



**National Park Service
Ozark Highlands Cluster
Fire Ecology Annual Report
Calendar Year 2011**

A. Summary

A. 1. BUFF - Nationally-rare Newton's Larkspur Discovered Thriving in Burn Unit at Buffalo National River, Arkansas (National Fire Plan – Accountability)

This summer, the NPS Ozark Highlands fire ecology crew discovered that a population of the nationally-rare Newton's larkspur (*Delphinium newtonianum*) was thriving in the 4,525-acre Point Peter Mountain prescribed fire unit at Buffalo National River. An estimated 10,000+ blooming stems of Newton's larkspur were observed along a mile-long portion of the burn unit, making this one of the largest populations under fire management.

Newton's larkspur was once under consideration for protection under the Federal Endangered Species Act until botanists found additional populations. The large clustered flowers of Newton's larkspur are a stunningly bright azure blue. This beautiful wildflower is only known from seven counties in Arkansas. The Buffalo River flows through the heart of this wildflower's primary population. Thus it is especially fitting that such a significant population would be documented in the national park.

This population of Newton's larkspur has likely benefitted from a combination of fire effects. Unfortunately, no pre-burn permanent plots were established to help decipher what the optimal fire management is for Newton's larkspur. Fortunately, the positive influence of dormant-season fire on Newton's larkspur in the Point Peter Mt. burn unit is extremely obvious.

In the last 17 years, Point Peter Mountain has been burned 4 times at approximately 4 year intervals. A mid-slope road that parallels a large portion of the Newton's larkspur population also serves as the fire line. Although the soils, and many other variables, are equivalent on both sides of the road, the Newton's larkspur clearly prefers the side that has been treated with prescribed fire. Only a handful of Newton's larkspur plants were found on the unburned side of the road.

One obvious difference on the burned side of the road was the significant increase in the amount of sunlight reaching the ground. Dense shade characterized the unburned side of the road. Fire can also release nutrients that some plants rely on more than others in order to successfully bloom and produce seed.

Large local population sizes are typically important to ensuring that genetic diversity within a species is maintained. Small populations are often vulnerable to dying out because they lack the genetic diversity to adapt to rapid changes in their environment. Consequently, the large size of the Point Peter Mountain population suggests that it should remain viable well into the future.

Over time, we expect to enrich the small pool of knowledge of how to maintain viable natural populations of this rare wildflower. We also plan to ensure that we are accountable to the needs of other rare species in the park.



Newton's larkspur by Dan Drees

A. 2. HOSP – Plots established to monitor the nationally-rare fire-dependent Ouachita blazing star.

On 6/1/11, Angela Sokolowski and Dan Drees met Arkansas Heritage Commission botanist Theo Witsell in Hot Springs National Park (HOSP) to establish permanent plots within the Sugarloaf South prescribed burn unit. The purpose of these plots was to collect baseline preburn population data within the burn unit to determine if Ouachita blazingstar (*Liatris compacta*) populations remain stable, increase, or decrease under fire management.

Ouachita blazingstar was recently elevated from a variety of blazingstar to a species of blazingstar. Ouachita blazingstar is currently only known from the Ouachita Mountains in Arkansas. The Nature Conservancy classifies Ouachita blazingstar as globally-vulnerable (G3). For comparison, the federally-threatened Missouri bladderpod is also rated G3. Ouachita blazingstar currently does not have federal listing status.

The primary goal of fire management at HOSP is to return fuel loads to their natural levels while restoring healthy fire-dependent natural communities. However, embedded in these goals is the opportunity to

maintain or enhance populations of the rarest fire-dependent species at HOSP. Previous fire effects monitoring at HOSP lacked the resolution to assess fire effects on the rarest species.

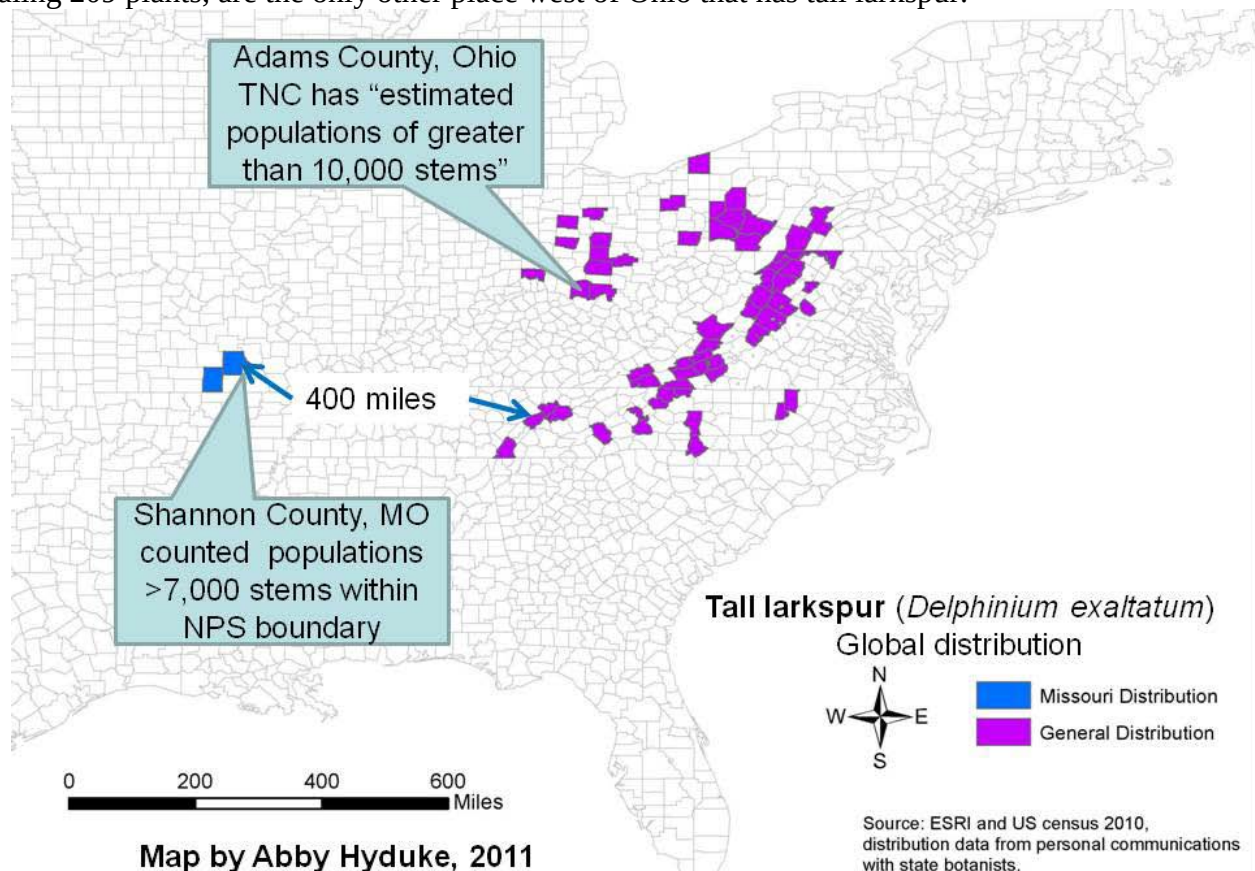
In 2002, Theo Witsell discovered a small population of the fire-dependent Ouachita blazingstar and proposed the Sugarloaf South prescribed burn unit. We relocated this population but determined that there were not enough plants to establish multiple monitoring plots.

Nearby, we also found a small population of Arkansas jewelflower (*Streptanthus maculatus* ssp. *obtusifolius*). Arkansas jewelflower is also a rare (G3) fire-dependent wildflower that is currently only known from the Ouachita area of Arkansas.

In the most remote portion of the burn unit we discovered previously unrecorded populations of Ouachita blazingstar that were sufficient to establish two 10 x 25 meter plots inside the burn unit and one plot outside the burn unit. Plans are to burn Sugarloaf South during the early dormant season of 2012 and inventory all 3 of these plots again about June 1, 2012.

A. 3. OZAR - Intern grant leads to discoveries of nationally-rare wildflower at Ozark National Scenic Riverways (ONSR).

This project documented that the second largest concentration of the nationally-rare tall larkspur (*Delphinium exaltatum*), blooms in the Current River watershed of Shannon County, Missouri. Only Adams County, Ohio claims a larger population than the 8,400 tall larkspurs inventoried in Shannon County, 82% of which are within the boundary of the ONSR. Furthermore, adjoining Howell County, Missouri's two sites totaling 209 plants, are the only other place west of Ohio that has tall larkspur.



We suspected that ONSR's tall larkspur was nationally significant because it is over 400 miles west of the next closest populations in Ohio. Consequently, we expect that tall larkspur populations at ONSR are genetically distinct from the Appalachian populations. However, the total size of the ONSR tall larkspur populations greatly exceeded our expectations and further elevates the national significance of our populations.

Only Oak Ridge National Lab in Tenn. has pre-burn and post-burn (2011) population data for tall larkspur. Consequently, if ONSR established pre-burn tall larkspur monitoring plots it would join Oak Ridge at the cutting edge of deciphering the fire ecology of tall larkspur.

Intern Abby Hyduke's job was to find and inventory new populations of tall larkspur in areas proposed for prescribed fire management within ONSR. Abby found 3 new populations of this beautiful wildflower, along with a new population of largeleaf phlox (*Phlox amplifolia*) which is imperiled in MO.

Abby led the effort to establish two 10x25 meter permanent plots in the expanded Welch Lodge prescribed burn unit and another 10x25 m. plot in the expanded Devils Well prescribed burn unit. Abby also mapped the perimeter of the entire populations in both units using a GPS. A 10x25 m. "control" plot was established in a known tall larkspur population near Round Spring where no prescribed burns are planned. This data will allow fire managers to determine what future effect ONSR fuel reduction treatments have on tall larkspur population numbers and population geographic extent.

Abby's work also allowed us to collect detailed population data on a large tall larkspur population that was discovered in 2009 within a unit that burned in 2008. In 2009, the detailed inventory of the Pistol Barrel burn unit counted 2,481 tall larkspur. In March of 2011, the Pistol Barrel unit received another burn. The July 2011 inventory of the same tall larkspur populations inventoried in 2009 counted 3,322, up 25% from 2009. Abby also made the first detailed map of the Pistol Barrel tall larkspur populations so we can determine if their locations change over time.

A minimal number of published anecdotal observations suggest that tall larkspur is fire-dependent. Nothing published suggests tall larkspur is vulnerable to dormant-season fire. Thus the Pistol Barrel population increase suggests that tall larkspur does benefit from dormant season fire. Abby conducted a literature search but found no additional publications to enlighten our understanding of tall larkspur ecology.

Abby also sent questionnaires to most of the botanists and tall larkspur managers in the 8 Appalachian states where tall larkspur was believed to occur. Alabama and Kentucky reported that tall larkspur was erroneously reported from their states. Most of the other 6 states reported that they have little or no ongoing data collection to guide their tall larkspur management, (Oak Ridge lab was the one exception). Consequently, Abby proved that if ONSR wants to know how to be a wise steward of its nationally-significant tall larkspur population we will have to collect the data ourselves.

Abby's internship is a great example of our mission to "preserve unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations".

A. 4. OZAR - Indiana bat research

A 3-year Indiana bat research project at OZAR was completed in 2011. The summary report is still in production. This research was 50% funded by Fire Management. The upcoming summary report is expected to validate that multi-season prescribed burning is compatible with most of the OZAR burn units. Rx units adjoining Indiana bat hibernation caves will be avoided 9/1 - 10/31 and 4/1 - 5/1.

Table 1. Fire Effects Plot Workload (2011) and Total Plots Installed

Park	Monitoring Unit	Plot Type (FMH Brush plot, photo point, CBI, etc.)	Pre-burn 2011	Immed. Post 2011	Postburn (1-20 yrs) 2011	Annual Total (2011)	Total Plots
Ozark NSR	Glade/Woodland Transition (SCSC)	FMH forest plot	0	2	15	17	23
Ozark NSR	Dry Mesic Woodland Oak/Hickory (QUAL)	FMH forest plot	0	2	10	12	14
Ozark NSR	Dry Woodland Oak/Hickory/Pine (QUVE)	FMH forest plot	0	2	14	16	19
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	4, + 1 contrl	0	5	10	10
Ozark NSR	Riddell's goldenrod	Rare species count/photo points	2	0	0	2	2
Ozark NSR	Cedar removal	Photo point	3	0	0	3	3
Ozark NSR	Deer enclosure & open deer control	Species richness	3 exc 3 con	0	0	6	6
Buffalo NR	Glade/Woodland Transition (SCSC)	FMH Forest plot	0	0	0	0	10
Buffalo NR	Dry Woodland Oak/Hickory/Pine (QUVE)	FMH Forest plot	0	0	3	3	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
Hot Springs NP	Dry Woodland Pine-oak (HOSP)	FMH Forest plot	0	0	2	2	7
Hot Springs NP	Dry Woodland Pine-oak (HOSP)	Modified Forest plot	0	0	8	8	8
Hot Springs NP	Ouachita blazing star	Rare species count/photo points	2, + 1 contrl	0	0	3	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	0	0	0	6
Total			16	6	57	79	282

Table 2. Fire Ecology Staffing 2011

Ecologist and Monitors	Starting Date	Ending Date	# of Pay Periods	READ Qualified (Yes or No)	Training and Development completed in 2011
Dan Drees Fire Ecologist	1/1/11	12/31/11	26	No	S-290, FFT1 and, FEMO task books completed, ICT5 task book opened, Planning committee member for the Fire in Eastern Oak forests Conference, Ozark Botany, Red-carded, ATV refresher, Search & Rescue, Fire Safety refresher, USERRA, FISSA, ArcGIS 10.0 with GPS integration, 2 PMIS courses, Discrimination & Whistleblowing in the Workplace, Updates for Supervisors, all OZAR-all day Safety training, 2 days of Operational Leadership,
Erin Yeoman, Lead Monitor (position vacant)	4/25/11	5/6/11, resigned	1	Yes	RXB2 task book completed,
Angela Sokolowski, Asst. Lead Monitor	4/25/11	12/2/11	16	Yes	S-234, L-280, FALB, FFT1, & ICT5 task books completed, ENOP task book initiated, Ozark Botany, Red-carded, ATV refresher, Search & Rescue, Fire Safety refresher, USERRA, FISSA,
Emily Baker, monitor	5/23/11	9/22/11	9	No	Ozark Botany,
Jen Shelby, monitor	5/9/11	9/22/11	10	No	S-290, Ozark Botany, Red-carded, ATV refresher, Fire Safety refresher, USERRA, FISSA
Heather Bosserman, monitor	5/9/11	9/22/11	10	No	S-290, Ozark Botany, Red-carded, Fire Safety refresher, USERRA, FISSA
Brittany Cole, monitor	5/9/11	9/8/10	9	No	S-290, Ozark Botany, Red-carded, Fire Safety refresher, USERRA, FISSA
Abby Hyduke, YIP larkspur intern	5/11/11	8/25/10	8	No	S-130/190 S-290, Ozark Botany, Red-carded, Fire Safety refresher, USERRA, FISSA,

The Lead and Assistant Lead monitors returned to fire effects work in late April. Unfortunately, Lead Monitor Erin Yeoman resigned in early May to take a job with the USFS. We are very grateful to Erin for the 5 years of sweat equity that she invested in our program and her superb dedication to collecting and entering quality data.

I have no plans to install new FMH plots until the GS-7 Lead Fire Effects Monitor position vacancy is unfrozen and staffing levels return to normal. We were stretched very thin this past summer without the Lead Monitor position. We could never have completed our intense work load without a strong crew of returning veterans and everyone on the crew constantly pushing themselves to the maximum. Plots become more difficult and time consuming to read with each burn because they are typically recovering their herbaceous diversity and density. Thus our workload increases even when the number of plots stays the same.

Assistant Lead Monitor Angela Sokolowski got a 120-day temporary promotion to Lead Monitor at the start of our field season. The highlight of 2012 was the outstanding job Angela did leading an exceptionally talented and motivated crew. Angela's contagious enthusiasm and positive attitude resulted in fabulous crew morale, despite a horrendously hot, humid, and biting-insect infected summer.

Angela was greatly assisted by 5-year FEMO seasonal veteran Emily Baker, who also successfully stepped up to help fill the leadership void. Emily was recognized for her outstanding contribution with the first monetary Performance Award given to a fire program seasonal at OZAR. We will miss Emily in 2012 since she has accepted a job with the Missouri Dept. of Conservation.

The up-side of the vacant/frozen Lead position was the lapse dollars that provided additional pay periods for Angela. This proved essential for us to get caught up on the data entry and quality checking that we got behind on in 2010 due to the 6-month furloughs of the Lead and Assistant Lead.

Table 3. 2011 Management Objectives and Monitoring Results

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (XX% confidence interval)	Objective Achieved?	Year Last Analysis Completed
OZAR, 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.)	Total pole tree reduction = 27% Decrease (n=16 plots, 2 fires)	No	2011
	Increase the average number of species (per quadrat) in the herbaceous layer by at least 40% within two growing seasons after the second burn (90% C.I.)	Total increase in average number of species (per quadrat) in the herbaceous layer = 23.5% (n=16 plots, 2 fires)	No	2011
OZAR, 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.)	Total pole tree reduction = 51% Decrease (n=11 plots, 2 fires)	Yes	2011
	Increase the average number of species (per quadrat) in the herbaceous layer by at least 20% within two growing seasons after the second burn (90% C.I.)	Total increase in average number of species (per quadrat) in the herbaceous layer = 23% Increase (n=11plots, 2 fires)	Yes	2011
OZAR, 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.)	Total pole tree reduction = 54% (n=14 plots, 2 fires)	Yes	2011
	Increase the average number of species (per quadrat) in the herbaceous layer by at least 40% within two growing seasons after the second burn (90% C.I.)	Total increase in average number of species (per quadrat) in the herbaceous layer = 30% Increase (n=14 plots, 2 fires)	No	2011

OZAR data analysis interpretation – OZAR is meeting goals to reduce pole trees in dry woodlands and moist woodlands, and meeting goals to increase herbaceous richness in moist woodlands. OZAR is not meeting goals to reduce pole trees on glades due to eastern red cedars that are now too big to kill with fire alone. Consequently, mechanical removal of cedars has been initiated. This mechanical cedar removal is also expected to result in attaining the goal to increase the glade herbaceous diversity. See the discussion for BUFF (page 11), regarding further information on the shortcomings of fire alone for Ozark glade restoration.

A current bright spot in the OZAR data analysis is that none of the 56 FMH plots have any invasive exotic plants. There are certainly many prescribed burn units that have invasive exotic plants. However, thus far these outbreaks are primarily restricted to road edges, old fields, and floodplains.

I developed a spreadsheet to track fire effects goals on a plot-by-plot basis at OZAR, (see below). I need to conduct further analysis of the OZAR herbaceous data to determine if there are significant differences between the plots inside of the 3,000-acre deer refuge portion of the park versus the portion open to deer hunting. I also want to compare plots that are on rhyolite derived soils versus dolomite derived soils.

OZAR Monitoring Type	Plot #	Burn Unit	1st Burn	2nd Burn	% reduction of pole-size trees per hectacre, 2nd yr after 2nd burn	% increase in avg # of native herbaceous species per 1 meter quadrat	3rd Burn	4th Burn
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 2.5 to 3.8 = up 52%	3/24/2007	3/5/2010
Moist woodland	2	Brandewiede	3/?/2000	3/?/2003	from 1560 to 1120 = -28%	from 8.4 to 8 = -5%	3/27/2009	
Moist woodland	3	Lower Thorny	3/?/2002	NA	NA	NA		
Moist woodland	4	West Thorny	3/?/2001	3/?/2003	from 1680 to 840 = -50%	from 2.8 to 4.1 = up 46%	3/27/2009	
Moist woodland	5	West Thorny	3/?/2001	3/?/2003	from 2720 to 920 = -66%	from 4.4 to 10.7 = up 143%	3/27/2009	
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
Moist woodland	7	Chilton Creek	3/?/2003	4/4/2006	from 1000 to 680 = -32%	from 2.2 to 2.6 = up 18%	3/18/2010	
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	
Moist woodland	9	Russell Mt.	?/?/2003	3/29/2006	from 1080 to 120 = -89%	from 1.5 to 1.5 = no change	3/23/2010	
Moist woodland	10	Russell Mt.	?/?/2003	3/29/2006	from 1400 to 480 = -66%	from 4.3 to 5.7 = up 33%	3/23/2010	
Moist woodland	11	South Chilton	4/4/2006	3/18/2010	from 1160 to 490 = -58%	from 1.9 to 6.2 = up 226%		
Moist woodland	12	South Chilton	4/4/2006	3/18/2010	from 960 to 360 = -63%	from 4.9 to 6.1 = up 24%		
Moist woodland	13	Angel Ridge	3/22/2007	3/12/2011	NA	NA		
Moist woodland	14	Angel Ridge	3/22/2007	3/12/2011	NA	NA		
Moist woodland recovery goals and avg. results		Reduce the density of pole trees (2.5-15 cm dbh) by at least 30% within two growing seasons after 2nd burn; (80% C.I.)			Total pole tree reduction = 51% Decrease (N=11 plots with 2 fires)	Total increase in average number of species (per quadrat) in the herbaceous layer = 23% (N=11 plots with 2 fires)		Increase the average number of species (per quadrat) in the herbaceous layer by at least 20% within two growing seasons after the second burn (90% C.I.)

OZAR Monitoring Type	Plot #	Burn Unit	1st Burn	2nd Burn	% reduction of pole-size trees per hectare, 2nd yr after 2nd burn	% increase in avg # of native herbaceous species per 1 meter quadrat	3rd Burn	4th Burn
Dry woodland	1	Campbell Pt.	3/?/2000	3/?/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
Dry woodland	2	Campbell Pt.	3/?/2000	3/?/2004	from 1520 to 400 = -74%	from 2.3 to 4 = up 74%	3/26/2007	3/19/2010
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
Dry woodland	4	Campbell Pt.	3/?/2000	3/?/2004	from 1840 to 1320 = -28%	from 5.1 to 5.6 = up 10%	3/26/2007	3/19/2010
Dry woodland	5	West Thorny	3/?/2000	3/?/2003	from 1080 to 680 = -37%	from 2.9 to 4.3 = up 48%	3/27/2009	
Dry woodland	6	Booming Shoal II	?/?/2001	3/?/2004	from 800 to 120 = -85%	from 1.2 to 2.8 = up 133%	3/24/2007	3/5/2010
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
Dry woodland	8	Quarry	3/?/2001	3/?/2005	from 800 to 360 = -55%	from 0.9 to 0.9 = no change	3/12/2009	
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	
Dry woodland	10	Chilton Creek	?/?/2003	4/4/2006	from 720 to 440 = -39%	from 3 to 2.7 = -10%	3/18/2010	
Dry woodland	11	Russell Mt.	?/?/2003	3/29/2006	from 1160 to 160 = -86%	from 0.6 to 0.5 = -17%	3/23/2010	
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	
Dry woodland	13	South Chilton	4/4/2006	3/18/2010	from 400 to 0 = -100%	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 3.1 to 4 = up 29%		
Dry woodland	15	Angel Ridge	3/22/2007	3/12/2010	NA	NA		
Dry woodland	16	Angel Ridge	3/22/2007	3/12/2010	NA	NA		
Dry woodland	17	Peavine	3/10/2009		NA	NA		
Dry woodland	18	Peavine	3/10/2009		NA	NA		
Dry woodland	19	Peavine	3/10/2009		NA	NA		
Dry woodland recovery goals and avg. results		Reduce the density of pole trees (2.5-15 cm dbh) by at least 30% within two growing seasons after 2nd burn; (80% C.I.)		Total pole tree reduction = 54% Decrease (N=14 plots with 2 fires)		Total increase in average number of species (per quadrat) in the herbaceous layer = 30% (N=14 plots with 2 fires)	Increase the average number of species (per quadrat) in the herbaceous layer by at least 40% within two growing seasons after the second burn (90% C.I.)	

OZAR Monitoring Type	Plot #	Burn Unit	1st Burn	2nd Burn	% reduction of pole-size trees per hectare, 2nd yr after 2nd burn	% increase in avg # of native herbaceous species per 1 meter quadrat	3rd Burn	4th Burn
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	
Glade	2	Brandewiede	3/?/2000	3/?/2003	from 1960 to 1000 = -40%	from 2 to 11.2 = up 460%	3/27/2009	
Glade	3	Little Booming Shoal	3/?/2000	3/?/2004	from 1880 to 1200 = -36%	from 2 to 5.2 = up 160%	plot did not burn in 07, but did 3/5/2010	
Glade	4	Booming Shoal II	?/?/2001	3/?/2004	from 160 to 160 = no change	from 9.4 to 8.8 = -7%	plot did not burn in 07, but did 3/5/2010	
Glade	5	Booming Shoal II	?/?/2001	3/?/2004	from 1360 to 720 = -47%	from 9.2 to 10.4 = up 13%	3/24/2007	
Glade	6	Booming Shoal II	?/?/2001	3/?/2004	from 600 to 560 = -7%	from 17 to 13.6 = -20%	plot did not burn in 07, but did 3/5/2010	
Glade	7	West Thorny	3/?/2001	3/?/2003	from 1920 to 680 = -65%	from 7.8 to 10.2 = up 31%	plot did not burn in 09,	
Glade	8	Quarry	3/?/2001	3/?/2005	from 640 to 440 = -31%	from 7.4 to 9 = up 22%	plot did not burn in 09,	
Glade	9	Russell Mt.	?/?/2003	3/29/2006	from 2600 to 2040 = -22%	from 6.2 to 8.8 = up 42%	3/23/2010	
Glade	10	Lower Thorny	3/?/2002	none	NA	NA		
Glade	11	Chilton Creek	3/?/2003	4/4/2006	from 1360 to 160 = -88%	from 6.4 to 5.4 = -16%	3/18/2010	
Glade	12	Chilton Creek	3/?/2003	4/4/2006	from 1640 to 360 = -78%	from 6.8 to 9.2 = up 35%	3/18/2010	
Glade	13	Russell Mt.	?/?/2003	3/29/2006	from 1800 to 800 = -56%	from 3.6 to 5.4 = up 50%	3/23/2010	
Glade	14	Russell Mt.	?/?/2003	3/29/2006	from 2960 to 2400 = -19%	from 6.2 to 8.2 = up 32%	3/23/2010	
Glade	15	Beaver Pond	3/?/2004	plot did not burn in 07, but did 3/19/2010	from 1840 to 1760 = -4%	from 12.2 to 11 = -10%		
Glade	16	Vance/Barnett Mt.	3/24/2011	none	NA	NA		
Glade	17	Mill/Buzzard Mt.	3/?/2004	3/24/2010	from 2600 to 2280 = -12%	from 8 to 9 = up 13%		
Glade	18	Mill/Buzzard Mt.	3/?/2004	3/24/2010	from 1200 to 800 = -33%	from 6.4 to 7 = up 9%		
Glade	19	Peavine	3/10/2009		NA	NA		
Glade	20	Peavine	3/10/2009		NA	NA		
Glade	21	Alley	NA		NA	NA		
Glade	22	Alley	NA		NA	NA		
Glade	23	Vance/Barnett Mt.	3/24/2011		NA	NA		
Glade recovery goals and avg. results		Reduce the density of pole trees (2.5-15 cm dbh) by at least 40% within two growing seasons after 2 nd burn ; (80% Confidence Interval.)			Total pole tree reduction = 27% Decrease (N=16 plots with 2 fires)	Total increase in average number of species (per quadrat) in the herbaceous layer = 23.5% (N=16 plots with 2 fires)	Increase the average number of species (per quadrat) in the herbaceous layer by at least 40% within two growing seasons after the second burn (90% C.I.)	

BUFF, Glade/Transition	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=6 plots, 2 fires)	No	2011 No 02yr02 plots since 2008.
	Reduce pole density (2.5 – 15 cm dbh) by 60% after 10 years of burning; (80% C.I.)	Total pole tree reduction = 12% decrease (n=6 plots, 2 fires)	NA, first burns with plots in 2004	2011 No new data since 2008
	Reduce new growth eastern red cedar by 95% after three consecutive burns (90% C.I.)	Reduced new growth eastern red cedar by 34% (n=6 plots, 2 fires)	NA, no 3 burn units yet.	2011 No new data since 2008
BUFF, Dry Woodland	Reduce tree density to open vista with a target density of 74 trees/hectare after 20 years (80% C.I.)	300 tph (n=7 plots, 2 fires)	NA, first burns with plots in 2004	2011 No new data since 2008
	Reduce pole density (2.5-15 cm dbh) by 60% after 10 years of burning; (80% C.I.)	57% Decrease (n=7 plots, 2 fires)	NA, first burns with plots in 2004	2011 No new data since 2008
	Reduce live stems/acre by 60 % over 10 years of burning (90% C.I.)	46% Decrease (n=7 plots, 2 fires)	NA, first burns with plots in 2004	2011 No new data since 2008

BUFF data analysis interpretation – Regarding the glade transition objective to, “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.)”. Unfortunately, no prescribed burn units have been burned since 2007 that have fire effects plot reads the second year after the second burn (02yr02). Therefore the findings of the 2008 data analysis showing, “no change in the average number of species (per quadrat) in the herbaceous layer” is still valid.

The Pruitt Cedar Glade prescribed burn unit is the next unit that will have fire effects plot reads the second year after the second burn (02yr02). This unit was burned once in 2005 and is being prepped for another burn in 2012.

Sadly, the same glade objective to, “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.)”, was not written for the dry woodlands at BUFF. **The average number of native species per quadrat in the dry woodlands had an increase of 94.2% (n = 7, 2 fires).** It is regrettable that the objectives for the dry woodlands did not include a goal to increase native herbaceous richness.

This disparity between the superb recovery of the dry woodland herbaceous layer and the lack of recovery of the glade transition herbaceous layer is also mirrored to a lesser extent at OZAR. I believe that the data, and my personal observations, can accurately explain this disparity. BUFF had 2 glade plots in the Lower Wilderness that did not carry fire in 2004. OZAR has 6 of 21 scattered glade plots that failed to carry fire during past burns. BUFF had one woodland plot that failed to carry fire but all of OZAR’s 33 woodland plots have burned successfully.

Indeed, I have witnessed numerous examples of fires that burned strongly through the woodlands and then lost their intensity (or went out) when they reached the glades. These have typically been Jan. – April burns. Winter moisture often recharges the ridges above Ozark glades and then seeps from the exposed dolomite

bedrock in the glades. This problem is compounded by the unnatural accumulation of large eastern red cedars on these glades.

The evergreen cedars cast an extremely dense shade that inhibits drying and replaces fire-prone fuel with damp cedar duff. Glades are often encircled by cedars as opposed to the dense mat of grasses and forbs that grow once the cedars are removed.

I believe that cutting the cedars, or burning before winter moisture replenishes the seasonal glade seeps, is necessary if we are going to achieve our glade transition zone objectives for increasing native species richness, reducing pole tree density, and reducing the number of young cedars both at BUFF and OZAR.

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 18% after 1 burn. (n=3 plots, 1 fire)	NA, only 1 burn	2011 No new data since 2008
	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 24% after 1 burn. (n=3 plots, 1 fire)	NA, only 1 burn	2011 No new data since 2008
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 6% after 1 burn. (n=5 plots, 1 fire)	NA, only 1 burn	2011 No new data since 2008
	Increase mean percent cover of native herbaceous species by 60-100% after four burns (80% C.I.)	No change after 1 burn. (n=5 plots, 1 fire)	NA, only 1 burn	2011 No new data since 2008

PERI data analysis interpretation – No units containing FMH plots have burned since 2007 and no post burn data has been collected since 2008.

HOSP, 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.)	Total pole tree reduction = 47% (n=11 plots, 1 fire)	Yes	2011
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HOSP data analysis interpretation – This is the first time fire effects data has been reported for HOSP. Unfortunately, a Fire Effects Monitoring Plan has never been written for HOSP. Writing the first draft of a HOSP Fire Effects Monitoring Plan is my top priority planning document for 2012. The HOSP fire effects goal reported on above is identical to the pole tree reduction goal for Ozark National Scenic Riverways. The HOSP Fire Effects Monitoring Plan team will need to decide if this should remain a valid goal for HOSP.

The 47% reduction in pole trees in 11 plots scattered across 4 prescribed burn units at HOSP is remarkable. It indicates that the understory has been significantly opened up and that substantially more sunlight will be reaching the herbaceous layer. This is a common fire effects goal for fire-dependent natural communities throughout the Ozark Highlands eco-region.

Unfortunately, we are still trouble-shooting a database conversion problem recently discovered in the herbaceous data for HOSP. Apparently, when this portion of the database was converted from the FEAT database to the FFI database a glitch occurred. I look forward to having this issue resolved so that I can analyze and compare the herbaceous data to the pole tree data.

Invasive exotic tree-of-heaven and princess tree saplings were discovered in the North Mt. Rx burn unit during the plot reads of 2010 and 2011. This burn unit is known to have rare fire-dependent plants only known from the Ouachita Mountains of Arkansas. I reported these finding each year. In the fall of 2011, the newly operational Heartland Exotic Plant Management Team (EPMT) followed up on these reports and treated the outbreak. Furthermore, they hunted for and found the mother trees about 1/8th mile away and treated them also. Hooray for the great work of the EPMT!

B. Fire ecologist accomplishments and areas of focus

Table 4. Fire Ecologist 2011 Accomplishments/Focus Areas

Category	% Time	Accomplishments and/or areas of activities
1. Planning	10%	- Determined 3 years of fire effects travel costs to 3 parks per NFPORS requirements. - Developed a supplemental budget request for 3 seasonal-FEMO pay periods. - Made maps for all of the 2011 and 2012 OZAR burn plans. - Wrote a 16-page NEPA scoping response for new or expanded OZAR burn units. - Served on Planning Committee for Fire in Eastern Oak Forests Conference
2. Presentations	5%	- OZAR burn unit tour for USDA's Midwest Regional Ecological Site Description Workshop. - Presentation on the Fire Ecology of the Current River Watershed for TNC in St. Louis - Wrote Fire Success Story for BUFF. - OZAR burn unit tour for U. of MO forestry field camp. - Presentation on tall larkspur research at OZAR for the Current River COA (watershed agency partners) - Presentation on the Fire Ecology of the Current River Watershed for the Ozark Chapter of the MO. Native Plant Society in West Plains. - Presentation on the Fire Ecology of the Current River Watershed for the MDC/AmeriCorps fireline prep crews working in the Current River watershed. - Contributed to an article discussing the integration of fire management, RM, and Heartland I&M in controlling invasive exotics. - Prepared presentation for a meeting in Denver of the MWR & IMR NPS fire ecologists on how OZAR is using data, adaptive resource mgt., and networking to expand and create new Rx burn units.
3. NPS Meetings/ task groups	8%	- Meetings and coordination with OZAR resource management on several issues. - Frequent meetings and coordination with OZAR fire staff on numerous issues. - Met with the FMO & RM Chief at BUFF to discuss FEMO discovery that a nationally-rare endemic fire-dependent plant was thriving in a Rx unit. - Meeting in Denver of the MWR & IMR NPS fire ecologists.
4. Interagency work	1%	- Helped coordinate established and future interagency burn units with the MO. Dept. of Conservation and Pioneer Forest. - Initiated the acquisition of a 175-acre inholding with 1 mile of river frontage at OZAR.
5. Wildfire assignments	7%	- FFT1 or FFT2 on 8 local wildfires (10 operational periods) - Several days of wildfire severity patrols - ENOP trainee on Flatrock WF at BUFF (6 operational periods); submitted a fire effects report to BUFF staff based on observations.
6. Prescribed fire projects	5%	6 Rx fires at OZAR, 2 as FEMO. 1 Rx fire at WICR as FEMO/ATVO. 1 Rx fire at GWCA as FEMO/ATVO.
7. Non-fire	1%	Helped guide the Sweezie and Mill Mt. fens mechanical projects at OZAR.

fuels projects		- Helped establish tree girdling protocols for cane restoration at Big Tree Rx unit. - Mapped & calculated acreage for several mechanical cedar removal projects and cane restoration projects.
8.Research	4%	Facilitated a graduate intern to elevate our fire effects monitoring of tall larkspur to something more scientifically rigorous
9.Data collection	15%	25 days in the field with plot reads, plot establishment, photostations, and rare plant searches in Rx burn units.
10.Data entry	0%	All data entry was accomplished by the FEMO crew.
11.Data analysis	15%	- Worked on 2009 through 2011 data analysis for OZAR and BUFF. - Worked on all data analysis for HOSP.
12.Supervision /Admin	15%	- Supervision, performance appraisal plans, & PA's for each of my 7 staff. - Botany training, travel, payroll, etc. - Workers Comp admin for 1 employee.
13.Training	7%	S-290, FFT1 Task book completed, FEMO task book completed, Ozark Botany, ArcGIS 10.0 with GPS integration, 2 PMIS courses, Discrimination & Whistleblowing in the Workplace, USERRA, FISSA, Search & Rescue, ATV refresher, Updates for Supervisors, all OZAR-all day Safety training, 2 days of Operational Leadership,
14. Travel out-of-park for plot or project work	<1%	2 trips to HOSP and 1 trip to BUFF (note that this fluctuates annually based on plot read rotations, field investigations, and the availability of travel funds)
15.Miscellaneous	7%	- Submitted detailed weekly reports to FMO. - Fire monitoring trip reports were submitted to BUFF and HOSP. - Functioned as the GIS map maker for the OZAR Fire Shop. - Duties as acting FMO - Worked with FEMO crew to remove stripping, clean, and turn-in GSA pickup.

B. 1 Planning

B.1.a Fire Operations Plans

I worked closely with the new Prescribed Fire Specialist (PFS) to make the GIS maps for all of the 2011 and 2012 burn plans that the PFS wrote for OZAR.

I utilized my familiarity with the FMP, and a scientific literature search, to develop a 16-page NEPA internal scoping response. This was required by the OZAR NEPA coordinator because of several new or expanded fire management projects that were not covered in the existing FMP.

B. 1. b. Budgets

I applied for and received a \$17,500 grant to support the 2011 work of our tall larkspur research intern.

Our FMO recommended that I write a "white paper" detailed justification and budget analysis to consolidate our permanent subject-to-furlough Lead & Assistant Lead monitors into 1 permanent full-time Lead Monitor position. Unfortunately, MWR did not support this proposal at this time.

I provided 3 years of fire effects travel budget requests for NFPORS entries for BUFF, HOSP, and PERI. I assisted in identifying 3 years of NFPORS projects for OZAR. I developed and received a supplemental budget request for 3 seasonal-FEMO pay periods to cover our busy plot read schedule and August prescribed burns at WICR and GWCA.

I attended numerous meetings related to the ever-evolving FY2012 budget cuts. Due to the budget uncertainties; we were not permitted by MWR to refill our vacant Lead Monitor position. Fortunately, our FMO recognized the critical need to give our Assistant Lead Monitor more pay periods in FY2012 to partially compensate for the vacant Lead position.

B. 2. Presentations

B. 2. a. USDA's Ecological Site Description (ESD) workshop

I developed a 10-page handout and lead a tour of our Stegall Mt. Rx burn unit for USDA's Midwest Regional Ecological Site Description Workshop.

B. 2. c. The Nature Conservancy (TNC)

At the request of TNC, I provided a presentation in St. Louis for 100 people on the Fire Ecology of the Current River Watershed for TNC's Conservation Speakers Series.

B. 2. d. Fire Success Story and Posters

I wrote a Fire Success Story for the Newton's larkspur in the Point Peter Rx unit at BUFF. I developed 2 Fire Success Story posters for the Fire in Eastern Oaks Conference held in Springfield, MO., one on our expanding research of the nationally-rare tall larkspur at OZAR and another on expansion of collared lizard populations in several burn units at OZAR.

B. 2. e. Burn unit tour

At the request of the U. of MO. Forestry summer camp I prepared handouts and a talk for a 2-hour tour of our Stegall Mt. burn unit.

B. 3 NPS Meetings/ task groups

B. 3. a. OZAR Fire Operations

On average, I meet 3 times a week with our FMO and Prescribed Fire Specialist (PFS). Both of these colleagues are extremely good at integrating the management for healthy fire-dependent natural communities with reducing hazardous fuel loads. Their genuine concern for getting the optimal fire effects from each burn makes my job a pleasure. Our fire shop does an excellent job of integrating both the principles of fire ecology, and fire effects personnel, into fire operations planning and completion.

B. 3. b. OZAR Resource Management (RM)

I initiated a presentation by the contracted Indian bat researchers at OZAR to provide an update of their findings on year 2 of this 3 year project. Victoria Grant is the COTR for this joint RM and Fire funded project. Victoria facilitated a meeting whereby a great wealth of helpful information was shared on how we could compatibly restore fire-dependent natural communities **and** be good stewards of our federally-endangered Indiana bats. I wrote a summary report for our FMO who was unable to attend this meeting.

I attended meetings with fire staff, OZAR's NEPA coordinator, and OZAR's terrestrial ecologist in order to facilitate several new or expanded prescribed burn units.

B. 3. c. BUFF Resource Management

I worked with our intern Abby to check 3 Heritage sites for the nationally-rare Newton's larkspur at Point Peter Mt. We found an estimated 10,000 + plants, making this the largest known population anywhere under prescribed fire management. I met with the BUFF FMO and RM Chief to discuss our findings.

B. 3. d. Fire Ecologist meeting

I attended a 3-day meeting in Denver of the MWR & IMR NPS fire ecologists. This proved to be an excellent meeting with a great amount of very useful and relevant information on a wide range of topics.

B. 3. e. Heartland Network

I responded to Craig Young's request for invasive exotic species information for parts of OZAR, BUFF, and HOSP so that the new EPMT had a better idea of priority target species and their locations. I greatly appreciate the networking that has occurred between the Heartland EPMT, the OZAR terrestrial ecologist, and our fire

program. This collaboration has capitalized on the FEMO crew's ability to detect invasive exotic outbreaks in remote and high natural integrity parts of our parks. It has also produced efficiencies that any Fortune 500 CEO would applaud.

I am especially grateful to the Heartland EPMT, and the OZAR terrestrial ecologist, for making it a priority to treat invasive exotic species outbreaks on the edges of the Alley Spring, Mill Mt., and Booming Shoals Rx units

B. 4. Interagency work

B. 4. a. Land acquisition

I noticed that 175 acres inside OZAR park boundaries (with a mile of river frontage) was to be auctioned on the courthouse steps in 19 days. I made maps of the property and mobilized The Nature Conservancy to acquire the property so that it would not get into the hands of potential developers who could subdivide it as riverfront campsites. The acquisition was finalized less than 16 hours before the auction. I was asked by TNC and NPS to draft a press release on the successful acquisition.

B. 4. b. Pioneer Forest

Pioneer Forest owns over 100,000 acres adjoining OZAR's park boundary. In 2011 we discovered 2 large populations of tall larkspur on Pioneer Forest land adjoining existing NPS prescribed burn units. Maps and detailed reports of these discoveries were provided to Pioneer Forest. With the encouragement of our FMO, I contacted Pioneer Forest and proposed that we include their tall larkspur populations in expansions of 2 of our Rx burn units. They have tentatively agreed. We are awaiting the completion of the NEPA process in order to supply Pioneer Forest with a burn plan for their review and endorsement.

In April, while checking on a contained wildfire near Chalk Bluff, I suggested to Erin and Angela that we search for American barberry (*Berberis canadensis*), the rarest plant within the designated boundary of OZAR. Erin discovered the first plants in what turned out to be a new site and a small range expansion. The 807 stems made this one of the largest populations west of the Mississippi. NPS leases Chalk Bluff from Pioneer Forest. The staff of Pioneer Forest were thrilled to receive a map and detailed report of this discovery on their property. The map and report were also submitted to the Missouri rare species database.

B. 4. c. MO. Dept. of Conservation (MDC)

With the encouragement of our FMO, I met with former colleagues in MDC to discuss opportunities to expand some existing burn units and create new units that can only be done as dual agency burns. These included site visits to Mule Mt., Williams Mt., and Thorny Creek units.

B. 5. Wildfire assignments

I was FFT1 or FFT2 on 8 OZAR wildfires (10 operational periods) and ENOP trainee on Flatrock WF at BUFF (6 operational periods). I was asked to participate in several days of wildfire severity patrols due to my experience conducting local firetower shots and being able to determine which sides of the rivers the wildfires were on. I submitted a fire effects report on the Flatrock wildfire to the Fire and Resource Management staff at BUFF.

B. 6. Prescribed fire projects

I was FEMO, FFT1 or FFT2 on 6 OZAR prescribed burns (8 operational periods), FEMO at 1 Rx burn at GWCA, and FEMO at 1 RX burn at WICR.

B. 7. Non-fire fuels projects

I flagged the perimeters of the Mill Mt. fens at OZAR and met with the BUFF Module on-site before they started mechanical removal of the cedar. I met with staff on-site who conducted the mechanical removal and

pile burning of cedars on the Sweezie Hollow glades at OZAR. I identified old-growth chinkapin oaks in need of special consideration.

B. 8. Research

B. 8. a. The tall larkspur internship performed by graduate student Abby Hyduke greatly elevated the size and scope of our tall larkspur monitoring. The grant that funded Abby's internship was based on the discovery that OZAR had the largest population of tall larkspur under fire management anywhere and that little is documented about the fire ecology of this wildflower that tall larkspur specialists believe is fire-dependent. Abby and I discovered a few new populations adjoining existing burn units at OZAR. We established 3 pre-burn permanent plots and a much better control plot. Abby's extensive summary report lays a strong foundation for our 2012 graduate intern to build upon. We eventually hope to have sufficient quantity and quality of data to publish our findings in a peer reviewed journal.

B. 9. Data collection

B. 9. a. Plot reads

I assisted the crew with 10 days of plot reads at OZAR, BUFF, and HOSP.

B. 9. b. Tall larkspur

I assisted Abby with 15 days in the field locating tall larkspur population boundaries, establishing plots, and conducting comprehensive inventories of several large populations.

B. 10. Data entry

All data entry was accomplished by the FEMO crew.

B. 11. Data analysis

Thanks to the gracious assistance of former OZAR fire ecologist Dan Swanson, I was able to get caught up on most of the data analysis at OZAR, BUFF, PERI, and HOSP. A FEAT database to FFI database conversion problem affecting the density belt protocol was discovered and still needs to be fixed for some plots.

B. 12. Supervision/Admin

B. 12. a. HR duties

The conversion from working with two in-park HR staff to working with the HR staff at the Central SHRO was very daunting and remains so at times. However, all 5 of my seasonal staff in 2011 reported to work on my requested EOD date. Despite this success, the requirement that I do more of my own HR work and try to stay current on a constantly changing matrix of HR requirements is far more time consuming for me than when I worked with our in-park HR people.

B. 12. B. b. PA's

I had the privilege to supervise and write performance appraisals for 7 very talented colleagues. All 7 final PA's were completed on time, and included detailed dialogue with the employee.

B. 13. Training

B. 13. a. S-290

I previously took S-290 on CD without obtaining a completion certificate. Thus I had to take it at the MO. Wildland Fire Academy to get credit.

B. 13. b. Botany

I was unable to hire a contractor to teach our week-long Ozark botany training in 2011 due to budget reductions. Fortunately, my wife is qualified to teach this course and she agreed to do it. Of course, I had to pay her dearly by completing numerous projects that she wanted done for her.

B. 15. Miscellaneous

B. 15. a. Acting FMO

I am grateful to have a close and trusting relationship with my Fire Management Officer (FMO). I was given several opportunities to share the job of being the Acting FMO with Aaron Mier, our Prescribed Fire Specialist. I believe my existing skills are being fully utilized and I am being given opportunity for professional growth and development.

B. 15. b. GIS Mapping

It has been my privilege to be the map maker for the OZAR fire program. Map making is a critical support function for most of what we do. Consequently, in the future we need multiple staff that can perform this duty, instead of just me. I mapped wildfire perimeters and made all of the prescribed burn plan maps for OZAR. Since high quality maps are such a critical tool to successful prescribed burns, I often end up remaking the operational maps in order to incorporate new information on roads, trails, structures, changes in fireline placement, changes in acreage, etc. Some of this information is brought to me by other staff, but often it is information that I seek out myself. I also make a large number of maps for our strategic planning of new or expanded burn units. I fulfilled MWR Fire GIS request for OZAR wildfire and Rx fire shapefile perimeters for 2008 through 2010.

C. Fire effects crew accomplishments and areas of focus

Table 5. Fire Effects Crew 2011 Accomplishments/Focus Areas

Category	Percent Time	Notes
FMH plots	44	Estimated amount of time spent collecting plot data; includes any preparation time.
WUI plots	0	None.
CBI plots	0	None.
Other plot work	4	Fire-dependent rare plant plots. Deer enclosure plots for Resource Mgmt.
Wildfire assignments	10	LM was ICT5 or FFT1 on 5 local wildfires (6 operational periods) & was deployed to BUFF to assess & report on effects of a wildfire there. ALM was ENOP trainee on wildfire in GA. (14 operational periods) & AR. (6 operational periods). ALM was ICT5, FFT1 or FFT2 on 5 local wildfires (6 operational periods). 3 seasonal FEMO's were FFT2 on wildfires in GA. for 14 operational periods each.
Prescribed fire projects	10	LM was RXB2 trainee on 2, ICT5 on 2, and FFT 1 on 2 OZAR burns. ALM was FEMO on 1, FFT1 on 2, FFT2 on 2 and ATVO on 3 burns at 3 parks. 3 seasonal staff were FFT2's on a total of 2 burns at 2 parks.
Non-fire fuels projects	0	Estimated amount of time spent assisting with non-fire fuels projects; include READ activities
Travel out-of-park for plot or project work	1	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)
Data entry	15	Estimated amount of time spent entering data from paper to PC
Data analysis	0	None.
Supervision/Admin	5	ALM typically supervised crew during plot reads. ALM also handled most of the travel.
Training	10	LM completed RXB2 task book. ALM had S-234: Ignitions Operations, Search & Rescue, & L-280: Followership to Leadership. ALM completed FFT1/ICT5 (Fire Fighter Type 1/ Incident Commander Type 5) & FALB (B Faller) task books. ALM initiated ENOP (Engine Operator) task book. Seasonal staff had a mix of Rx-310, S-130/190, S-290, L-280, All had Ozark Botany and PT
Miscellaneous	1	Removal of flood debris piles in the Big Spring Campground.

- At OZAR staff installed 5 Tall larkspur woodland plots (1 control, 1 in a previously burned unit, and 3 in new burn units).
- At OZAR staff read 6 immediate post-burn plots during the dormant season.
- At OZAR staff read 39 FMH plots, 5 tall larkspur plots (1 control & 4 post-burn), 2 Riddell's goldenrod plots, and 6 deer research plots (3 exclosures & 3 controls) during the growing season.
- At BUFF staff read 3 FMH plots during the growing season and evaluated the Point Peter Rx burn unit to determine if plots should be established to monitor the nationally-rare Newton's larkspur.
- At HOSP staff read 2 FMH plots and 8 modified forest plots during the growing season.
- At HOSP staff established 3 Ouachita blazing star plots (1 control and 2 pre-burn).
- At PERI there were no 2010 or 2011 prescribed burns thus no plots were due for reads.
- Data entry and quality checking was completed for all plots read in 2012 and 11 plots that were not entered in 2010.
- LM was requested by BUFF to conduct fire effects assessments and report her findings on the Rocky Hollow #1, Rocky Hollow #2, and Center Point wildfires. While doing so she helped discover and report on a large population of the endemic Ozark trillium in the Ponca Wilderness Area.
- FEMO crew were deployed for 3 days using the wood chipper to remove flood debris piles in the Big Spring Campground.

D. Additional Program Information

Table 6. Planning - 2011

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 2011)	Assisted with how many BAER plans in 2011?
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 7. Monitoring - 2011

Park	% 2011 Data Entered	% 2011 Data Quality Checked	# Prescribed Fires Monitored*	# Non-fire Fuels Treatments Monitored*	# Wildfires Monitored*	# BAER Treatments Monitored*
Buffalo National River	100%	100%	2	0	2	0
Hot Springs National Park	100%	100%	2	0	0	0
Ozark National Scenic Riverways	100%	100%	9	2	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 8. Communicating Results - 2011

Park	# of Project Monitoring Reports completed in 2011	# of Annual meeting(s) with Park staff	# of Formal presentations of results	Do you use Minitab?*
Buffalo National River	1	1	0	
Hot Springs National Park	1	0	0	
Ozark National Scenic Riverways	1	1	0	Yes, BUFF, HOSP, OZAR, & PERI 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 9. Research - 2011

Park	Are research needs identified in FMP or Monitoring Plan?	# of Proposals Submitted in 2011	# of Proposals Funded in 2011	# of Research Projects Supported in 2011*	Additional Comments
Buffalo National River	no	0	0	0	
Hot Springs National Park	no	0	0	0	
Ozark National Scenic Riverways	yes	1	1	1	park-requested tall larkspur project ; significant park-involvement
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.

E. 2012 Direction

- A Fire Effects Monitoring Plan has never been written for HOSP. Writing the first draft of a HOSP Fire Effects Monitoring Plan is my top priority planning document for 2012.
- A YPP grant has been allocated to continue the tall larkspur intern research at OZAR.
- There is widespread recognition by multiple disciplines within the OZAR management staff that we should capitalize on the interest of our neighboring agency partners to restore glade and woodland natural communities. This has resulted in an above average amount of NEPA work in the last two years as prescribed burn units are expanded or created. This trend is expected to continue for another 2 to 3 years. This collaboration within NPS, and with agency partners, is thrilling. It stands as a wonderful example of how federal and state government should work in order to deliver the maximum return for the taxpayer's dollar.
- I have no plans to install new FMH plots until the GS-7 Lead Fire Effects Monitor position vacancy is unfrozen and staffing levels return to normal. We were stretched very thin this past summer without the Lead Monitor position. We could never have completed our intense work load without a strong crew of returning veterans and everyone on the crew constantly pushing themselves to the maximum. Plots become more difficult and time consuming to read with each burn because they are typically recovering their herbaceous diversity and density. Thus our workload increases even when the number of plots stays the same.

F. Optional Information

- It is very gratifying to see that we are typically getting the fire-dependent natural community results that we had hoped for from our prescribed burns. It is also very fulfilling to know that we have initiated a successful strategy to attain the goals that we were falling short of fully achieving (i.e. the mechanical removal of cedar on our glades).
- It is wonderful that there is now an EPMT to protect the natural integrity of the prescribed burn units that we have worked so hard to restore in the Ozark Highlands. They have been a God-send by responding quickly to our reports of treatable outbreaks of invasive exotic plants.
- The main challenge facing our monitoring program is the freezing of the Lead Monitor vacancy.

INSTRUCTIONS FOR UPLOADING 2011 ANNUAL REPORT

1. Save your report as a PDF file using the following file naming convention "2011 *Park/Network Name* Annual Report.pdf".
2. Go to the NPS Fire Ecology Sharepoint site (<http://npsfamshare.nps.doi.net/wildlandfire/firescience/fireecology/default.aspx>). In Fire Ecology Documents, upload your report to the 2011 Park and Network Fire Ecology Program Annual Reports folder.
3. Please e-mail your regional ecologist, Nate Benson, and MaryBeth Keifer to let us know when you get your report uploaded.

Call MaryBeth Keifer (603-795-2333) or Nate Benson (208-387-5219) if you have any questions or problems.