Fuel Loading on the Las Conchas Fire: Before and After

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Kent Reid
New Mexico Forest and Watershed Restoration Institute

A Fortuitous Event?

On Tuesday 21 June 2011 in a stand in the Jemez Mountains, a FWRI crew measured three 0.25-acre plots according to FFI protocols, including three complete fuels transects per plot.

On Sunday 26 June, this hillside burned over in the Las Conchas fire.

This presentation shows the numbers and the visual results.

No equations are presented.

Caveats

These data were collected for one purpose and are being presented here for another.

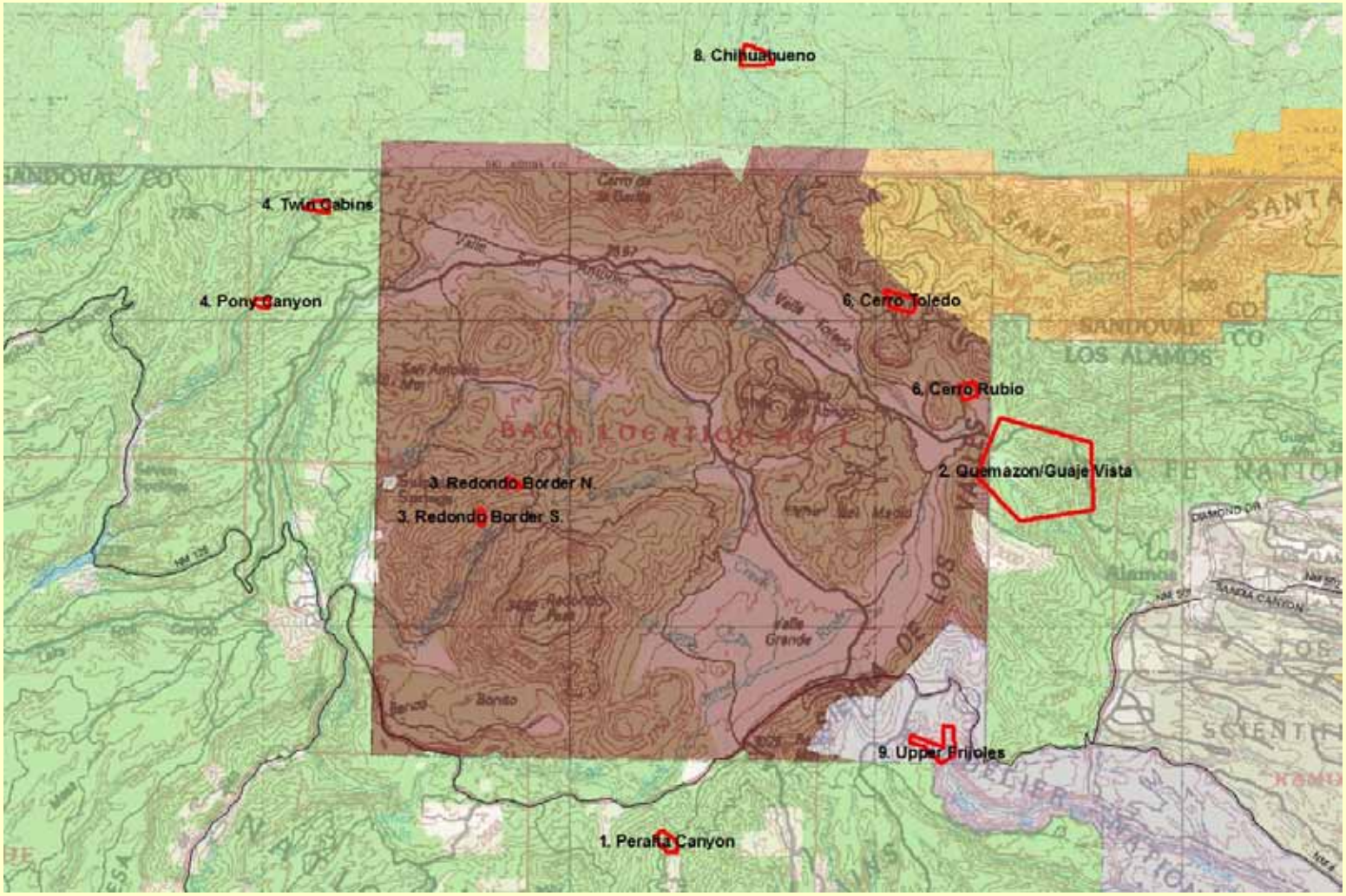
Plot locations were not random, but were established at sites of maximum down woody debris.

The plot-to-plot variation was greater than expected.

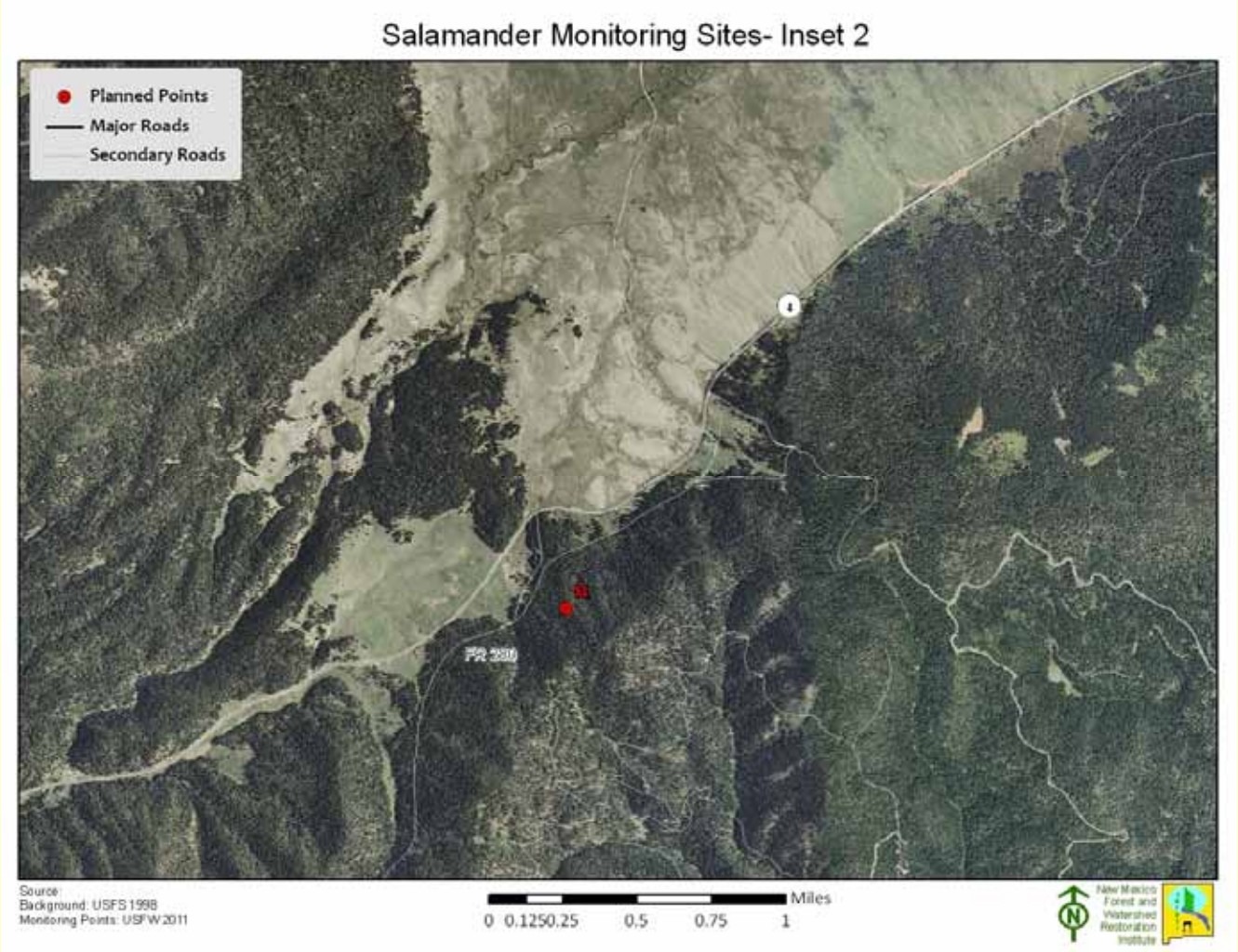
CFRP with TNC for the JMS

We were there because of this animal, the Jemez Mountain Salamander (JMS), as part of a larger effort, a grant form the Collaborative Forest Restoration Program of the Forest Service. The grant is managed by The Nature Conservancy, with many other partners.
The JMS is a candidate for listing, and the project attempts to characterize habitat.
Plot size is driven by the range of the JMS. Since the JMS spends the rainy season in down logs, the project partners had a strong interest in determining down woody debris (DWD), especially down coarse woody debris (CWD).

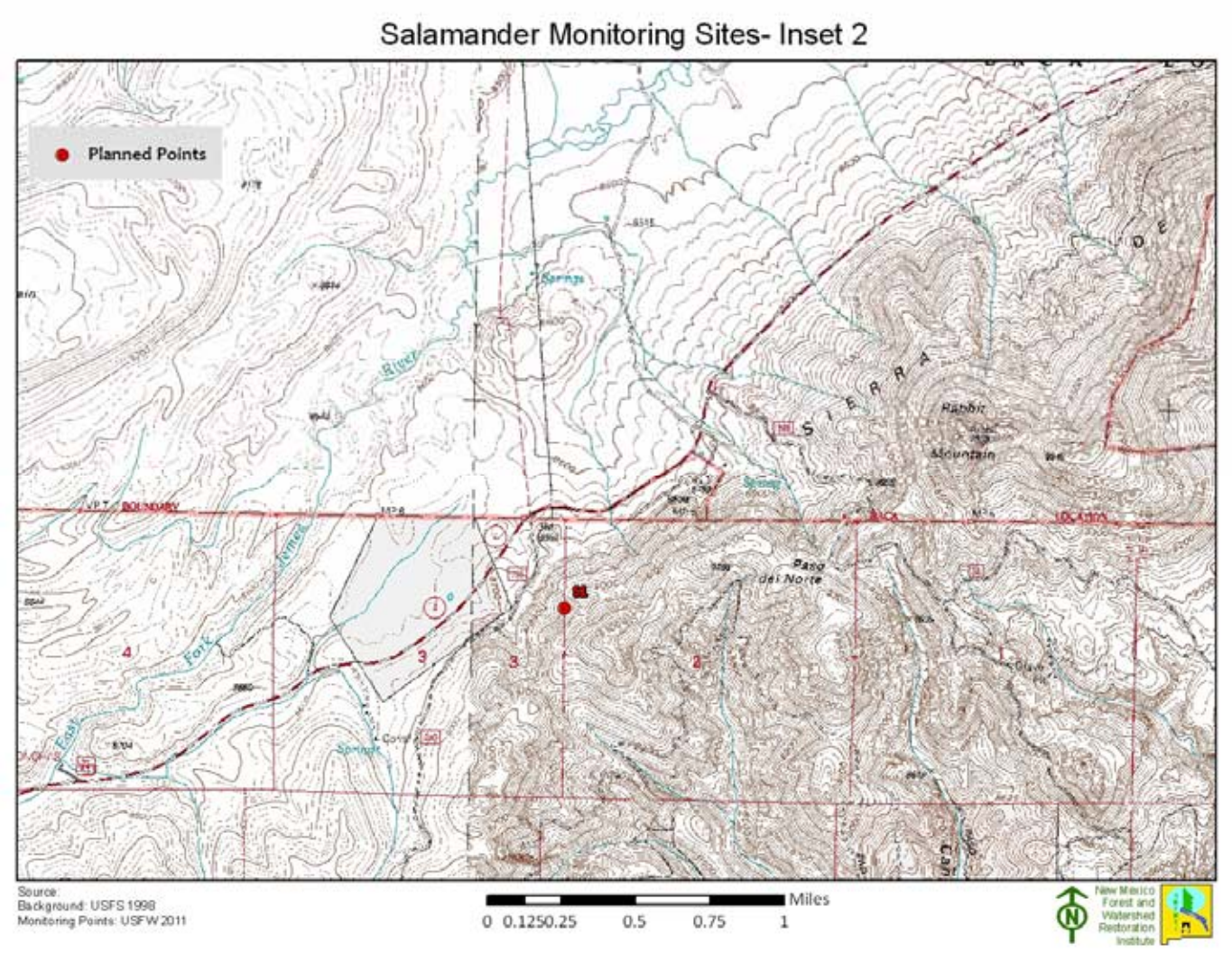
JMS priority sampling sites, May 2011



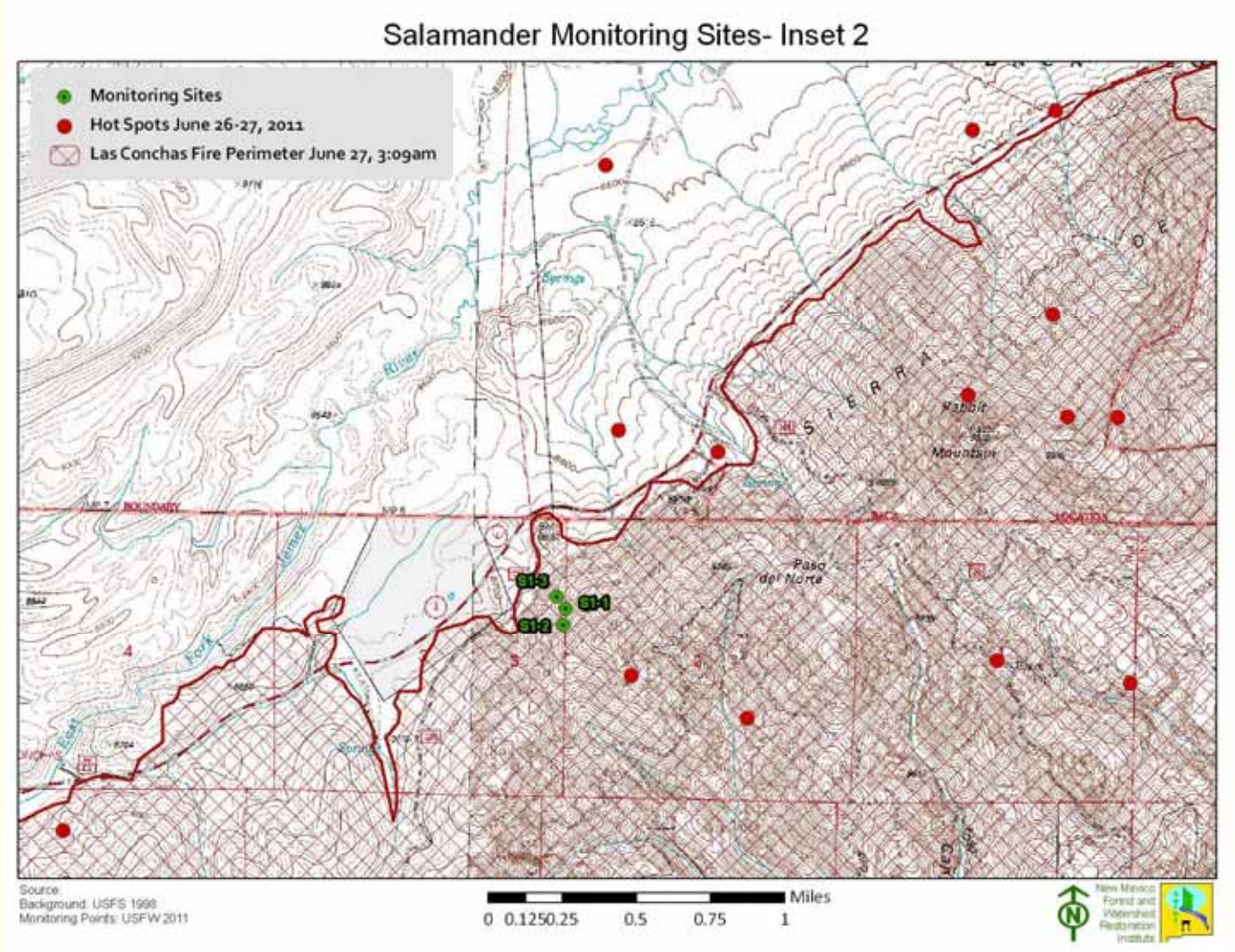
"Peralta Canyon" priority area – S1



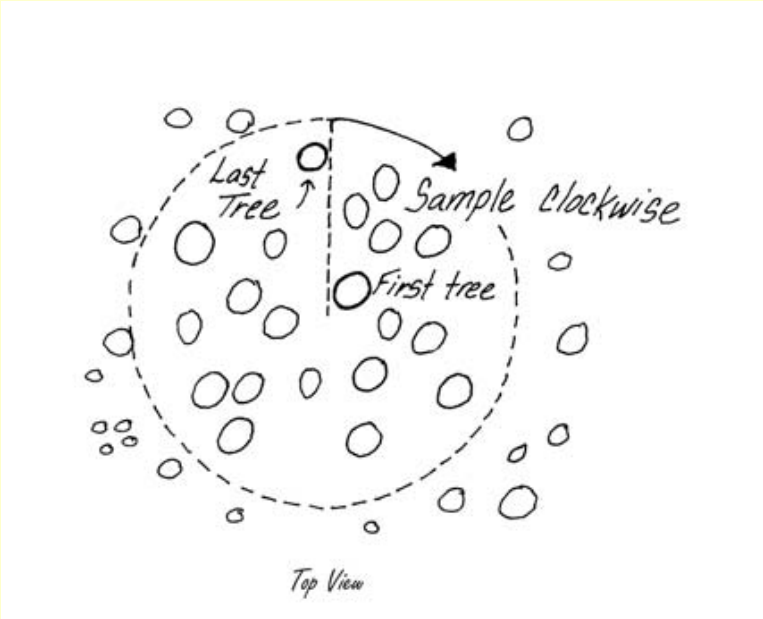
"Peralta Canyon" – plots taken 21 June 2011



"Peralta Canyon" plots and fire perimeter



Fixed-radius circular plots

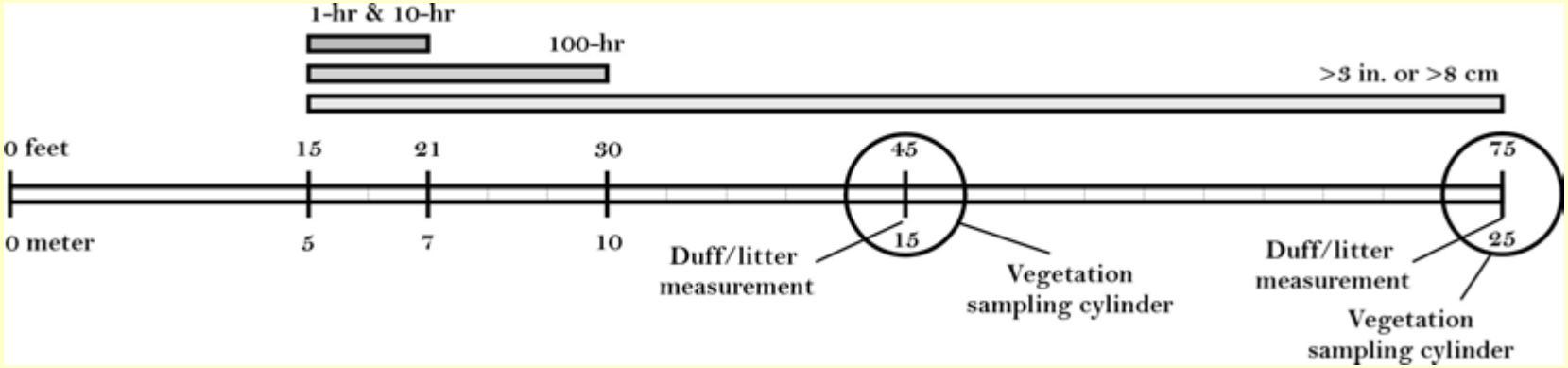


from FIREMON manual

One-quarter acre plots,
so radius = 58.9 ft

Also sub-plot for cover and seedlings,
0.01 acre = 11.8 ft radius

Brown's transects



from FIREMON manual

100-hr DWD taken to 50 ft

3 transects taken at azimuths of 0, 135, and 270 degrees from plot center

The JMS is found with this level of CWD,
but seems to prefer bigger logs and more Doug-fir

Plot 1 – high white fir trees per acre; pine bark

Plot 2 – aspect more to north; maple

Plot 3 – early instar Douglas-fir tussock moth larvae falling from trees

Pre-fire stand parameters

Cover measurements - percent

	S1-1	S1-2	S1-3	mean
Tree canopy	89	90	87	89
Seedling cvr	5	10	5	7
Shrub	0	5	3	3
Grass	3	15	4	7
Forbs	2	10	3	5
Litter	90	40	65	65
Bare soil	0	17	20	12
Rock	0	3	0	1

Brown's transects summary - DWD

	S1-1	S1-2	S1-3	mean
1-hour	0.13	0.33	0.15	0.20
10-hour	1.29	3.84	2.52	2.55
100-hour	1.31	2.25	5.74	3.10
1000-hr C1-4	5.07	8.20	24.39	12.55
1000-hr C5	3.11	10.39	14.14	9.21
Total ton/ac	10.91	25.01	46.94	27.6

JMS biologists asked us to tally Class 5 (decomposed CWD) separately

Brown's transects summary – duff and litter

	S1-1	S1-2	S1-3	mean
duff	8.32	7.32	13.81	9.82
litter	7.15	4.41	5.41	5.66
Total ton/ac	15.47	11.72	19.22	15.48

Brown's transects summary – ladder fuels

	S1-1	S1-2	S1-3	mean
Herb. dead	0.0	0.0	0.0	0.0
Herb. live	0.0	0.4	0.0	0.1
Woody dead	0.5	0.1	0.8	0.5
Woody live	3.4	2.3	0.3	2.0
Total ton/ac	3.9	2.8	1.1	2.6

Live Herbaceous material was detected only on Plot 2.

Brown's transects summary

	S1-1	S1-2	S1-3	mean
DWD	10.9	25.0	46.9	27.6
Duff and litter	15.5	11.7	19.2	15.5
Ladder fuels	3.9	2.8	1.1	2.6
Total ton/ac	30.3	39.5	67.3	45.7

Compared to other sites in New Mexico,

The DWD is about three times what we usually find,
Duff and Litter are about nine times what we usually find,
And Ladder fuels are about average.

All tree species

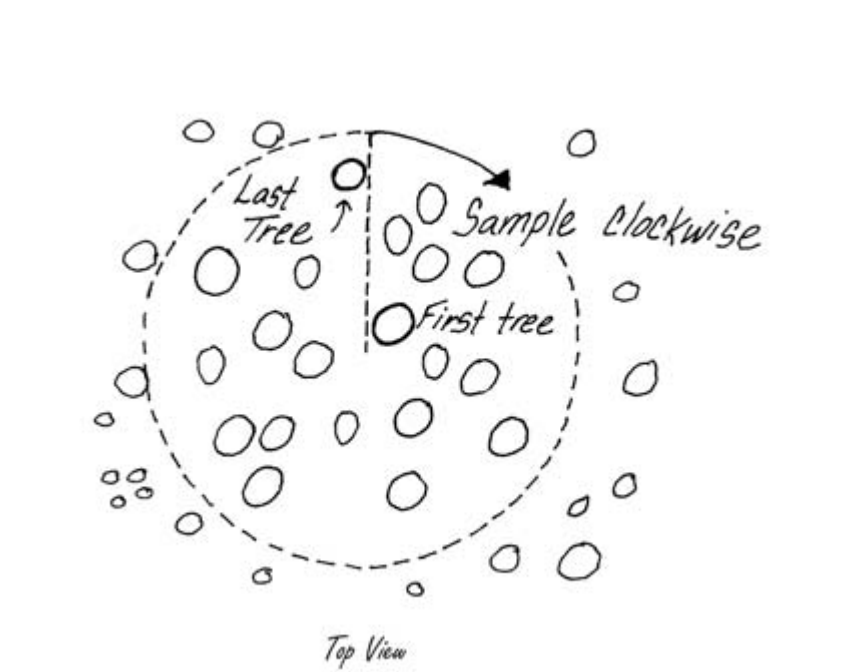
	S1-1	S1-2	S1-3	all
tpa	484	420	656	520
Avg DBH	9.5	9.4	7.8	8.9
Crown base ht	18	16	12	15
Basal Area	238	201	218	219

Each plot had scores of additional trees less than 4.5 feet tall.

All tree species – BA summary

	S1-1	S1-2	S1-3	all
Ponderosa pine	57	69	61	62
White fir	107	55	70	77
Douglas-fir	35	69	50	51
Limber pine	37	0.4	11	16
Aspen	2	0	12	5
Engelmn spruce	0	0	14	5
Maple	0	8	0	3
Total	238	201	218	219

Paired photos



from FIREMON manual

S1-1, from 66’ N to plot center

1, from plot center to E

1, from plot center to S

1, from plot center to W

1, from plot center to N

^

^

The big White Fir to the right of the tape was already a snag pre-burn.

S1-2 , from plot center to E

Note little resprouting of maple, and grass patch in rear center is bare rock post-fire.

2, from plot center to W

Note surviving grass at rear of photo

2, from plot center to N

S1-3 from 66’ N to plot center

^ These are the same ponderosa pine; ^
later, we will see it from plot center

Plot 3 palimpsest

	tpa	Avg DBH	BA
Ponderosa pine	24	21.6	61
Aspen	12	13.7	12
White fir	252	7.1	70
Douglas-fir	244	6.2	50
Engelmann spruce	76	5.7	14
Limber pine	48	6.4	11

At some point, either this was a ponderosa pine stand invaded by aspen; or, the ponderosa established themselves in a much older aspen stand, which then was out-competed by shade-tolerant conifers.

S1-3 , from plot center to E

^ Note pre-fire Aspen snag

^ and post-fire stump hole

S1-3, from plot center to S

Note larger log rolled to touch tree base just left of photo center

S1-3, from plot center to W

Note no post-fire aspen sprouts,
even though this was the quadrant with most pre-fire aspen.

S1-3, from plot center to N

The first tree measured on this plot was the ponderosa pine just uphill of the central figures. It was 29.5 inch dbh, 76 ft tall, and height to crown base was 52 ft. The white fir uphill of that was the third tree measured - 14.8 inch dbh, 48 ft tall, height to crown base of 20 ft – and completely inside the drip line of the pine. A note on the field sheets says “ladder fuel for #1 PIPO”. They are both dead post-fire (next slide).

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S1-3 W

The base of the tree on the next slide is here ^

14.2 inch dbh, average for Aspen for this plot

It says “AD 1911 Abundio Gurule”

"Abundio Gurule" aspen, post-fire

For more information, contact

rkreid@nmhu.edu

505-426-2145

www.nmfwri.org