays of values that represent topographic elevations measured at equal intervals on the Earth's surface.

Glossary of Terms (cont.)

Term	Definition
Diameter	The length of a straight-line segment passing through the center of an item and terminating at its periphery.
Diameter at Breast Height (DBH)	A measure at breast height (4.5 feet), outside bark, of the tree bole, perpendicular to the tree bole.
Diameter at Root Collar (DRC)	The straight line passing through the center of a cross section of a bole measured at the root collar of a shrub or tree.
Down Log	Stem material (conifer or hardwood) that is lying on the ground. If a stem material is leaning more than 45 degrees from vertical, is not self-supporting, and/or in contact with the ground, it is considered a down log.
Down Woody Material	Woody pieces of trees and shrubs that have been uprooted (no longer supporting growth) or severed from their root system, not self-supporting, and are lying on the ground.
Duff Layer	Duff is the fermentation and humus layer of the forest floor. It does not include the freshly cast material in the litter layer. The top of the duff is where needles, leaves, and other cast-off vegetative material have noticeably begun to decompose. Individual particles usually will be bound by fungi mycelium. When moss is present, the top of the duff is just below the green portion of the moss. The bottom of the duff is the start of the soil ("A" horizon).
Elevation	Vertical distance from a datum, usually mean sea level, to a point or object on the earth's surface. Not to be confused with altitude, which refers to points above the earth's surface.
Fuel Bed	The fuel bed is the accumulation of dead, woody residue on the forest floor. It begins at the top of the duff layer and above. It includes litter, dead limbwood and bolewood from tree species, as well as dead material from shrub, herbaceous, and grass species.
Fuel Model	Mathematical descriptions of fuel properties (e.g., fuel load and fuel depth) that are used as inputs to calculations of fire danger indices and fire behavior potential.
GPS	Global Positioning System. A network of radio-emitting satellites deployed by the U.S. Department of Defense. Ground-based GPS receivers can automatically derive accurate surface coordinates for all kinds of GIS, mapping, and surveying data collection.
Ground Level	The forest floor, made up by soil and duff layer. It does not include unincorporated woody debris that may rise above the ground line. In reference to a point of measure, it is the highest point of the ground touching the base of the object being referenced.
Group Talley	A count of one or more items of the same type or species and recorded as a single line entry.
Growth	A measure of the increase in growth layers for a specified time frame.
Height Growth	The increase in height over a set period of time.
Intersect Diameter	Measurement of diameter at a point where the sampling plane intersects the geometric center of the object being tallied. No adjustment is made for stem irregularities at the point of intersection.

Glossary of Terms (cont.)

Term	Definition
Lean (Tree)	The deflection from vertical, > 15 degrees of a straight line passing through the geometric center of the base and top of the main stem.
Length	The measurement of the extent of something along its greatest dimension.
Life Form	Species and individuals that are grouped into classes on the basis of their similarities in structure and function. A growth form that displays an obvious relationship to important environmental factors.
Limiting Distance	A comparative measurement between the subplot radius and the distance from the subplot center to the center of the object. The comparison is used to determine whether the object is IN or OUT of the fixed area subplot. **IN** - The object is "in" if the measured distance is equal to or less than the subplot radius. **OUT** - The object is "out" if the measured distance is greater than the subplot radius.
Live Crown Length	The straight-line distance measured parallel to the main bole of a tree, from the top of the live crown to the base of the live crown.
Ownership	The identification of the legal owner/administrator on both the surface and subsurface estates.
Plant Species	The major subdivision of a genus or subgenus of a plant being described or measured.
Plot Configuration	The size and shape of the sampling unit (plot) and the spatial arrangement of subplots within that unit.
Plot	A sub-sample of a plot or stand exam. This is the unit on which data are recorded to individual trees, snags, logs, understory vegetation, and fuels. Data can be collected on either a fixed area or variable radius area.
Proclaimed Forest	Units of the National Forest System as originally proclaimed or designated by Congress.
Quadratic Mean Diameter	The diameter of the tree of average basal area.
Radial Growth Increment	The increase in tree radius over a period of time at breast height, or occasionally at the base.
Random Sample	Any method of sample selection based on the theory of probability (degree of certainty). At any stage of the operation of selection, the probability of any set of units being selected must be known. It is the only method that can provide a measure of precision of the estimate.
Reconciliation Code	A code used to reflect the status of an individually tallied item with regards to previous surveys.
Slope	A deviation from the horizontal.
Species	A code that represents a fundamental category of taxonomic classification of an organism.
Stand	A spatially continuous group of trees and associated vegetation having similar structures and growing under similar soil and climatic conditions.

Glossary of Terms (cont.)

Term	Definition
Stand Exam Grid	Basic data collection method for stand exams. It consists of a set of plots, separated by equal distances on a grid pattern. The lines of the grid (transects) are oriented in cardinal directions. There is a predetermined distance between plots. The number of transects and grid plots will vary depending upon the size and shape of the stand.
Stratified Sample	A method of sampling forest resources where stands or polygons of similar properties are lumped into strata. This improves the efficiency of an inventory by reducing the variability within a given population. The less variability there is within a strata, the fewer samples will need to be taken to achieve a statistically valid result.
Stratum	A group of stands within a condition class; similar characteristics such as forest type, tree size class, and canopy density.
Stump	The woody base of a tree remaining in contact with the soil after the trunk or main stem has been severed at a point less than 4.5 feet above ground height (measured on the uphill side).
Tree	A woody perennial plant, typically large, with a single well-defined stem carrying a more or less definite crown.
Tree Age	Total age of the above ground stem of a tree (not age of the root stock or the total age from seed). Total age is usually the annual ring count to the pith of the tree at breast height plus an estimate of the number of years it took the tree to reach breast height.

Region 8 Land Class Codes

Land Class	Name	Suitable	Description
000	**Un-Inventoried**	No	Land in Forest Service Ownership that has not been classified. Usually for new acquisitions or other lands for which no information is available
100	**Water Area**	No	Areas that are covered by water and not included in the more specific codes below
110	Natural Lake	No	A naturally occurring area of water of more than one are in size
120	Reservoir	No	A constructed area of water of more than one acre in size
125	Pond	No	A natural or construncted area of water of less than one acre in size
130	Estuary	No	An area where fresh water from a river mixes with salt water from the sea
140	River	No	A flowing body of water in a well defined bed or channel. Wider than a stream
150	Stream	No	A flowing body of water in a well defined bed or channel. Narrower than a river. Most of the streams that we are used to seeing are components of stands and do not get mapped out separately with stand numbers of their own and thus would not be covered by this code. Use this code when a stream is large enough or important enough to be mapped separately as a stand by itself.

Region 8 Land Class Codes (cont.)

Land Class	Name	Suitable	Description
160	Wetlands	No	Areas that are periodically or permanently inundated by surface or ground water and support vegetation adapted for life in saturated soil. These areas are also referred to as swamps, marshes, bogs, and bays.
200	**Non-Forest Land**	No	Lands developed for non-forest use include areas for crops, improved pasture, residential, or administrative areas, improved roads of any width, and adjoining road clearing and power line/pipeline clearing of any width. (Forest land is defined as land at least 10 percent occupied by forest trees of any size or formerly having had such tree cover and not currently developed for non-forest use). 219.3. Use this code for non-forest land not covered by more specific codes below.
210	Public Park, Cemetery	No	Land containing an officially designated public park or a cemetary
220	Utility R-O-W	No	Land containing easements or Right-of-way for utility lines
230	Road and Railroad R-O-W	No	Land occupied by road and/or railroad right-or-way
240	Special Use	No	Lands that rea under a special user permit
250	Wildlife Opening	No	Non-forest land used for wildlife purposes
251	Balds	No	High elevation heaths or grassy areas
260	Nursery	No	Nursery
265	Seed Orchard	No	Seed Orchard
270	Non Forest service	No	Lands within Forest Service boundary that do not belong to Forest Service. May be forested or non-forested.
280	Mine	No	Strip Mines, well sites, quarries, etc.
290	Military Use	No	Lands used by or formerly used by military. May contain unexploded ordinance at or near ground surface. May contain shrapnel in trees.
300	**Reserved - Withdrawn**	No	Withdrawn from timber production by an acto of Cngress, the Secretary of Agriculture, or the Chief of the Forest Service
310	Scenic Area	No	Officially designated scenic area
320	Historic Area	No	Officially designated historic area
330	Natural Area	No	Officially designated natural area. Includes research natural areas, RNAs
340	Geological/Archeological Area	No	Officially designated geological/archeological area
350	Wilderness Area	No	Officially designated wilderness area
351	RCW in Wilderness – Active	No	Officially designated wilderness area with RCW currently active
352	RCW in Wilderness – in active	No	Officially designated wilderness area with RCW previously active
360	Wild and Scenic River	No	Officially designated wild and scenic river. Includes river corridor
370	Roadless Area	No	Officially designated roadless area
400	**Deferred - Withdrawn**	No	Defferred – withdrawn from timber production pending final action at which time it may be re-classified into the 300 series or some other land class
410	Scenic Area	No	Scenic area. Pending

Region 8 Land Class Codes (cont.)

Land Class	Name	Suitable	Description
420	Historic Area	No	Historic area. Pending
430	Natural Area	No	Natural area. Pending
440	Geological/Archeological Area	No	Geological/Archeological area. Pending
450	Wilderness Area	No	Wilderness area. Pending
460	Wild and Scenic River	No	Wild and Scenic River. Includes river corridor. Pending
470	Roadless Area	No	Roadless area. Pending
500	**Standard Forest Land**	Yes	Standard – timber production emphasis
510	Key Area for Wildlife, Fish, Rare Plants	Yes	A stand lying within an area having a timber production emphasis where wildlife, fish, and rare plants resources area a major management consideration
511	Contains key area for wildlife, Fish, rare Plants	Yes	Area of standard forest land which contains an inclusion where wildlife, fish, and rare plants resources area major management consideration.
512	Contains Threatened & endangered Species-Plants	Yes	Area of standard forest land which contains an inclusion where threatened & endangered plants resources are a major management consideration.
513	Contains Threatened & endangered Species-Animals	Yes	Area of standard forest land which contains an inclusion where threatened & endangered animals resources are a major management consideration.
520	Open woodland	Yes	Stocking levels are maintained below regional guidelines for fully stocked stands. Stands are open, park-like with emphasis on maintaining a strong herbaceous component. Percent crown closure from all woody vegetation is between 10% and 60%
530	Low Site Productivity	Yes	
540	Steep Slopes	Yes	Steep slopes
545	Sensitive Soils	Yes	Sensitive soils
550	Needs R-O-W	Yes	Lands needing road access for implementation of management prescriptions
560	Needs Road	Yes	Lands needing road construction for implementation of management prescriptions
580	Military Use	No	Lands used or formerly used by military. May contain unexploded ordinance at or near ground surface. May contain shrapnel in trees.
590	RCW Forage for Active Cluster	Yes	Stand designated as foraging habitat for active RCW cluster
591	RCW Foraging Stand for Recruitment Cluster	Yes	Stand designated as foraging habitat for RCW recruitment cluster. Note: recruitment clusters are provisioned with artificial cavities.
592	RCW Foraging Stand for Recruitment Stand	Yes	Stand designated as foraging habitat for RCW recruitment stand. Note: recruitment stands are not provisioned with artificial cavities.
593	RCW Foraging Stand for Inactive Cluster	Yes	Stand designated as foraging habitat for inactive RCW cluster
594	RCW Potential Recruitment	Yes	Stand that may be used for recruitment in the future
600	**Special**	Yes	Special – Timber production secondary to other resources
620	Sensitive Plants	Yes	Sensitive plants

Region 8 Land Class Codes (cont.)

Land Class	Name	Suitable	Description
630	Recreation Emphasis	Yes	Recreation emphasis
640	Visual Emphasis	Yes	Visual emphasis
650	Wildlife Emphasis	Yes	Wildlife emphasis
660	Water Emphasis	Yes	Water emphasis
665	Cultural Resource Emphasis	Yes	Cultural resource emphasis
667	Wildlife Preserve	Yes	Wildlife preserve
670	Special Study Area	Yes	Special study area
671	Growth and Yield Research Plot	Yes	Growth and yield research plot
680	Progeny Test Plantation	Yes	Progeny test plantation
690	Military Use	No	Lands used or formerly used by military. May contain unexploded ordinance at or near ground surface. May contain shrapnel in trees.
700	**Lack of Technology**	No	Technology is not available t ensure timber production from the land withut irreversible resource damage to soils, productivity, or watershed conditions.
710	Restocking Not Assured	No	There is not reasonable assurance that the land can be adequately restocked as provided in 219.27©(3). Adequate restocking means that the cut area will contain the minimum number, size, distribution, and species composition of regeneration as specified in the regional silvicultural guides for each forest type 5 years after harvest.
720	Irreversible Damage	No	Timber production would cause irreversible resource damage to soils, productivity, or watershed conditions.
740	Response Info Lacking	No	It is not known if timber production can be ensured without irreversible resource damage to soils, productivity, or watershed conditions.
800	**Not Appropriate**	No	Land coded in the 800's series are designated as Not Appropriate for timber production by regional Forester's decision in approving forest plans
810	Experimental Forest, Range or Watershed	No	Lands used for research and special study
820	MIN Level	No	Lands that are unsuitable due to access or existing landscape features. Lands that are difficult and/or exceedingly costly to manage. Minimally productive. If a treatment is applied then a number of mitigating measures must be implemented to protect the resources. Use this code if, when classifying a stand, you think "I would not tough this area with a 10 foot pole," nothing but big trouble once disturbed, "Why would I want to?"
821	MIN Level - Steep Slopes	No	MIN level – steep slopes
822	MIN Level - Inadequate Markets	No	MIN level – inadequate markets
823	MIN Level - Inaccessible ROW needed	No	MIN level – In accessible – ROW needed
824	MIN Level - Sensitive Soils	No	MIN level – sensitive soils
825	MIN Level - Low Level Management	No	MIN level – low level management

Region 8 Land Class Codes (cont.)

Land Class	Name	Suitable	Description
826	MIN Level – Physical Barriers	No	MIN level – physical barriers
827	MIN Level - Road Costs Exceed Values	No	MIN level – road costs exceeds values
828	MIN Level – Riparian Area	No	MIN level – riparian area
830	Wildlife Emphasis	No	Wildlife emphasis
832	Threatened & Endangered Species – Plants	No	Unsuitable forest land with threatened & endangered plant resources
833	Threatened & Endangered Species – Animals	No	Unsuitable forest land with threatened & endangered animal resources
840	RCW Cluster Active	No	Area, at least 10acres in size, containing the aggregate of cavity trees + a 200' buffer in an active cluster
841	RCW Cluster Inactive	No	Area, at least 10acres in size, containing the aggregate of cavity trees + a 200' buffer in an inactive cluster
842	RCW Recruitment Stand	No	Area, at least 10 acres in size, designated for RCW recruitment that has not been provisioned with artificial cavities
843	RCW Replacement Stand	No	Area, at least 10 acres in size, designated to replace existing active RCW cluster. Sites should be adjacent to or within ¼ mile of active cluster it is replacing. Cavities are not present.
844	RCW Recruitment Cluster	No	Area, at least 10 acres in size, designated for RCW recruitment that has been provisioned with artificial cavities
846	Other Rare/Endangered Species	No	Area, ar least 10 acres in size, designated for conservation of rare/endangered species other than RCW
848	Designated Critical habitat	No	Area, at least 10 acres in size, legally designated as critical habitat. For aquatic designated crtical habitat, the adjacent riparian should also be coded as critical habitat.
850	Developed Recreation Site	No	Developed recreation site
851	Un-Developed Recreation Site	No	Un-developed recreation site
852	Appalachian Trail	No	Appalachian Trail corridor
853	Other National Recreation Trail	No	Other national Recreation Trail corridor
860	Administrative Site	No	Land occupied by Forest Service structures such as District offices, work centers, etc.
861	Undeveloped Administrative Site	No	Land potentially occupied by Forest Service structures such as District offices, work centers, etc.
862	Summer Home Site	No	Site contains a residential structure owned by Forest Service but rented or leased to public for residential or recreational purposes
870	Nursery	No	Lands dedicated to production of tree seedlings
871	Seed Orchards	No	Lands dedicated to the production and collection of tree seed
880	RARE II Lands under study	No	Lands removed from the suitable timber base pending evaluation with the roadless Area Review and Evaluation legislated program
890	Military Use	No	Lands used or formerly used by military. May contain unexploded ordinance at or near ground surface. May contain shrapnel in trees.

Region 8 Land Class Codes (cont.)

Land Class	Name	Suitable	Description
891	Contaminated	No	Lands containing hazardous materials (chemical, nuclear, etc.)
900	**Unproductive**	No	Forested land that is incapable of producing a minimum level of growth where the minimum level is set in the forest plan

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APPENDIX N: FUEL MODELS

The original 13 fuel models are from "**Aids to Determining Fuel Models for Estimating Fire Behavior**", Hal E. Anderson, INT-122, 1982. The remaining fuel models are from "Standard Fire Behavior Fuel Models: A Comprehensive Set for Use with Rothermel's Surface Fire Spread Model" by Joe H. Scott and Robert E. Burgan. RMRS –GTR-153. June 2005.

Fuel Model	Fuel Model Code	Fuel Model Name	Fuel Type	Model Set	Fuel 1-Hr	Fuel 10-Hr	Fuel 100-Hr	Fuel Bed Depth
1		Short grass (1 foot)	Grass and grass-dominated	Original 13	0.74	0	0	1
2		Timber (grass and understory)	Grass and grass-dominated	Original 13	2	1	0.500	1
3		Tall grass (2.5 feet)	Grass and grass-dominated	Original 13	3.01	0	0	2.50
4		Chaparral (6 feet)	Chaparral and shrub fields	Original 13	5.01	4.010	2	6
5		Brush (2 feet)	Chaparral and shrub fields	Original 13	1	0.500	0	2
6		Dormant brush, hardwood slash	Chaparral and shrub fields	Original 13	1.50	2.500	2	2.50
7		Southern rough	Chaparral and shrub fields	Original 13	1.13	1.870	1.500	2.50
8		Closed timber litter	Timber litter	Original 13	1.50	1	2.500	0.20
9		Hardwood litter	Timber litter	Original 13	2.92	0.410	0.150	0.20
10		Timber (litter and understory)	Timber litter	Original 13	3.01	2	5.010	1
11		Light logging slash	Slash	Original 13	1.50	4.51	5.510	1
12		Medium logging slash	Slash	Original 13	4.01	14.03	16.53	2.30
13		Heavy logging slash	Slash	Original 13	7.01	23.04	28.05	3
91	NB1	Urban/Developed	Nonburnable	Scott and Burgan	0	0	0	0
92	NB2	Snow/Ice	Nonburnable	Scott and Burgan	0	0	0	0
93	NB3	Agricultural	Nonburnable	Scott and Burgan	0	0	0	0
98	NB4	Open Water	Nonburnable	Scott and Burgan	0	0	0	0
99	NB5	Bare Ground	Nonburnable	Scott and Burgan	0	0	0	0
101	GR1	Short, Sparse Dry Climate Grass (Dynamic)	Grass	Scott and Burgan	0.10	0	0	0.40
102	GR2	Low Load, Dry Climate Grass (Dynamic)	Grass	Scott and Burgan	0.10	0	0	1
103	GR3	Low Load, Very Coarse, Humid Climate Grass (Dynamic)	Grass	Scott and Burgan	0.10	0.40	0	2

Fuel Models (cont.)

Fuel Model	Fuel Model Code	Fuel Model Name	Fuel Type	Model Set	Fuel 1-Hr	Fuel 10-Hr	Fuel 100-Hr	Fuel Bed Depth
104	GR4	Moderate Load, Dry Climate Grass (Dynamic)	Grass	Scott and Burgan	0.25	0	0	2
105	GR5	Low Load, Humid Climate Grass (Dynamic)	Grass	Scott and Burgan	0.40	0	0	1.50
106	GR6	Moderate Load, Humid Climate Grass (Dynamic)	Grass	Scott and Burgan	0.10	0	0	1.50
107	GR7	High Load, Dry Climate Grass (Dynamic)	Grass	Scott and Burgan	1	0	0	3
108	GR8	High Load, Very Coarse, Humid Climate Grass (Dynamic)	Grass	Scott and Burgan	0.50	1	0	4
109	GR9	Very High Load, Humid Climate Grass (Dynamic)	Grass	Scott and Burgan	1	1	0	5
121	GS1	Low Load, Dry Climate Grass-Shrub (Dynamic)	Grass-Shrub	Scott and Burgan	0.20	0	0	0.90
122	GS2	Moderate Load, Dry Climate Grass-Shrub (Dynamic)	Grass-Shrub	Scott and Burgan	0.50	0.500	0	1.50
123	GS3	Moderate Load, Humid Climate Grass-Shrub (Dynamic)	Grass-Shrub	Scott and Burgan	0.30	0.250	0	1.80
124	GS4	High Load, Humid Climate Grass-Shrub (Dynamic)	Grass-Shrub	Scott and Burgan	1.90	0.300	0.100	2.10
141	SH1	Low Load, Dry Climate Shrub (Dynamic)	Shrub	Scott and Burgan	0.25	0.250	0	1
142	SH2	Moderate Load, Dry Climate Shrub	Shrub	Scott and Burgan	1.35	2.400	0.750	1
143	SH3	Moderate Load, Humid Climate Shrub	Shrub	Scott and Burgan	0.45	3	0	2.40
144	SH4	Low Load, Humid Climate Timber-Shrub	Shrub	Scott and Burgan	0.85	1.150	0.200	3
145	SH5	High Load, Dry Climate Shrub	Shrub	Scott and Burgan	3.60	2.100	0	6
146	SH6	Low Load, Humid Climate Shrub	Shrub	Scott and Burgan	2.90	1.450	0	2
147	SH7	Very High Load, Dry Climate Shrub	Shrub	Scott and Burgan	3.50	5.300	2.200	6
148	SH8	High Load, Humid Climate Shrub	Shrub	Scott and Burgan	2.05	3.400	0.850	3
149	SH9	Very High Load, Humid Climate Shrub (Dynamic)	Shrub	Scott and Burgan	4.50	2.450	0	4.40

Fuel Models (cont.)

Fuel Model	Fuel Model Code	Fuel Model Name	Fuel Type	Model Set	Fuel 1-Hr	Fuel 10-Hr	Fuel 100-Hr	Fuel Bed Depth
161	TU1	Low Load, Dry Climate Timber-Grass-Shrub (Dynamic)	Timber-Understory	Scott and Burgan	0.20	0.900	1.500	0.60
162	TU2	Moderate Load, Humid Climate Timber-Shrub	Timber-Understory	Scott and Burgan	0.95	1.800	1.250	1
163	TU3	Moderate Load, Humid Climate Timber-Grass-Shrub (Dynamic)	Timber-Understory	Scott and Burgan	1.10	0.150	0.250	1.30
164	TU4	Dwarf Conifer With Understory	Timber-Understory	Scott and Burgan	4.50	0	0	0.50
165	TU5	Very High Load, Dry Climate Timber-Shrub	Timber-Understory	Scott and Burgan	4	4	3	1
181	TL1	Low Load Compact Conifer Litter	Timber Litter	Scott and Burgan	1	2.200	3.600	0.20
182	TL2	Low Load Broadleaf Litter	Timber Litter	Scott and Burgan	1.40	2.300	2.200	0.200
183	TL3	Moderate Load Conifer Litter	Timber Litter	Scott and Burgan	0.50	2.200	2.800	0.30
184	TL4	Small Downed Logs	Timber Litter	Scott and Burgan	0.50	1.500	4.200	0.40
185	TL5	High Load Conifer Litter	Timber Litter	Scott and Burgan	1.15	2.500	4.400	0.60
186	TL6	Moderate Load Broadleaf Litter	Timber Litter	Scott and Burgan	2.40	1.200	1.200	0.30
187	TL7	Large Downed Logs	Timber Litter	Scott and Burgan	0.30	1.400	8.100	0.40
188	TL8	Long-Needle Litter	Timber Litter	Scott and Burgan	5.80	1.400	1.100	0.30
189	TL9	Very High Load Broadleaf Litter	Timber Litter	Scott and Burgan	6.65	3.300	4.150	0.60
201	SB1	Low Load Activity Fuel	Slash-Blowdown	Scott and Burgan	1.50	3	11	1
202	SB2	Moderate Load Activity Fuel or Low Load Blowdown	Slash-Blowdown	Scott and Burgan	4.50	4.250	4	1
203	SB3	High Load Activity Fuel or Moderate Load Blowdown	Slash-Blowdown	Scott and Burgan	5.50	2.750	3	1.20
204	SB4	High Load Blowdown	Slash-Blowdown	Scott and Burgan	5.25	3.500	5.250	2.70

Detailed Description of the Fuel Models

Code	Detailed Description
1	Contains fine, very porous, and continuous herbaceous fuels that have cured or are nearly cured. Generally less than one-third of the area contains shrubs or timber. Grasslands and savanna are represented along with stubble, grass-tundra, and grass-shrub combinations. Annual and perennial grasses are included in this fuel model.
2	Herbaceous material with litter and dead-down stem wood from the open shrub or timber overstory. Open shrub lands and pine stands or scrub oak stands that cover one-third to two-thirds of the area. Stand may include clumps and may include pinyon-juniper.
3	Stands are tall, averaging about three feet, but considerable variation may occur. Approximately one-third or more of the stand is considered dead and cured. May include cultivated grains that have not been harvested, tall prairie, and marshland grasses
4	Stands of mature shrubs, 6 feet or more tall such as California mixed chaparral, the high pocosin along the east coast, the pine barrens of New Jersey, or the closed jack pine stands of the north-central states. Besides flammable foliage, stand may contain dead woody material. May contain a deep litter layer.
5	Shrubs are young with little dead material, and the foliage contains little volatile material. Usually shrubs are short and almost totally cover the area. Young, green stands with no dead wood qualify: laurel, vine maple, alder, or even chaparral, manzanita, or chamise.
6	The shrubs are older, but not as tall as model 4, nor do they contain as much fuel as model 4. This model covers a broad range of shrub conditions: intermediate stands of chamise, chaparral, oak brush, low pocosin, Alaskan spruce taiga, and shrub tundra. May include hardwood slash that has cured. Pinyon-juniper shrub lands may be represented.
7	Stands of shrubs are generally between 2 and 6 feet high. Palmetto-galliberry understory, with a pine overstory, is typical. Low pocosin may be represented. Black spruce shrub combinations in Alaska may also be represented.
8	Contains closed canopy stands of short needle conifers or hardwoods that have leafed out. The compact litter layer is mainly needles, leaves, and occasionally twigs because little undergrowth is present. Representative conifer types are white pine, lodgepole pine, spruce, fir, and larch.
9	Both long-needle conifer stands and hardwood stands, especially the oak-hickory types, are typical. Closed stands of long-needled pine like ponderosa, Jeffrey, red pines, or southern pine plantations are grouped in this model. May contain concentrations of dead-down woody material.
10	Dead-down fuels include quantities of 3-inch or larger limb wood resulting from over maturity or natural events that create a large load of dead material on the forest floor. Any forest type may be considered if heavy down material is present; examples are insect- or disease-ridden stands, wind thrown stands, overmature situations with deadfall, and aged light thinning or partial cut slash.
11	Contains slash and herbaceous material intermixed with slash. Light partial cuts or thinning operations in mixed conifer stands, hardwood stands, and southern pine harvests are considered. Clearcuts generally produce more slash than represented here. The less than 3-inch material load is less than 12 tons per acre. The greater than 3 inch is represented by not more than 10 pieces, 4 inches in diameter, along a 50 foot transect.
12	The visual impression is dominated by slash and much of it is less than 3 inches in diameter. The fuels are well distributed. Heavily thinned conifer stands; clearcuts, and medium or heavy partial cuts are represented. The material larger than 3 inches is represented by encountering 11 pieces, 6 inches in diameter along a 50 foot transect.
13	There is a continuous layer of slash. Large quantities of material larger than 3 inches are present. Clearcuts and heavy partial cuts in mature and over mature stands are depicted where the slash load is dominated by the greater than 3 inch diameter material. Fuels less than 3 inches are generally only 10 percent of the total load. May include situations where the slash still has “red” needles attached.
91	Land covered by urban and suburban development. The area must not support wildland fire spread. In some cases the area may experience structural fire losses during a wildland fire incident; however, structure ignition in those cases is either house-to-house or by firebrands, neither of which is directly modeled using fire behavior fuel models. If sufficient vegetation surrounds structures such that wildland fire spread is possible, then choose a fuel model appropriate for the wildland vegetation.

Detailed Description of the Fuel Models (cont.)

Code	Detailed Description
92	Land covered by permanent snow and ice. Areas covered by seasonal snow and ice can be mapped to two different fuels models.
93	Agricultural land maintained in a nonburnable condition; examples include irrigated annual crops, mowed or tilled orchards, and so forth. However, there are many agricultural areas that are not kept in a non burnable condition. For example, grass is often allowed to grow beneath vines or orchard trees, and wheat or similar crops are allowed to cure before harvest; in those cases use a different fuel model.
98	Land covered by open bodies of water such as lakes, rivers and oceans.
99	Land devoid of enough fuel to support wildland fire spread. Such areas include gravel pits, arid deserts with little vegetation, sand dunes, rock outcroppings, beaches and so forth.
101	The primary carrier of fire is sparse grass, though small amounts of fine fuel may be present. The grass is generally short, either naturally or by grazing, and may be sparse or discontinuous. The moisture extraction is indicative of a dry climate fuelbed, but may also be applied in high-extinction moisture fuelbeds because in both cases predicted spread rate and flame length are low compare to other grass models.
102	The primary carrier of fire is grass, though small amounts of fine dead fuel may be present. Load is greater than 101, and fuelbed may be more continuous. Shrubs, if present, do not affect fire behavior.
103	The primary carrier of fire is continuous, coarse, humid-climate grass. Grass and herb fuel load is relatively light; fuelbed depth is about 2 feet. Shrubs are not present in significant quantity to affect fire behavior.
104	The primary carrier of fire is continuous, dry-climate grass. Load and depth are greater than 102; fuelbed depth is about 2 feet.
105	The primary carrier of fire is humid-climate grass. Load is greater than 103 but depth is lower, about 1-2 feet.
106	The primary carrier of fire is continuous humid-climate grass. Load is greater than 105 but depth is about the same. Grass is less coarse than 105.
107	The primary carrier of fire is continuous dry-climate grass. Load and depth are greater than 104. Grass is about 3 feet tall.
108	The primary carrier of fire is continuous, very coarse, humid-climate grass. Load and depth are greater than 106. Spread rate and flame length can be extreme if grass is fully cured.
109	The primary carrier of fire is dense, tall, humid-climate grass. Load and depth are greater than 108, about 6 feet tall. Spread rate and flame length can be extreme if grass is fully or mostly cured.
121	The primary carrier of fire is grass and shrubs combined. Shrubs are about 1 foot high, grass load is low. Spread rate is moderate; flame length is low. Moisture of extinction is low.
122	The primary carrier of fire is grass and shrubs combined. Shrubs are 1 to 3 feet high, grass load is moderate. Spread rate is high; flame length moderate. Moisture of extinction is low.
123	The primary carrier of fire is grass and shrubs combined. Moderate grass/shrub load, average grass/shrub depth less than 2 feet. Spread rate is high; flame length moderate. Moisture of extinction is high.
124	The primary carrier of fire is grass and shrubs combined. Heavy grass/shrub load, depth greater than 2 feet. Spread rate high; flame length very high. Moisture of extinction is high.
141	The primary carrier of fire is woody shrubs and shrub litter. Low shrub fuel load, fuelbed about 1 foot; some grass may be present. Spread rate is very low; flame length very low.
142	The primary carrier of fire is woody shrubs and shrub litter. Moderate fuel load (higher than 141), depth about 1 foot, no grass fuel present. Spread rate is very low; flame length low.
143	The primary carrier of fire is woody shrubs and shrub litter. Moderate shrub load, possibly with pine overstory or herbaceous fuel, fuel bed depth 2 to 3 feet. Spread rate is low; flame length low.
144	The primary carrier of fire is woody shrubs and shrub litter. Low to moderate shrub and litter load, possibly with pine overstory, fuel bed depth about 3 feet. Spread rate is high; flame length moderate.
145	The primary carrier of fire is woody shrubs and shrub litter. Heavy shrub load, depth 4-6 feet. Spread rate very high; flame length very high. Moisture of extinction is high.
146	The primary carrier of fire is woody shrubs and shrub litter. Dense shrubs, little or no herbaceous fuel, fuelbed depth about 2 feet. Spread rate is high; flame length high.

Detailed Description of the Fuel Models (cont.)

Code	Detailed Description
147	The primary carrier of fire is woody shrubs and shrub litter. Very heavy shrub load, depth 4 to 6 feet. Spread rate lower than 146, but flame length similar. Spread rate is high, flame length is very high.
148	The primary carrier of fire is woody shrubs and shrub litter. Dense shrubs, little or no herbaceous fuel, fuelbed depth about 3 feet. Spread rate is high; flame length high.
149	The primary carrier of fire is woody shrubs and shrub litter. Dense, finely branched shrubs with significant fine dead fuel, about 4-6 feet tall; some herbaceous fuel may be present. Spread rate is high; flame length very high.
161	The primary carrier of fire is low load of grass and/or shrub with litter. Spread rate is low; flame length is low.
162	The primary carrier of fire is moderate litter load with shrub component. High extinction moisture. Spread rate is moderate; flame length is low.
163	The primary carrier of fire is moderate forest litter with grass and shrub components. High extinction moisture. Spread rate is high; flame length is moderate.
164	The primary carrier of fire is short conifer trees with grass or moss understory. Spread rate is moderate; flame length is moderate.
165	The primary carrier of fire is heavy forest litter with a shrub or small tree understory. Spread rate is moderate; flame length is moderate.
181	The primary carrier of fire is compact forest litter. Light to moderate load, fuels 1 to 2 inches deep. May be used to represent a recently burned forest. Spread rate is very low; flame length is very low.
182	The primary carrier of fire is broadleaf (hardwood) litter. Low load, compact broadleaf litter. Spread rate is very low; flame length is very low.
183	The primary carrier of fire is moderate load conifer litter, light load of coarse fuels. Spread rate is very low; flame length low.
184	The primary carrier of fire is moderate load of fine litter and coarse fuels. Includes small diameter downed logs. Spread rate is low; flame length low.
185	The primary carrier of fire is high load of fine litter; light slash or mortality fuel. Spread rate is low; flame length low.
186	The primary carrier of fire is moderate load broadleaf litter, less compact than 182. Spread rate is very moderate; flame length is low.
187	The primary carrier of fire is heavy load of forest litter, includes large diameter downed logs. Spread rate low; flame length low.
188	The primary carrier of fire is moderate load long-needle pine litter, may include small amount of herbaceous load. Spread rate is moderate; flame length low.
189	The primary carrier of fire is very high load, fluffy broadleaf litter. This can also be used to represent heavy needle-drape. Spread rate is very moderate; flame length moderate.
201	The primary carrier of fire is light dead and down activity fuel. Fine fuel load is 10 to 20 t/ac weighted towards fuels 1 to 3 inch diameter class; depth is less than 1 foot. Spread rate is moderate; flame length moderate.
202	The primary carrier of fire is moderate dead and down activity fuel or light blowdown. Fine fuel load is 7 to 12 t/ac, evenly distributed across 0 to 0.25, 0.25 to 1, and 1 to 3 inch diameter classes, depth is about 1 foot. Blowdown is scattered, with many trees still standing. Spread rate is moderate; flame length moderate.
203	The primary carrier of fire is heavy dead and down activity fuel or moderate blowdown. Fine fuel load is 7 to 12 t/ac, weighted toward 0 to 0.25 inch diameter class, depth is more than 1 foot. Blowdown is moderate; trees compacted to near the ground. Spread rate is high; flame length high.
204	The primary carrier of fire is heavy blowdown fuel. Blowdown id total, fuelbed is not compacted, most foliage and fine fuel still attached to blowdown. Spread rate is very high; flame length very high.