

DATE: 20 May 2002

TO: Mark Morales, Fire Management Officer
USDA Forest Service, Ozark-St. Francis National Forests, Bayou Ranger District

FROM: Glen R. Thomas, Ecologist¹
Ecospectra Services

RE: Tornado-impacted Fuelbeds Assessment, Pleasant Hill Ranger District

A forest-floor inventory of weights and depths of fuelbed material was collected using the Planar Intercept Method, whereby particles of specific diameter-size-classes of DDW material, crossed by a vertical transect-line in each plot, were recorded. Also, duff- and litter-depths, respectively, crossed by these transect-lines were recorded. DDW and depth data were then entered into DDWoodyPC[®], a software application that performed calculations according to the Planar Intersect Method, producing means for fuel-loading weight-values (Figures 1 and 2; Table 1) by applying estimates for the specific gravity of recorded DDW material to its estimated volume. Additionally, mean percentages were derived for the following mature-tree categories: oak ($\bar{X} = 18\%$; $n = 50$), pine ($\bar{X} = 58\%$; $n = 50$), and mixed species ($\bar{X} = 24\%$; $n = 50$).

Descriptive statistics were derived for: (1) DDW particles grouped into the following diameter-inch-classes: 0.00 - 0.24, 0.25 - 0.99, 1.00 - 2.99, 3.00 - 5.99, 6.00 - 8.99, 9.00 - 20.00, and >20.00; and (2) for duff- and fuelbed-depths (Figures 1 and 2; Table 1). Total needle and DDW loading together were derived to be 17.60 tons per acre. Needle loading alone was 1.62 tons per acre. Although the data did not follow a normal distribution, the majority of plots sampled ($n = 50$) indicated fuelbed-loading to be between one and twenty tons per acre with a median of 10.54. The range varied from 0.67 tons per acre to 86.37 tons. For all plots combined, mean DDW-loading was 15.98 tons per acre with a standard deviation of 18.19. Mean duff- and fuelbed-depths, respectively, were 0.94 and 4.54 inches. The percent error (standard error \div mean) for total DDW-loading was 16.10%.

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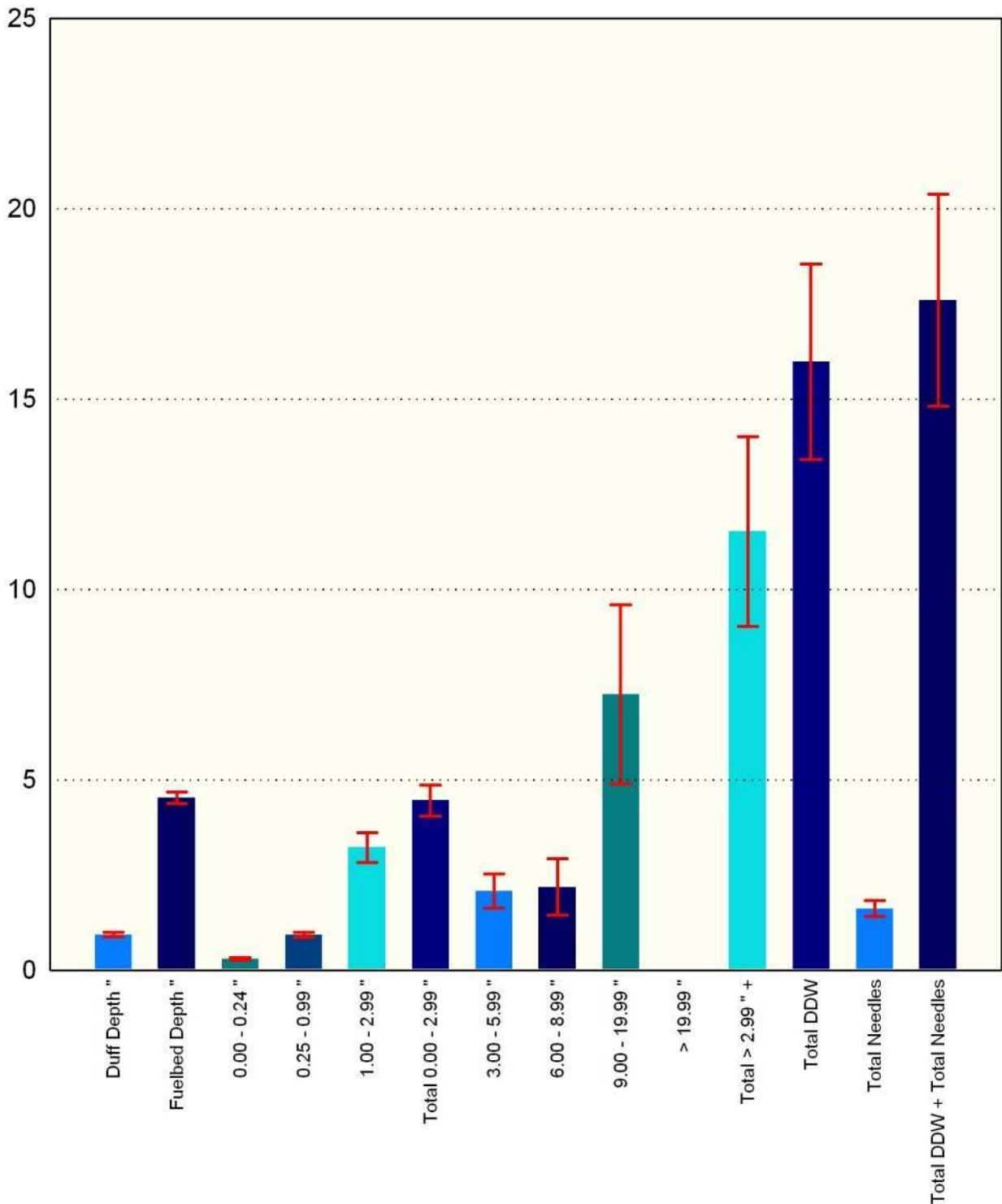


Figure 1. Mean values for: (1) dead and down woody (DDW) and needles fuel-loading (tons per acre); and (2) duff- and fuelbed-depths (inches) for sampling locations (n = 50) in tornado-impacted mature forest areas in the Ozark-St. Francis National Forests, Pleasant Hill Ranger District. Error bars represent individual-category standard-error values. Sampling dates: 5-8 May 2002.

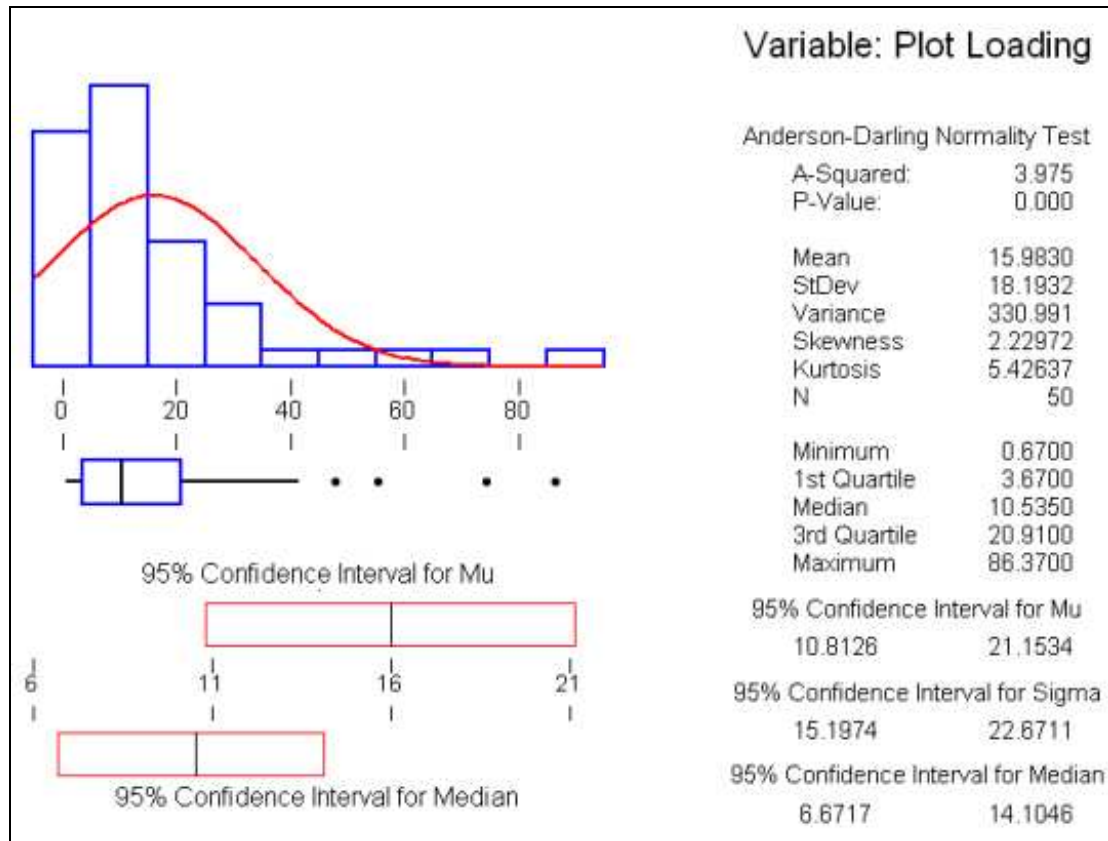


Figure 2. Descriptive statistics for variation in DDW loading (tons per acre) among sampling locations (n = 50) in tornado-impacted mature forest areas in the Ozark-St. Francis National Forests, Pleasant Hill Ranger District. Sampling dates: 5-8 May 2002.

Table 1. Planar intercept fuel-loading and duff- and fuelbed-depth results for sampling locations (n = 50) in tornado-impacted mature forest areas in the Ozark-St. Francis National Forests, Pleasant Hill Ranger District. Sampling dates: 5-8 May 2002.

Inventory Parameters:

Age Class: **Natural**

Percent Foliage Retained(%): **50**

Transect Lengths(ft):	3"+ Class Breaks	0-3" Fuel Composition:
0"- .24": 6	3" - 6"	OAK 18% 8 Avg DBH (in.)
.25"- .9": 6	6" - 9"	SHORTLEAF PINE 58% 8 Avg DBH (in.)
1"-2.9": 10	9" - 20"	MIXED 24% 8 Avg DBH (in.)
3"+: 35	20" +	

Fuel Loading and Depth Results:

Plot	Tons Per Acre									Avg. Duff		Avg. Fuelbed
	<----- 0"- .24"	.25"- .9"	1"- 2.9"	Total 0"-2.9"	3"- 6"	6"- 9"	9"- 20"	20"+	3"+	Total	Depth Inches	Depth Inches
1	1.60	1.48	0.00	3.08	3.95	0.00	0.00	0.00	3.95	7.03	0.55	3.00
2	0.22	0.00	5.34	5.56	1.71	6.53	0.00	0.00	8.24	13.79	0.55	2.67
3	0.31	0.58	1.78	2.67	0.00	0.00	0.00	0.00	0.00	2.67	0.65	4.67
4	0.13	0.58	3.56	4.26	4.25	6.12	33.33	0.00	43.70	47.96	0.50	4.33
5	0.13	0.87	0.00	0.99	4.26	0.00	0.00	0.00	4.26	5.25	1.20	3.00
6	0.25	1.44	5.33	7.02	2.13	0.00	0.00	0.00	2.13	9.15	0.55	2.33
7	0.19	1.44	1.78	3.41	0.00	6.11	0.00	0.00	6.11	9.51	0.40	2.67
8	0.13	0.60	1.85	2.58	0.00	6.36	25.43	0.00	31.79	34.37	0.65	3.33
9	0.31	1.74	3.57	5.62	11.86	0.00	0.00	0.00	11.86	17.48	1.05	4.33
10	0.13	0.58	1.79	2.49	0.00	0.00	0.00	0.00	0.00	2.49	0.35	3.33
11	0.06	0.58	3.60	4.24	0.00	0.00	16.30	0.00	16.30	20.55	0.60	4.00
12	0.13	0.58	1.80	2.51	7.66	4.85	0.00	0.00	12.51	15.02	0.70	5.00
13	0.29	2.04	0.00	2.33	3.37	4.85	0.00	0.00	8.22	10.55	0.50	5.67
14	0.32	0.88	1.81	3.01	4.94	0.00	0.00	0.00	4.94	7.95	0.90	6.00
15	0.29	1.46	1.80	3.55	0.00	0.00	0.00	0.00	0.00	3.55	0.90	5.00
16	0.38	1.76	5.41	7.55	2.76	6.20	0.00	0.00	8.96	16.51	1.35	5.67
17	0.22	1.75	9.01	10.98	3.40	0.00	0.00	0.00	3.40	14.38	1.65	4.33
18	0.22	0.29	1.79	2.30	0.00	0.00	0.00	0.00	0.00	2.30	0.85	5.67
19	0.67	1.77	7.27	9.72	2.18	0.00	0.00	0.00	2.18	11.90	1.00	5.33
20	0.22	0.58	3.59	4.40	2.74	0.00	0.00	0.00	2.74	7.14	0.60	5.33
21	0.19	1.17	5.41	6.78	2.76	17.23	0.00	0.00	19.99	26.77	1.00	3.33
22	0.13	0.87	7.17	8.17	15.74	0.00	0.00	0.00	15.74	23.91	1.05	5.33
23	0.22	0.87	8.91	10.00	6.98	0.00	69.40	0.00	76.37	86.37	0.95	4.67
24	0.53	1.16	0.00	1.69	2.16	17.03	20.61	0.00	39.80	41.49	0.50	4.67
25	0.66	2.02	5.33	8.01	5.96	0.00	0.00	0.00	5.96	13.97	0.75	4.67
26	0.41	0.87	8.91	10.18	2.72	0.00	0.00	0.00	2.72	12.91	1.00	6.00
27	0.13	0.00	3.59	3.71	0.00	0.00	0.00	0.00	0.00	3.71	0.65	5.33
28	0.19	1.17	5.40	6.75	0.00	25.80	0.00	0.00	25.80	32.55	0.75	4.00
29	0.06	1.16	1.78	3.00	0.00	0.00	26.16	0.00	26.16	29.16	0.75	4.33
30	0.35	1.74	1.79	3.88	0.00	0.00	0.00	0.00	0.00	3.88	2.10	4.33
31	0.25	0.87	3.58	4.71	0.00	0.00	69.76	0.00	69.76	74.46	0.55	4.67
32	0.19	0.87	3.56	4.62	2.14	0.00	48.71	0.00	50.85	55.46	1.00	3.67
33	0.13	0.58	7.11	7.81	2.72	0.00	0.00	0.00	2.72	10.52	0.90	3.00
34	0.16	0.87	1.78	2.80	0.00	0.00	19.19	0.00	19.19	21.99	1.65	4.33
35	0.26	0.30	1.88	2.44	0.00	0.00	0.00	0.00	0.00	2.44	0.85	3.67
36	0.19	0.87	5.39	6.45	0.00	0.00	0.00	0.00	0.00	6.45	1.30	4.33
37	0.19	0.88	1.81	2.88	1.22	0.00	0.00	0.00	1.22	4.10	1.50	4.67
38	0.25	1.46	3.60	5.32	0.00	0.00	0.00	0.00	0.00	5.32	0.75	4.00
39	0.22	0.58	1.79	2.60	0.00	0.00	0.00	0.00	0.00	2.60	0.90	4.33
40	0.32	0.58	1.80	2.70	0.00	0.00	0.00	0.00	0.00	2.70	1.00	6.00
41	0.47	1.45	10.71	12.63	2.73	0.00	0.00	0.00	2.73	15.36	1.00	6.67
42	0.50	0.58	1.79	2.87	1.20	8.56	0.00	0.00	9.76	12.63	1.00	3.67
43	0.19	0.58	0.00	0.77	0.00	0.00	10.88	0.00	10.88	11.65	2.25	5.00
44	0.50	0.29	0.00	0.79	0.00	0.00	22.64	0.00	22.64	23.44	1.00	4.67
45	0.32	0.59	0.00	0.91	0.00	0.00	0.00	0.00	0.00	0.91	1.50	4.67
46	0.38	0.29	0.00	0.67	0.00	0.00	0.00	0.00	0.00	0.67	1.00	4.67
47	0.13	0.29	3.60	4.02	2.75	0.00	0.00	0.00	2.75	6.78	1.25	5.67
48	0.22	0.58	1.80	2.60	0.00	0.00	0.00	0.00	0.00	2.60	1.00	5.00
49	0.44	0.58	1.79	2.80	0.00	0.00	0.00	0.00	0.00	2.80	0.75	4.67
50	0.54	1.46	0.00	2.00	0.00	0.00	0.00	0.00	0.00	2.00	1.00	7.33

Table 1 continued.

Fuel Loading and Depth Results:

Plot	-----Tons Per Acre-----									Avg.	Avg.	
	0"-	.25"-	1"-	Total	3"-	6"-	9"-	20"	20"+	3"+	Plot	Duff
	0"-	.25"-	1"-	Total	3"-	6"-	9"-	20"	20"+	3"+	Total	Depth
	0"-	.25"-	1"-	Total	3"-	6"-	9"-	20"	20"+	3"+	Total	Depth
Mean:	0.30	0.93	3.23	4.46	2.09	2.19	7.25	0.00	11.53	15.98	0.94	4.54
S.D.:	0.24	0.53	2.73	2.89	3.16	5.21	16.63	0.00	17.62	18.19	0.40	1.05
S.E.:	0.03	0.07	0.39	0.41	0.45	0.74	2.35	0.00	2.49	2.57	0.06	0.15
%Err:	11.29	7.98	11.96	9.17	21.44	33.58	32.46	0.00	15.59	16.10	5.98	3.28

Needle Loading (Tons Per Acre):	1.62
Total Needle and Dead Down Loading (Tons Per Acre):	17.60

3"+ Fuel-Composition Species Delineation (Tons Per Acre):

	3"-	6"	6"-	9"	9"-	20"	20"+	Total
OAK	0.96		1.52		1.59		0.00	4.07
HICKORY	0.53		0.00		0.00		0.00	0.53
SHORTLEAF PINE	0.54		0.67		5.66		0.00	6.87
EASTERN REDCEDAR	0.06		0.00		0.00		0.00	0.06
Total:	2.09		2.19		7.25		0.00	11.53
