



National Park Service Ozark Highlands Fire Ecology Annual Report Calendar Year 2015

By Dan Drees, Fire Ecologist

A. Summary

A1. Staffing summary -

In FY15 I had a crew of 2 extremely hard-working seasonal GS-5 Fire Effects Monitors for a total of 14 pay periods. On 2/9/15 when I made my hiring selections I was authorized to hire for a total of 18 pay periods, but one crew member left early due to receiving a permanent job. Ozark National Scenic Riverways (ONSR) continues to experience a severe housing shortage. Consequently, no grants for botany interns were pursued in 2015.

A2. 2014 ONSR data analysis summary – Ecologically, glade restoration is the highest goal of prescribed fire management at ONSR because some glade species can only survive in healthy glade habitat. Increasing native herbaceous plant species richness is currently our best measurement for determining if we are achieving our primary glade restoration goal. **The latest ONSR glade data shows a 73.3% increase in native herbaceous plant species richness, a resounding success.**

The second highest goal of prescribed fire management at ONSR is increasing native herbaceous plant species richness in the dry woodland habitat. The latest ONSR dry woodland data shows a 90% increase in native herbaceous plant species richness, another amazing success.

The third highest goal of prescribed fire management at ONSR is increasing native herbaceous plant species richness in the dry-mesic woodland habitat. The latest ONSR dry-mesic woodland data shows a 70.8% increase in native herbaceous plant species richness, another great success.

A3. 2015 Buffalo National River (BUFF) data analysis summary –Although several prescribed burns were completed on NPS lands in Arkansas in 2015, only 1 FMH fire effects monitoring plot was due for data collection and it was at BUFF. Consequently, the extensive data analysis from Arkansas NPS lands included in the 2013 Ozark Highlands Annual Report remains relevant. See additional discussion of 2015 fire effects monitoring at BUFF beginning on page 11 of this report.

Table 1. Fire Effects Plot Workload (2015) and Total Plots Installed

Park	Monitoring Unit	Plot Type (FMH plot, fuels, rare plant, photo point, CBI, etc.)	Pre-burn 2015	Immed. Post 2015	Postburn (1-20 yrs) 2015	Annual Total (2015)	Total Plots by type not just 2015
Ozark NSR	Glade/Woodland Transition (SCSC)	FMH forest plot	2	6	8	16	27
Ozark NSR	Dry Mesic Woodland Oak/Hickory (QUAL)	FMH forest plot	0	2	2	4	14
Ozark NSR	Dry Woodland Oak/Hickory/Pine (QUVE)	FMH forest plot	0	5	5	10	21
Ozark NSR	Various (Brown's lines)	Fuels	0	0	0	0	58
Ozark NSR	Various	CBI	0	0	0	0	67
Ozark NSR	Tall larkspur*	Rare species count/photo points	0	0	8 + 1 control	9	9
Ozark NSR	Riddell's goldenrod*	Rare species count/photo points	0	0	0	0	2
Ozark NSR	Cedar removal	Photo point	0	0	0	0	3
Ozark NSR	Deer exclosure & open deer control	Species richness	0	0	0	0	6
Buffalo NR	Glade/Woodland Transition (SCSC)	FMH Forest plot	0	1, on 11/3/15	0	1	10
Buffalo NR	Dry Woodland Oak/Hickory/Pine (QUVE)	FMH Forest plot	0	1, on 11/3/15	1	2	17
Buffalo NR	Dry Woodland Oak/Hickory/Pine	Modified Forest plot (no herbaceous)	0	0	0	0	16
Buffalo NR	Various (Brown's lines)	Fuels	0	0	0	0	7
Buffalo NR	Bush's poppy mallow*	Rare species count/photo points	0	0	2	2	2
Hot Springs NP	Dry Woodland Pine-oak (HOSP)	FMH Forest plot	0	0	0	0	7
Hot Springs NP	Dry Woodland Pine-oak (HOSP)	Modified Forest plot	0	0	0	0	8
Hot Springs NP	Ouachita blazing star*	Rare species count/photo points	0	0	0	0	3
Pea Ridge NMP	Oak Hickory forest/Woodland (OAH)	FMH Forest plot	0	0	0	0	6
Pea Ridge NMP	Post Oak – Black Jack Oak Woodland (QUMA)	FMH Forest plot	0	2, on 11/4/15	0	2	6
Total	* Pilot sampling plots		2	17	27	46	290

Table 2. Fire Ecology Staffing 2015

Ecologist and Monitors	Starting Date	Ending Date	# of Pay Periods	READ Qualified (Yes or No)	Training and Development completed in 2015
Dan Drees Fire Ecologist	1/1/15	12/31/15	26	Yes	Intro to Park Program Mgmt., Ozark Botany, Red-carded, Fire Safety refresher, USERRA, FISSA, Discrimination & Whistleblowing in the Workplace (No FEAR Act), VET-FHM, Approving Official and Purchase Cardholder mandatory charge card trainings, mandatory 10 hours of annual EEO training, MSP & PPP Training for NPS Supervisors,
Lead Monitor	Vacant				
Asst. Lead Monitor	Vacant				
Tesa Madsen-McQueen, monitor	5/18/15	9/17/15	9	No	S- 130/190, Ozark Botany, USERRA, FISSA, Travel Card User
Lyndsey Downing, monitor	5/18/15	7/23/15	5	No	Ozark Botany, USERRA, FISSA, Travel Card User
GS-5 FEMO	Vacant				
GS-5 FEMO	Vacant				

Table 3a. 2015 Management Objectives and Monitoring Results for ONSR glade, dry woodland, and dry-mesic woodland plots.

Monitoring Unit	Management Objective (Restoration)	Monitoring Results <i>Results in italic show data in relation to the written objectives of the original Fire Monitoring Plan.</i> Results in bold show data in relation to the latest data.	Original written Fire Monitoring Plan objective achieved?	Year Last Analysis Completed (Range of data years included in analysis)
ONSR, Glade/Transition	Reduce the density of pole trees (2.5-15 cm dbh) by at least 40% within two growing seasons after 2 nd burn ; (80% C.I.)	<i>Total pole tree reduction = 29.1% decrease (n=21 plots, 2 fires)</i> Total pole tree reduction = 45.8% decrease (n=21 plots, 2 to 5 fires)	No, but analysis of latest data shows success.	2015 (1999-2015)
	Increase the average number of native species (per quadrat) in the herbaceous layer by at least 40% within two growing seasons after the second burn (90% C.I.)	<i>Total increase in avg. # of native herbaceous species (per quadrat) = 41.8% (n=21 plots, 2 fires)</i> Total increase in avg. # of native herbaceous species (per quadrat) = 73.3% (n=21 plots, 2 to 5 fires)	Yes	2015 (1999-2015)

Monitoring Unit	Management Objective (Restoration)	Monitoring Results <i>Results in italic show data in relation to the written objectives of the original Fire Monitoring Plan.</i> Results in bold show data in relation to the latest data.	Original written Fire Monitoring Plan objective achieved?	Year Last Analysis Completed (Range of data years included in analysis)
ONSR, Dry Woodland (Oak/Hickory/Pine)	Reduce the density of pole trees (2.5-15 cm dbh) by at least 30% within two growing seasons after 2 nd burn; (80% C.I.)	<i>Total pole tree reduction = 53.3% (n=19 plots, 2 fires)</i> Total pole tree reduction = 62.8% decrease (n=19 plots, 2 to 5 fires)	Yes	2015 (1999-2015)
	Increase the average number of native species (per quadrat) in the herbaceous layer by at least 40% within two growing seasons after the second burn (90% C.I.)	<i>Total increase in avg. # of native herbaceous species (per quadrat) = 57.7% (n=19 plots, 2 fires)</i> Total increase in avg. # of native herbaceous species (per quadrat) = 90% (n=19 plots, 2 to 5 fires)	Yes	2015 (1999-2015)
ONSR, Dry-Mesic Woodland (Oak/Hickory/Pine)	Reduce the density of pole trees (2.5-15 cm dbh) by at least 30% within two growing seasons after 2 nd burn; (80% C.I.)	<i>Total pole tree reduction = 57% Decrease (n=14 plots, 2 fires)</i> Total pole tree reduction = 72.9% decrease (n=14 plots, 2 to 5 fires)	Yes	2015 (1999-2015)
	Increase the average number of native species (per quadrat) in the herbaceous layer by at least 20% within two growing seasons after the second burn (90% C.I.)	<i>Total increase in avg. # of native herbaceous species (per quadrat) = 47.4% (n=14 plots, 2 fires)</i> Total increase in avg. # of native herbaceous species (per quadrat) = 70.8% (n=14 plots, 2 to 5 fires)	Yes	2015 (1999-2015)

A4. ONSR data analysis interpretation

ONSR is meeting goals to reduce pole trees in dry woodlands and moist woodlands. Most importantly, ONSR is also meeting goals to increase native herbaceous plant species richness in glades, dry woodlands and moist woodlands.

On many glades, eastern red cedars were too dense and big to kill with fire alone. Consequently, mechanical removal of cedars was initiated. Mechanical cedar removal and/or 3rd, 4th, or 5th burns have subsequently accomplished the initial pole-sized tree reduction goals on glades. Based on the latest data, pole-sized trees in 21 glade plots have been reduced on average by 45.8%.

More importantly, the latest data shows a 73.3% increase in native herbaceous plant species richness. This measurement of ONSR fire management success is presently the best data that ONSR staff collects for analyzing whether ONSR glades are losing or recovering their indigenous biodiversity. For some of this biodiversity, healthy glade natural communities are their only habitat, or their best habitat.

The following tables (3b, 3c, and 3d) show fire effects results on a plot-by-plot basis at ONSR in relationship to management goals.

Table 3b. 2015 ONSR glade mgmt. objectives & monitoring results from individual plots.

ONSR Plot Type & #	Burn Unit	Dates of 1 st & 2 nd burns	% reduction of pole-size trees per hectare, 2nd yr after 2nd burn	% increase in avg # of native herbaceous species per 1 meter quadrat 2nd yr after 2 nd burn	Dates of 3 rd , 4 th , or 5 th Burn	% increase in avg # of native herbaceous species per 1 meter quadrat based on latest data
Glade 1	Brandewiede	3/?/2000 & 3/?/2003	goal is at least -40% from 920 to 1080 = up 17%	goal is at least +40% from 4.4 to 14.2 = up 223%	3/27/2009 4/5/2013	goal is at least +40% from 4.4 to 18.4 = up 318%
Glade 2	Brandewiede	3/?/2000 & 3/?/2003	from 1960 to 1000 = -40%	from 2 to 11.2 = up 460%	3/27/2009 4/5/2013	from 2 to 10.8 = up 440%
Glade 3	Little Booming Shoal	3/?/2000 & 3/?/2004	from 1880 to 1200 = -36%	from 2 to 5.6 = up 180%	plot did not burn in 07, but did 3/5/2010, 4/9/2014	from 2 to 9.4 = up 370%
Glade 4	Booming Shoal II	?/?/2001 & 3/?/2004	from 160 to 160 = no change	from 9.4 to 8.8 = -6%	plot did not burn in 07, but did 3/5/2010 4/9/2014	from 9.4 to 14.0 = up 49%
Glade 5	Booming Shoal II	?/?/2001 & 3/?/2004	from 1360 to 720 = -47%	from 9.2 to 10.6 = up 15%	3/24/2007 3/5/2010 4/9/2014	from 9.2 to 15.0 = up 63%
Glade 6	Booming Shoal II	?/?/2001 & 3/?/2004	from 600 to 560 = -7%	from 15.8 to 13.6 = down 14%	plot did not burn in 07, but did 3/5/2010 4/9/2014	from 15.8 to 21.6 = up 37%
Glade 7	West Thorny	3/?/2001 & 3/?/2003	from 1920 to 680 = -65%	from 7.8 to 10.4 = up 33%	plot did not burn in 09, but did 4/3/2013	from 7.8 to 10.2 = up 31%
Glade 8	Quarry	3/?/2001 & 3/?/2005	from 640 to 440 = -31%	from 7.4 to 9.6 = up 30%	plot did not burn in 09,	from 7.4 to 8.4 = up 14%
Glade 9	Russell Mt.	?/?/2003 & 3/29/2006	from 2600 to 2040 = -22%	from 6.2 to 10 = up 61%	3/23/2010 4/5/2013	from 6.2 to 12.4 = up 100%
Glade 10	Lower Thorny	3/?/2002 & 4/3/2013	From 2160 to 360 = -83%	from 6.4 to 15.8 = up 147%		from 6.4 to 15.8 = up 147%
Glade 11	Chilton Creek	3/?/2003 & 4/4/2006	from 1360 to 160 = -88%	from 6.4 to 5.8 = down 9%	3/18/2010	from 6.4 to 10.8 = up 69%
Glade 12	Chilton Creek	3/?/2003 & 4/4/2006	from 1640 to 360 = -78%	from 6.8 to 9.4 = up 38%	3/18/2010	from 6.8 to 10.6 = up 56%
Glade 13	Russell Mt.	?/?/2003 & 3/29/2006	from 1800 to 800 = -56%	from 3.6 to 5.8 = up 61%	3/23/2010 4/5/2013	from 3.6 to 10.2 = up 183%
Glade 14	Russell Mt.	?/?/2003 & 3/29/2006	from 2960 to 2400 = -19%	from 6.2 to 9.0 = up 45%	3/23/2010 4/5/2013	from 6.2 to 9.0 = up 45%
Glade 15	Beaver Pond	3/?/2004, plot did not burn in 07, but did 3/19/2010	from 1840 to 1560 = -15%	from 12.2 to 11.2 = down 8%		from 12.2 to 11.2 = down 8%
Glade 16	Vance/Barnett Mts.	3/24/2011 & 3/22/2014	from 800 to 640 = -20%	from 4 to 7.8 = up 95%		from 4 to 7.8 = up 95%
Glade 17	Mill/Buzzard Mts.	3/?/2004 & 3/24/2010	from 2600 to 2160 = -17%	from 8 to 9.4 = up 17%	4/13/2013	from 8 to 10.8 = up 35%
Glade 18	Mill/Buzzard Mts.	3/?/2004 & 3/24/2010	from 1200 to 680 = -43%	from 6.4 to 7.0 = up 9%	4/13/2013	from 6.4 to 11.0 = up 72%
Glade 19	Peavine	3/10/2009, 3/21/2012	from 600 to 480 = -20%	from 12.8 to 20.2 = up 58%		from 12.8 to 20.2 = up 58%
Glade 20	Peavine	3/10/2009, 3/21/2012	from 360 to 280 = -22%	from 8.8 to 9.0 = up 2%		from 8.8 to 9.0 = up 2%

ONSR Plot Type & #	Burn Unit	Dates of 1 st & 2 nd burns	% reduction of pole-size trees per hectare, 2nd yr after 2nd burn	% increase in avg # of native herbaceous species per 1 meter quadrat 2nd yr after 2 nd burn		Dates of 3 rd , 4 th , or 5 th Burn	% increase in avg # of native herbaceous species per 1 meter quadrat based on latest data
Glade 21	Alley	3/13/2012 only	NA	NA			
Glade 22	Alley	3/13/2012 only	NA	NA			
Glade 23	Vance/Barnett Mts.	3/24/2011 3/22/2014	from 1320 to 1040 = -21%	from 4.2 to 8.6 = up 105%			from 4.2 to 8.6 = up 105%
This row sums glade recovery goals and avg. results	GOAL - Reduce the density of pole trees (2.5-15 cm dbh) by at least 40% within two growing seasons after 2 nd burn with a 80% confidence interval (C.I.)		RESULTS - Total pole tree reduction = 29% Decrease (N=21 plots with 2 fires)	GOAL - Increase the average number of native species (per quadrat) in herbaceous layer by at least 40% within 2nd growing season after 2nd burn	RESULTS - Total increase in average number of native species (per quadrat) in the herbaceous layer = 41.8% (N=21 plots with 2 fires, 90% C.I.)		RESULTS - Total increase in average number of native species (per quadrat) in the herbaceous layer based on latest data = 73.3% (N=21 plots with 2 or more fires, 90% C.I.)

Table 3c. 2015 ONSR dry woodland mgmt. objectives & results from individual plots.

ONSR Plot Type & #	Burn Unit	Dates of 1 st & 2 nd burns	% reduction of pole-size trees per hectare, 2nd yr after 2nd burn	% increase in avg # of native herbaceous species per 1 meter quadrat 2 nd yr after 2 nd burn		Dates of 3 rd , 4 th , or 5 th Burn	% increase in avg # of native herbaceous species per 1 meter quadrat based on latest data		
Dry woodland 1	Campbell Pt.	3/14/2000 2/20/2004	goal is at least -30% from 1320 to 600 = -55%	goal is at least +40% from 3.1 to 2.7 = -13%		3/26/2007 3/19/2010	goal is at least +40% from 3.1 to 3.3 = up 6%		
Dry woodland 2	Campbell Pt.	3/14/2000 2/20/2004	from 1520 to 400 = -74%	from 2.3 to 3.9 = up 70%		3/26/2007 3/19/2010	from 2.3 to 4 = up 74%		
Dry woodland 3	Little Booming Shoal	3/?/2000 3/?/2004	from 1080 to 160 = -85%	from 0.2 to 2.9 = up 1350%		3/24/2007 3/5/2010 4/9/2014	from 0.2 to 7.7 = up 3,750%		
Dry woodland 4	Campbell Pt.	3/14/2000 2/20/2004	from 1840 to 1320 = -28%	from 5.1 to 5.6 = up 10%		3/26/2007 3/19/2010	from 5.1 to 6.7 = up 31%		
Dry woodland 5	West Thorny	3/?/2000 3/?/2003	from 1080 to 680 = -37%	from 2.9 to 3.9 = up 34%		3/27/2009 4/3/2013	from 2.9 to 4.2 = up 45%		
Dry woodland 6	Booming Shoal II	?/?/2001 3/?/2004	from 800 to 120 = -85%	from 1.2 to 2.7 = up 125%		3/24/2007 3/5/2010 4/9/2014	from 1.2 to 6.3 = up 425%		
Dry woodland 7	Booming Shoal II	?/?/2001 3/?/2004	from 1200 to 440 = -63%	from 1.5 to 4.7 = up 213%		3/24/2007 3/5/2010 4/9/2014	from 1.5 to 8.5 = up 467%		
Dry woodland 8	Quarry	3/?/2001 3/?/2005	from 800 to 360 = -55%	from 0.9 to 0.9 = no change		3/12/2009	from 0.9 to 1.1 = up 22%		
Dry woodland 9	Chilton Creek	3/?/2003 4/4/2006	from 760 to 600 = -21%	from 1.8 to 2.1 = up 17%		3/18/2010	from 1.8 to 2.9 = up 61%		
Dry woodland 10	Chilton Creek	?/?/2003 4/4/2006	from 720 to 440 = -39%	from 3 to 2.8 = -7%		3/18/2010	from 3 to 5.5 = up 83%		
Dry woodland 11	Russell Mt.	?/?/2003 3/29/2006	from 1160 to 160 = -86%	from 0.6 to 0.6 = no change		3/23/2010 4/3/2013	from 0.6 to 3.1 = 417%		
Dry woodland 12	Beaver Pond	?/?/2004 3/27/2007	from 1200 to 360 = -70%	from 3.2 to 5.1 = up 59%		3/19/2010	from 3.2 to 6.8 = up 112%		
Dry woodland 13	South Chilton	4/4/2006 3/18/2010	from 440 to 0 = -100%	from 0.3 to 1.3 = up 333%			from 0.3 to 1.3 = up 333%		
Dry woodland 14	South Chilton	4/4/2006 3/18/2010	from 920 to 560 = -39%	from 2.9 to 4 = up 38%			from 2.9 to 4 = up 38%		
Dry woodland 15	Angel Ridge	3/22/2007 3/12/2011	from 840 to 640 = -67%	from 0.7 to 1.2 = up 71 %			from 0.7 to 1.2 = up 71 %		
Dry woodland 16	Angel Ridge	3/22/2007 3/12/2011	from 920 to 560 = -94%	from 1.2 to 8.3 = up 592%			from 1.2 to 8.3 = up 592%		
Dry woodland 17	Peavine	3/10/2009 3/21/2012	from 120 to 40 = -67%	from 1.4 to 2.0 = up 43%			from 1.4 to 2.0 = up 43%		
Dry woodland 18	Peavine	3/10/2009 3/21/2012	from 240 to 160 = -33%	from 1.5 to 2.1 = up 40 %			from 1.5 to 2.1 = up 40 %		
Dry woodland 19	Peavine	3/10/2009 3/21/2012	from 920 to 800 = -13%	from 7.5 to 7.7 = up 3%			from 7.5 to 7.7 = up 3%		
This row sums the dry woodland recovery goals and avg. results		GOAL - Reduce the density of pole trees (2.5-15 cm dbh) by at least 40% within two growing seasons after 2nd burn with a 80% confidence interval (C.I.)		RESULTS - Total pole tree reduction = 53% Decrease (N=19 plots with 2 fires, 80% C.I.)		GOAL - Increase the average number of native species (per quadrat) in herbaceous layer by at least 40% within 2nd growing season after 2nd burn		RESULTS - Total increase in average number of native species (per quadrat) in the herbaceous layer based on latest data = 90% (N=19 plots with 2 or more fires, 90% C.I.)	

Table 3d. 2015 ONSR dry-mesic woodland mgmt. objectives & monitoring results from individual plots.

ONSR plot type & #	Burn Unit	Dates of 1 st & 2 nd burns	% reduction of pole-size trees per hectare, 2nd yr after 2nd burn	% increase in avg # of native herbaceous species per 1 meter quadrat 2nd yr after 2 nd burn	Dates of 3 rd , 4 th , or 5 th Burn	% increase in avg # of native herbaceous species per 1 meter quadrat based on latest data
Moist woodland 1	Little Booming Shoal	3/?/2000 & 3/?/2004	goal is at least -30% from 1160 to 200 = -83%	goal is at least +20% from 2.6 to 3.9 = up 50%	3/24/2007 3/5/2010 4/9/2014	goal is at least +20% from 2.6 to 4 = up 54%
Moist woodland 2	Brandewiede	3/?/2000 & 3/?/2003	from 1560 to 1120 = -28%	from 8.4 to 8.4 = 0%	3/27/2009 4/3/2013	from 8.4 to 10.8 = 29%
Moist woodland 3	Lower Thorny	3/?/2002 & 4/3/2013	From 1760 to 80 = -95%	from 5.7 to 13.3 = up 133%		from 5.7 to 13.3 = up 133%
Moist woodland 4	West Thorny	3/?/2001 & 3/?/2003	from 1680 to 840 = -50%	from 2.8 to 4.6 = up 64%	3/27/2009 4/3/2013	from 2.8 to 4.6 = up 64%
Moist woodland 5	West Thorny	3/?/2001 & 3/?/2003	from 2720 to 920 = -66%	from 4.4 to 11.9 = up 170%	3/27/2009 4/3/2013	from 4.4 to 13 = up 195%
Moist woodland 6	Booming Shoal II	?/?/2001 & 3/?/2004	from 1560 to 1120 = -28%	from 1.3 to 1.6 = up 23%	3/24/2007 3/5/2010 4/9/2014	from 1.3 to 2.2 = up 69%
Moist woodland 7	Chilton Creek	3/?/2003 & 4/4/2006	from 1000 to 680 = -32%	from 2.2 to 2.8 = up 27%	3/18/2010	from 2.2 to 3.5 = up 59%
Moist woodland 8	Chilton Creek	3/?/2003 & 4/4/2006	from 920 to 400 = -57%	from 3.8 to 4.1 = up 8%	3/18/2010	from 3.8 to 4.2 = up 11%
Moist woodland 9	Russell Mt.	?/?/2003 & 3/29/2006	from 1080 to 120 = -89%	from 1.5 to 1.6 = up 7%	3/23/2010 4/3/2013	from 1.5 to 3.3 = up 120%
Moist woodland 10	Russell Mt.	?/?/2003 & 3/29/2006	from 1400 to 480 = -66%	from 4.3 to 5.8 = up 35%	3/23/2010 4/3/2013	from 4.3 to 8.6 = up 100%
Moist woodland 11	South Chilton	4/4/2006 & 3/18/2010	from 1160 to 280 = -76%	from 1.9 to 3.1 = up 63%		from 1.9 to 3.1 = up 63%
Moist woodland 12	South Chilton	4/4/2006 & 3/18/2010	from 960 to 360 = -62%	from 5.0 to 6.5 = up 30%		from 5.0 to 6.5 = up 30%
Moist woodland 13	Angel Ridge	3/22/2007 & 3/12/2011	from 1320 to 40 = -97%	from 3.0 to 8.4 = up 180%		from 3.0 to 8.4 = up 180%
Moist woodland 14	Angel Ridge	3/22/2007 & 3/12/2011	from 560 to 280 = -50%	from 3.4 to 5.6 = up 65%		from 3.4 to 5.6 = up 65%
This row sums the moist woodland recovery goals and avg. results		GOAL - Reduce the density of pole trees (2.5-15 cm dbh) by at least 30% within two growing seasons after 2nd burn with a 80% confidence interval (C.I.)	RESULTS - Total pole tree reduction = 57% Decrease (N=14 plots with 2 fires)	GOAL -Increase the average number of native species (per quadrat) in herbaceous layer by at least 20% within 2nd growing season after 2nd burn	RESULTS - Total increase in average number of native species (per quadrat) in the herbaceous layer = 47.4% (N=14 plots with 2 fires, 80% C.I.)	RESULTS - Total increase in average number of native species (per quadrat) in the herbaceous layer based on latest data = 70.8% (N=14 plots with 2 or more fires, 80% C.I.)

A5. Based on 2015 ONSR native herbaceous plant species richness data:

1. **In the glades**, we are 90% certain there is a **41.8% increase in species richness by the second growing season after the second application of prescribed fire** based on data from 21 plots.
2. **In the glades**, we are 90% certain there is a **73.3% increase in species richness based on the latest data from 21 plots having 2 or more prescribed fires.**
3. **In the dry woodlands**, we are 90% certain there is a **57.7% increase in species richness by the second growing season after the second application of prescribed fire** based on data from 19 plots.
4. **In the dry woodlands**, we are 90% certain there is a **90% increase in species richness based on the latest data from 19 plots having 2 or more prescribed fires.**
5. **In the moist woodlands**, we are 80% certain there is a **47.4% increase in species richness by the second growing season after the second application of prescribed fire** based on data from 14 plots.
6. **In the moist woodlands**, we are 80% certain there is a **70.8% increase in species richness based on the latest data from 14 plots having 2 or more prescribed fires.**

A6. Based on the latest ONSR live pole-sized tree data as of 2015:

1. **In the glades** we are 80% certain there is a **45.8% decrease in the number of pole-sized trees per hectare based on the latest data from 21 plots having 2 or more prescribed fires.**
2. **In the dry woodlands** we are 80% certain there is a **62.8% decrease in the number of pole-sized trees per hectare based on the latest data from 19 plots having 2 or more prescribed fires.**
3. **In the moist woodlands** we are 80% certain there is a **70.8% decrease in the number of pole-sized trees per hectare based on the latest data from 14 plots having 2 or more prescribed fires.**

A7. Summary of 2015 ONSR Riddell's goldenrod data: No data from the Riddell's goldenrod plots was collected in 2015 because of my wildfire deployment to WA.

A7. Summary of 2015 ONSR tall larkspur monitoring data. (The following information is extracted from the 28-page 2015 ONSR Tall Larkspur Annual Status Report)

Tall larkspur is a nationally rare wildflower primarily distributed through the central Appalachian Highlands. The disjunct Ozark population is 400 miles west of the closest populations in Ohio or Tennessee. I estimate that over 90% of the Ozark population grows within the designated boundary of the Ozark National Scenic Riverways (ONSR), a unit of the National Park Service.

ONSR personnel began collecting demographic data of local populations from permanent plots in 2010 to determine the best management practices for tall larkspur conservation on the Ozark landscape. During the summer of 2015, data were collected from 9 permanent monitoring plots at ONSR and compared to initial population data. This year's highlights include:

1. Overall, the 8 tall larkspur monitoring plots receiving fire management have increased by 248% from the initial populations, (from 1,181 to 4,113 = +248%). By contrast, the one plot in an unmanaged tall larkspur population decreased by 66% since 2011 (from 138 to 47 = -66%).
2. Although the overall tall larkspur population increased again in 2015 (due to big increases at plots 6, 7, and 9), 4 of the 5 plots in the Pistol Barrel prescribed burn unit are below their initial population levels.
3. The tall larkspur populations in the Pistol Barrel Rx unit remain perplexing. Three of the five plots had population increases over last year and two plots had declines.
4. A big increase in deer herbivory in 2014 in the Pistol Barrel prescribed burn unit was reported as a supplement to last year's tall larkspur report. This year deer herbivory on the tall larkspur at Pistol Barrel was back to normal. However, in 2015 we saw an enormous increase in deer herbivory at the Devils Well plot where cedars had been cut and burned near the plot five months earlier.

2015 data results.

Table A7a. Stem counts for tall larkspur by plot, 2010-2015. DEEX5 plot was abandoned as an insufficient unmanaged "control" plot. See Figures A1 – A10 on pages 21 -26 for annual life stage counts by plot.

Year	DEEX1	DEEX2	DEEX3	DEEX4	DEEX5	DEEX6	DEEX7	DEEX8	DEEX9	DEEX10	Total
2010	167	203	118	177	13	N/A	N/A	N/A	N/A	N/A	
2011	135	314	128	187	N/A	94	129	109	184	138	1418
2012	89	189	67	136	N/A	79	197	74	200	50	1081
2013	78	185	100	173	N/A	93	243	147	363	104	1486
2014	78	184	104	164	N/A	82	526	237	1257	79	2711
2015	119	155	116	145	N/A	276	658	198	2446	47	4160

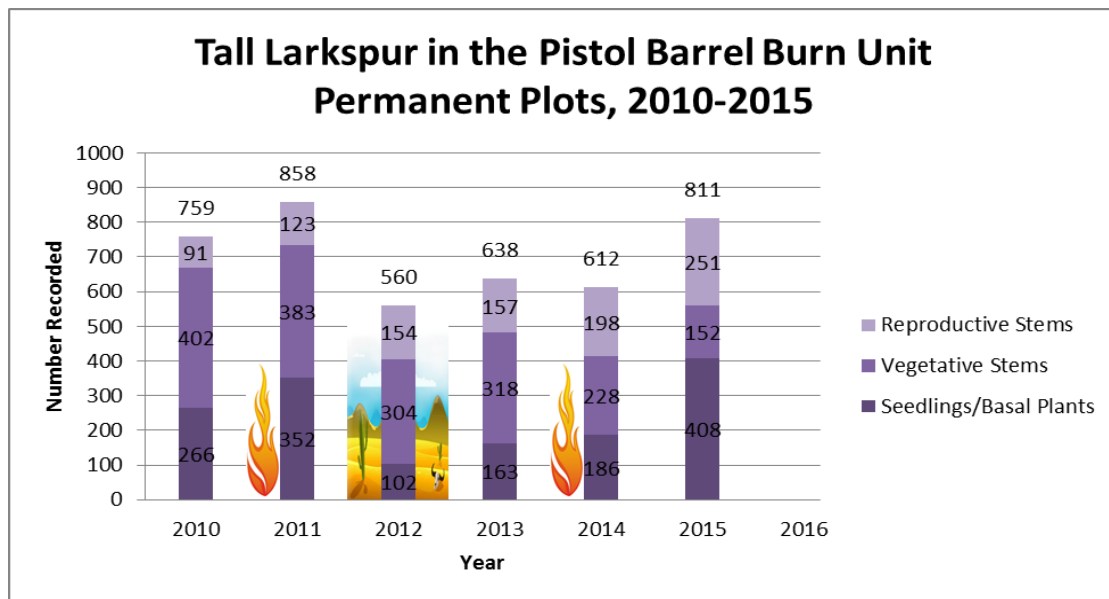
Table A7b. Names of DEEX plots and population locations.

Permanent Plots Within Polygon	Population Location
DEEX 1-4	Pistol Barrel Burn Unit
DEEX 5	Alley Spring (abandoned control plot)
DEEX 6	Pistol Barrel Burn Unit
DEEX 7	Devils Well Burn Unit
DEEX 8, 9	Akers Ferry (Welch Lodge Burn Unit)
DEEX 10	Round Spring (active control plot)

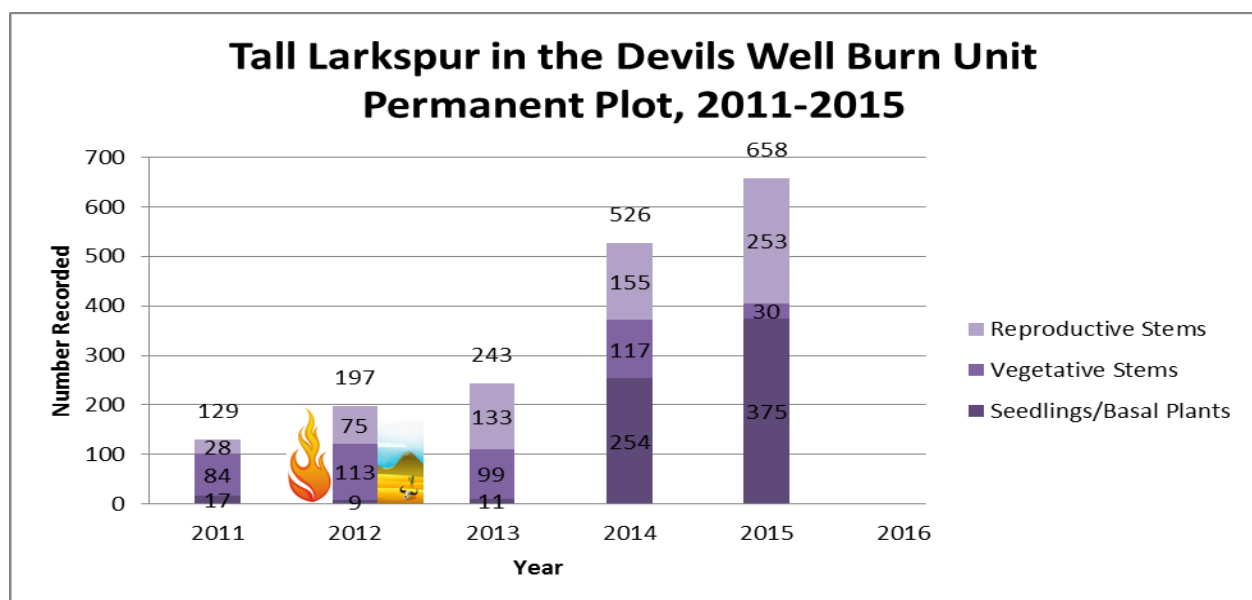
2015 population counts from the 5 plots in the **Pistol Barrel Rx Burn unit** indicate that 4 of the 5 tall larkspur plots have not maintained their initial population levels (see Table A7a above). However, for reasons I cannot hypothesize, the sub-population in plot 6 experienced a 194% population increase over its initial population inventory (from 94 in 2011 to 276 in 2015).

The big population increase in plot 6 makes the sum of the 2015 population in the following Pistol Barrel Burn Unit population chart exceed initial populations in 2010. However, the data interpretation is complicated by the fact that we did not know the Plot 6 sub-population

was in the Pistol Barrel Burn unit until 2011, when 94 plants were inventoried. Thus the 94 plants from the 2011 Plot 6 population were added to the 2010 inventory column to more accurately portray this burn units overall population changes.



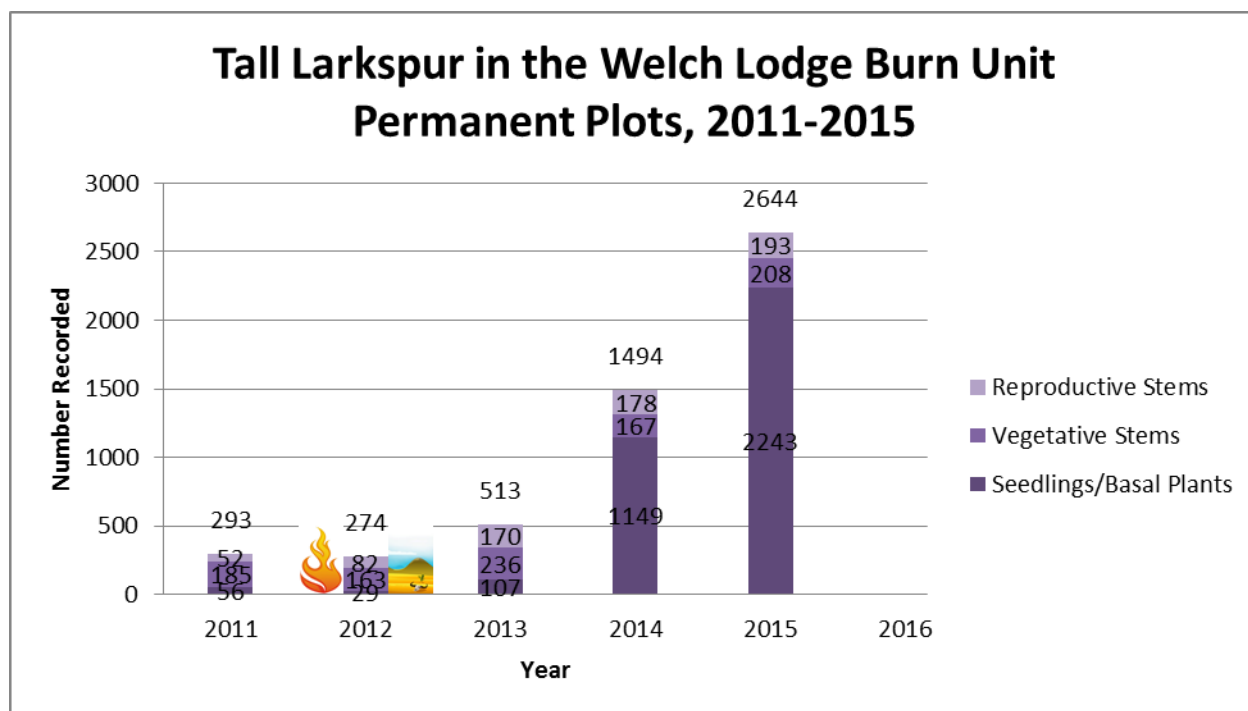
The tall larkspur population in the **Devils Well** prescribed burn unit has increased steadily following one prescribed burn. From the initial population observation, the Devils Well population has increased 410% (from 129 to 658 = +410%). This year's continued increase in the Devils Well tall larkspur population occurred predominantly because of an increase in the number of plants in the seedling and basal size-classes, see chart below.





2012 burn + winter 2015 removal & pile burn of cedar increased tall larkspur by 410% from 2011 to 2015.





In the **Welch Lodge Rx burn unit**, tall larkspur populations have increased 802% (from 293 to 2,644 = +802%). An enormous increase in the number of seedlings in plot 9 accounted for the majority of this increase. No clear explanation for this dramatic population increase is discernable at this time.

A8a. Table 3j. 2014 Buffalo National River (BUFF) fire effects objectives and monitoring results

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (XX% confidence interval)	Objective Achieved?	Year Last Analysis Completed (Range of data years included in analysis)
BUFF, Glade/Transition	Reduce pole density (2.5 – 15 cm dbh) by 60% after 10 years of burning; (80% C.I.)	Total pole tree reduction = 20% decrease (n=8 plots, 2 fires)	No	2013 2001-2013
	Increase the average number of native species in the herbaceous layer by at least 40% within two growing seasons after the second burn; (90% C.I.)	No change in the average number of species (per quadrat) in the herbaceous layer. (n=8 plots, 2 fires)	No	2013 2001-2013
	Reduce new growth of eastern red cedar by 95% after three consecutive burns (90% C.I.)	Reduced new growth eastern red cedar by 100% (n=6 plots, 2 fires)	Yes	2013 2001-2013

BUFF, Dry Woodland	Reduce pole-sized tree density (2.5-15 cm dbh) by 60% after 10 years of burning; (80% C.I.)	64% Reduction (n=8 plots, 8 – 9 years after 1 st fire)	Yes	2013 2001-2013
	Reduce overstory-sized tree density to open vista with a target density of 74 trees/hectare after 20 years (80% C.I.)	295 tph = no reduction (n=8 plots, 8 – 9 years after 1 st fire)	NA, first burns with plots were in 2004, but reaching goal is unlikely.	2013 No 20 yr data 2001 - 2013
	Reduce live tree stems/acre by 60 % over 10 years of burning (90% C.I.)	52% Reduction (n=8 plots, 8 – 9 years after 1 st fire)	No, because no additional burns are planned before 10 years.	2013 2001 - 2013

BUFF data analysis interpretation

No glade plots were burned in the 2 years preceding the 2015 summer data collection season. The one woodland plot that burned in 2014 (Dry woodland plot #8, at Pruitt), had the native herbaceous species richness increase by 151% (from 4.1 preburn to 10.3 in 2015).

At BUFF, we collected data from both customized fire effects monitoring plots established to monitor changes in a population of the nationally-rare and fire-benefitted Bush's poppy mallow (*Callirhoe bushii*) in the North River Road Rx unit.

In 2015 we saw a 221% increase in the number of Bush's poppy mallow seedlings from 2014, (from 76 in 2014 to 244 in 2015), see data table on following page. Presumably, this was a consequence of both the 2014 prescribed burn and favorable environmental conditions. However, in comparison to data initially collected in 2012, the Bush's poppy mallow population is still struggling to produce reproductive-sized plants, presumably due to a combination of excessive shade and herbivory by deer or elk.

I recommend cutting 50% - 100% of the eastern red cedar trees in these plots that are less than 9 inches DBH during the dormant season, and pile burning them in the adjoining roadbed before green-up, in order to reinvigorate this population.

Table A8b.

Buffalo National River <i>Callirhoe bushii</i> (CABU4) data from North River Road prescribed burn unit.											
Year & CABU4 plot #	Healthy Seedlings	Stressed Seedlings	Stress code*	Healthy Vegetative Stems	Stressed Vegetative Stems	Stress code*	Healthy Reproductive Stems	Stressed Reproductive Stems	Stress code*	Total for plot	Total for year
2012 plot #1	11	0		1	0		4	18	DH=18	34	
No 2013 visit											
2014 plot #1	23	20	DH=19 IH=1	0	0		0	0		43	
2014 plot #2	10	23	DH=23	0	9	DH=9	0	2	DH=2	44	87
2015 plot #1	92	54	DH=29 H=18 BT=4 MD=3	0	9	DH=9	0	0		155	
2015 plot #2	78	20	DH=8 IH=12	2	11	DH=11	1	2	DH=2	114	269
* Stress codes are used when $\geq 10\%$ of a plants total leaf area is affected. DH = deer or elk herbivory, GH = groundhog herbivory, IH = invertebrate herbivory (snail, insect, etc.), PM = powdery mildew, BT = black tip (viral wilt, fungus, drought, or any other factor causing an unbrowsed stem to wither), HD = hail damage, MD = mechanical damage (falling tree limbs, walked on, etc.).											

A9. Table 3k. Pea Ridge National Battlefield (PERI) fire effects objectives and monitoring results

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (XX% confidence interval)	Objective Achieved?	Year Last Analysis Completed (Range of data years included in analysis)
PERI, Oak Hickory Forest/Woodland	Reduce mean density of pole-sized trees (2.5-15cm dbh) by 50-70% after four burns; (80% C.I.)	Reduced mean density of pole-sized trees (2.5-15cm dbh) by 23% after 1 to 2 burns. (n=5 plots, 1 burn = 3 plots, 2 burns = 2 plots)	NA, some units with 2 burns & some with 1	2013 No 4 burn data yet.
	Increase mean density of oak seedlings and/or resprouts by 300-500% after four burns. (80% C.I.)	Increased mean density of oak seedlings and/or resprouts by 2,360% after 1 to 2 burns. (n=5 plots, 1 burn = 3 plots, 2 burns = 2 plots)	Yes, assuming that these initial results are maintained after the 4 th burn.	2013 No 4 burn data yet.
PERI, Post oak-blackjack oak savannah/woodland	Reduce mean density of pole-sized trees (2.5-15cm dbh) by 50-70% after four burns; (80% C.I.)	Reduced mean density of pole-sized trees (2.5-15cm dbh) by 22% after 1 burn to 2 burns. (n=6 plots, 1 burn = 4 plots, 2 burns = 2 plots)	NA, some units with 2 burns & some with 1	2013 No 4 burn data yet.
	Increase mean percent cover of native herbaceous species by 60-100% after four burns (80% C.I.)	No change after 1 or 2 burns. (n=6 plots, 1 burn = 4 plots, 2 burns = 2 plots)	NA, some units with 2 burns & some with 1	2012 No 4 burn data yet.

PERI data analysis interpretation – No fire effects monitoring plots were burned at PERI in 2014 or the spring of 2015. However, 2 woodland plots were burned on 10/20/2015 and immediate post-burn fire effects monitoring data was collected. The remainder of the data collection will be completed in 2016.

B. Program Information

Table 4. Planning - 2015

Park	Does Park have written Desired Future Conditions?	Date Park-level Monitoring Plan completed (or revised)	Total # of Project- or Community-level Monitoring Plans (not just 2015)	Assisted with how many BAER plans in 2015?
Buffalo National River	no	Draft 2002	0	0
Hot Springs National Park	no	None	0	0
Ozark National Scenic Riverways	no	Completed 2000 Partially revised 2007	0	0
Pea Ridge National Military Park	no	Draft 2003	0	0

Table 5. Monitoring – 2015

Park	% 2015 Data Entered	% 2015 Data Quality Checked	# Prescribed Fires Monitored*	# Non-fire Fuels Treatments Monitored*	# Wildfires Monitored*	# BAER Treatments Monitored*
Buffalo National River	100%	100%	2	0	0	0
Hot Springs National Park	NA	NA	NA	0	0	0
Ozark National Scenic Riverways	100%	100%	7	0	0	0
Pea Ridge National Military Park	NA	NA	0	0	0	0

* Number of treatment units with treatment effects monitoring conducted. Include pre-burn and post-burn monitoring but not burn-day monitoring.

Table 6. Communicating Results - 2015

Park	# of Project Monitoring Reports completed in 2015	# of Annual meeting(s) with Park staff	# of Formal presentations of results	Do you use Minitab?*
Buffalo National River	1	0	0	
Hot Springs National Park	0	0	0	
Ozark National Scenic Riverways	2	1	0	Yes, BUFF & OZAR analyzed from 1 install on Drees laptop
Pea Ridge Military Park	0	0	0	

* This information will help to assess Minitab multi-user license needs.

Table 7. Research - 2015

Park	Are research needs identified in FMP or Monitoring Plan?	# of Proposals Submitted in 2015	# of Proposals Funded in 2015	# of Research Projects Supported in 2015*	Additional Comments
Buffalo National River	no	0	0	0	
Hot Springs National Park	no	0	0	0	
Ozark National Scenic Riverways	yes	1	0	0	park-requested tall larkspur project ;
Pea Ridge National Military Park	no	0	0	0	

*Number of funded research projects, new or ongoing, supported by the fire ecology program including logistical info or support, staffing, etc.

Reserve Fund Research: No fire-related reserve fund research in park group.

C. Fire ecologist accomplishments and areas of focus

This section deals with roles and functions of the ecologist. Identify accomplishments and/or focus areas along with a rough estimate of the amount of time spent in these areas.

Table 8. Fire Ecologist 2015 Accomplishments/Focus Areas

Category	% Time	Accomplishments and/or areas of activities
1. Planning	5%	- Made updated fire operations maps for all 5 of the 2015 prescribed burns at OZAR. Made maps (NEPA, Operations, & Vicinity) for 2 new proposed burn units. Calculated numerous acreage figures, coordinates, and other GIS-related elements to be incorporated into Rx burn plans and operations. - Met on-site at the proposed Pulltite Rx unit with the manager of state-owned lands to be included in the burn and helped develop strategies to minimize fire damage to merchantable timber. - Took the initiative to write a successful \$12,700 Youth Partnership Program (YPP) grant request to help fund a seasonal Fire Effects Monitor to work on the tall larkspur project in 2016. - Developed a spreadsheet and maps of all OZAR Rx units needing cedar slashing and the acreage totals of the needed slashing. - Continued scouting the Jerktail Mt. Rx unit and providing information that was needed to finish writing the Jerktail Mt. Rx plan. Continued updating maps until the project was completed. - Reviewed and provided a page of recommendations on the grant/project proposal to thin cedars on the Pruitt Glades Rx unit at BUFF. - Met with Shannon County Assessor to resolve discrepancies on the location of a 1-acre inholding in the Pulltite Rx unit. - Provided 3 of the 10 photos used in the NPS 2015-2019 Wildland Fire Strategic Plan. - Made a map of the 4 parks in the Ozark Highlands for use in the Resilient Landscapes grant request.
2. Presentations	4%	5 presentations of the Fire Ecology of the Current River Watershed for; a Pioneer Forest staff meeting, a group of botanists from the MO. Botanical Garden, a OZAR RM staff meeting, the OZAR fuels crew & OZAR fire effects crew. - Gave a 30-minute presentation on OZAR Fire Effects results at a meeting of the MWR & IMR fire ecologists at MWR HQ. - Gave a 20-minute webinar presentation on OZAR Fire Effects results for NPS national and regional fire ecologists. - Co-wrote Jerktail Mt. Fire Success Story for Rocky Mt. Elk Foundation article. - As requested by TNC, prepared handouts for & presented our monitoring findings during a tour of restored TNC woodlands for a group of 35 terrestrial resource managers.
3. NPS Meetings/task groups	4%	- Attended 3-day meeting of the MWR & IMR fire ecologists at MWR HQ. - Served on a committee looking into FEMO PD issues related to the live-fire monitoring Major Duties section of the PD. - Meetings and coordination with OZAR resource management on several issues. - Frequent meetings and coordination with OZAR fire staff on numerous issues. - Attended several supervisor's meetings at OZAR.
4. Interagency work	3%	- Attended several meetings with Pioneer Forest staff to advance and finally complete the 1,836-acre Jerktail Mt. Rx burn. Attended partners gathering at Pioneer Forest HQ and briefed Pioneer staff on status of Jerktail Mt. Rx project in advance of their grant meeting with the Wildlife Conservation Society. - Attended 2 meetings of the Current River Conservation Opportunity Area. - Served as liaison between TNC and ONSR to finally complete the Kelley inholding acquisition.

		- Hosted and co-led 5 days of botany training for 14 field botanists from NPS, MDC, and USFS. Collected and organized teaching specimen plants each evening for next day's botany training. - Reviewed proposal for MDC-funded fire research on bryophytes at MO Ozark Forest Ecosystem Project and TNC's Chilton Creek Rx units, and accepted invite to join project team. - Coordinated with TNC, MDC, LAD, USFS, and DNR to get updated ownership shapefiles and get them assembled into an updated map of the Current River watershed's conservation entities.
5.Wildfire assignments	8%	READ on Graves Mt wildfire in WA. (14 operational periods + 6 days travel)
6.Prescribed fire projects	7%	5 Rx fires at OZAR, 4 as FEMO & 1 as UTV operator on holding. 1 Rx fire at GWCA as UTV operator on holding. - Wrote and distributed the 21-page Jerktail Mt.t Rx Burn Report, the 13-page Stegall Mt.Rx Burn Report, and co-wrote the 12-page Denning Hollow Rx Burn Report.
7.Non-fire fuels projects	1%	- Made and distributed maps of the highest priority 2015 cedar slashing areas in 4 Rx units and provided these maps to Fire Staff detailed to OZAR. - Developed a spreadsheet and maps of all OZAR 2016 Rx units needing cedar slashing and the acreage totals of the needed slashing. - Cut/girdled cedars at 4 tall larkspur plots, glades in the Thorny Creek Rx unit, and a glade and a fen in the Denning Hollow Rx unit.
8.Research	2%	- Continued collecting, analyzing, and reporting on tall larkspur population monitoring at OZAR.
9.Data collection	24%	36 days in the field with plot reads.
10.Data entry & checking	2%	Entered the tall larkspur portion of the 2015 data. Filtered a few data sets previously unfiltered then tracked down data entry errors spanning the last 16 years & made corrections using the well-archived original data sheets.
11.Data analysis	17%	- Worked on 2015 data analysis for OZAR and BUFF. - Completed the 2015 tall larkspur data analysis, wrote the 28-page 2015 Tall Larkspur Annual Report, and widely distributed the report locally, regionally, and nationally. - Conducted analysis of 2015 data from our plots on Pioneer Forest land in the Jerktail, Welch Lodge, and Devils Well Rx units. Provided Pioneer with reports showing tremendous success that greatly exceeded the written restoration goals required for Pioneer's \$97,000 grant from the Wildlife Conservation Society.
12.Supervision/Admin	13%	- Supervision, performance appraisal plans, & EPAP's for each of my 2 staff. - Taught travel card reconciliation, Quicktime, FMH protocols, botany, FFI, etc. to seasonal staff. - Recruiting and hiring of 2 seasonal FEMO employees remained a ridiculous process. 21 OZAR seasonal staff were scheduled to start on 5/18 but only 7 actually did. Fortunately, my 2 were among the 7. - Updated 4 copies of our botany manuals, species-code lists, FEMO crew orientation manuals (comprised of 28 separate documents, handouts, guide-sheets, etc.) and FFI database instructions so 2015 crew members would have up-to-date resources on how to do their jobs. (LM formerly did this job). - Trained Ander Jayo as FEMO on Jerktail and Denning Hollow Rx operations, as well as post-burn data collection at Jerktail. Edited Ander's Denning Hollow FEMO report. Certified him as a FEMO - Prepared fire effects plot folders with data sheets for 2015 data collection (LM formerly did this job). - Made edits and additions to the 2015 ONSR FEMO Botany Manual. - Updated and improved the OZAR FFI database User's Guide for easier use by the seasonal staff. - Successfully uploaded backup copies of the BUFF and OZAR FFI databases to the NPS Data Store. (This chore was formerly performed by the Lead Monitor).

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13. Training	2%	• Ozark Botany, Red-carded, Fireline Safety refresher, USERRA, FISSA, Discrimination & Whistleblowing in the Workplace, VET-FHM, Approving Official and Cardholder mandatory charge card trainings, mandatory 10 hours of annual training for Supervisors, 8 hours of EEO. • Completed 3-day Intro. to Park Program Mgmt. course at MWR HQ.
14. Travel out-of-park for plot or project work	1 %	• 2 trips to BUFF and 1 to PERI. Include <u>travel time only</u> for distant, multi-day plot/project work requiring a travel authorization (Note: include data collection or project time associated with these trips in the plot or project categories above)
15. Miscellaneous	7%	• Submitted detailed weekly reports to FMO. • Functioned as the GIS map maker for the OZAR Fire Shop, making 34 maps of Rx units for planning, compliance, operations, reports, and meetings. • Worked with staff writer from The Salem News and provided him extensive edits on his Jerktail Mt. fire success story. • Assisted in teaching S-212 Wildland Chainsaw practicum. • Explored discrepancies between the Major Duties of the Fire Effects Monitor PD and WASO Fire Policy Division's interpretation of the PD to see if we can get a S-130/190 pre-employment training requirement on our FEMO job announcements. • Cut down and/or cut up hazard trees in the Pulltite campground, trees blocking access to Waymeyer river access, and trees removed to create debris burning area near Big Spring. • Built an Arcmap project to show all of the Rx units with ONSR land on 1 map. • As requested by AFMO, supplied him with copies of all the shapefiles that I routinely use in making Rx Ops maps. • As requested by Deputy Supt., I built an ArcMap project and made 3 maps of an inholding at OZAR for possible acquisition.

D. Fire effects crew accomplishments and areas of focus

Table 9. Fire Effects Crew 2014 Accomplishments/Focus Areas

Category	% Time	Notes
FMH plots	60	Estimated amount of time spent collecting plot data; includes any preparation time.
WUI plots	0	NA
CBI plots	0	
Other plot work	4	Fire-dependent rare plant plots.
Wildfire assignments	0	
Prescribed fire projects	0	
Non-fire fuels projects	0	
Travel out-of-park for plot or project work	1	1 trip to BUFF. (Include <u>travel time only</u> .)
Data entry	20	Estimated amount of time spent entering data from paper to PC
Data analysis	0	
Supervision/Admin	0	

Training	5	Ozark Botany, FISSA. Travel cardholder, AccessPIV cardholder, FMH protocols, FFI protocols.
Miscellaneous	10	Tesa worked to create a 2016 ONSR FEMO Botany Manual that has all of the nomenclature matching the Revised Flora of Missouri, Volumes 1, 2, and 3.

E. 2016 Direction

Hopefully 2015 was the low point in staffing for the Ozark Highlands Fire Ecology Program. Thanks to a FY16 Youth Partnership Program grant I hope to have 3 FEMO seasonal staff in 2016. However, OZAR remains plagued by a serious shortage of seasonal housing and I had to get a commitment from The Nature Conservancy to provide housing for one of my 2016 seasonal staff. Last summer one of my seasonal staff moved out of the dilapidated rodent, roach, and mold infested park housing because of health concerns.

2016 will be extremely busy as I work to update the scientific plant names in our databases and data collection guides to match the Revised Flora of Missouri, Volumes 1, 2, and 3.

The Ozark Highlands Fire Effects Monitoring (FEMO) Crew plans for the near future are to continue collecting high quality data from recently burned units. Importantly, this includes species level recognition of immature grasses and forbs, since recovery of herbaceous species richness and abundance are our best measures of success.

F. Overall Data Entry Status and FFI suggestions

I estimate that 99.9% of the **total** Ozark Highlands monitoring program data (including past and present data) has been entered into FFI, or another application, and quality checked.

I presently am unaware of a need for migration of any data to FFI.

FFI Feedback – I presently have no recommendations for improving FFI or FFI-Lite.

G. Optional Information - None