



National Park Service Fire Ecology Annual Report for Ozark Highlands Group Calendar Year 2012

A. Summary

A.1. General:

The highlight of the Ozark Highlands fire effects 2012 season was being able to replace our vacant Lead Monitor position. The fact that our Assistant Lead Monitor, Angela Sokolowski, was the most qualified applicant gave Angela a promotion that she deserved, but it resulted in the Assistant Lead Monitor subject-to-furlough position being held vacant due to budget reductions.

The seasonal Fire Effects Monitoring (FEMO) crew was also affected by budget cuts. One position was left vacant and two positions had reduced payperiods compared to previous years. In addition to the challenges of being short-staffed, 2012 was a recoding-breaking hot and dry summer in the Ozarks. The brutally enduring heat and drought were the low point of 2012.

The physical stress of the summer was compounded by the summer-long lack of anything approaching a normal size crew or routine. Frequently we fielded a crew of two. The Lead Monitor, 2 seasonals, and myself, rotated out on 4 different deployments. Additionally, we lost 2 weeks of plot reads to local wildfire severity patrols. Despite the challenges of a summer where no routine could be established, the FEMO crew maintained a superb positive mental attitude. They were also grateful for the experiences of being integrated into a wide variety of important operations.

A.2 BUFF (Buffalo National River):

Mechanical thinning on Pruitt Glades Rx Unit We read 3 plots at Pruitt where mechanical thinning was initiated late in 2011 and followed with a prescribed fire in March 2012. An evaluation of this subset of data showed BUFF glade plot 9 had 1,360 pole-sized trees per hectare pre-treatment, 1,440 by the second year after the first burn, but only 200 by the first year after the second burn **and** mechanical thinning (an 85% reduction from pre-treatment). BUFF glade plot 10 had 720 pole-sized trees per hectare pre-treatment, 720 by the second year after the first burn, and 400 by the first year after the second burn **and** mechanical thinning (a 45% reduction from pre-treatment). The BUFF Fire Effects Monitoring Plan set a goal of reducing pole tree density by 60% after 10 years.

Plot 9 had 480 pole-sized eastern red cedar trees per hectare pre-treatment, 520 by the second year after the first burn, and none by the first year after the second burn **and** mechanical thinning (a 100% reduction from pre-treatment). Plot 10 had 560 pole-sized eastern red cedar trees per hectare pre-treatment, 560 by the second year after the first burn, and 320 by the first year after the second burn **and** mechanical thinning (a 43% reduction from pre-treatment).

It is highly desirable to mechanically thin the native eastern red cedar since it is highly invasive in glade and open woodland natural communities in a reduced-frequency or reduced-intensity fire regime. In the Ozarks, fire alone is rarely effective in significantly reducing cedars that are protected by the shade of adjoining cedars, unless a wind-driven fire enters a cedar thicket under exceptionally dry conditions. It is commendable that the BUFF fire staff recognized the need to implement mechanical thinning, especially thinning targeted at cedar.

BUFF Pruitt Glades Rx unit, number of pole-sized trees (0.98-5.9 in.) per hectare

Sum of Density					
Glade Plot ID	Burn Status	Latin Name	DBH	Total	
FSCSC1D0209	00pre	Celtis	small pole	40	
		Celtis Total		40	
		Cercis canadensis	small pole	40	
		Cercis canadensis Total		40	
		Juniperus virginiana	large pole	120	
			small pole	360	
		Juniperus virginiana Total		480	
		Quercus muehlenbergii	small pole	120	
		Quercus muehlenbergii Total		120	
		Quercus shumardii	small pole	200	
		Quercus shumardii Total		200	
		Rhamnus caroliniana	small pole	480	
		Rhamnus caroliniana Total		480	
		00pre Total			1360
	01yr02	Celtis	small pole	40	
		Celtis Total		40	
		Cercis canadensis	small pole	40	
		Cercis canadensis Total		40	
		Juniperus virginiana	large pole	120	
			small pole	400	
		Juniperus virginiana Total		520	
		Quercus muehlenbergii	small pole	200	
		Quercus muehlenbergii Total		200	
		Quercus shumardii	small pole	200	
		Quercus shumardii Total		200	
		Rhamnus caroliniana	small pole	400	
		Rhamnus caroliniana Total		400	
		Ulmus rubra	small pole	40	
		Ulmus rubra Total		40	
		01yr02 Total			1440
	02yr01	Celtis	small_pole	40	
		Celtis Total		40	
		Quercus muehlenbergii	small_pole	120	
		Quercus muehlenbergii Total		120	
		Quercus shumardii	small_pole	40	
		Quercus shumardii Total		40	
	02yr01 Total			200	
	FSCSC1D0210	00pre	Bumelia lanuginosa	large pole	40
Bumelia lanuginosa Total			40		

	Carya glabra	small pole	40
	Carya glabra Total		40
	Cercis canadensis	small pole	40
	Cercis canadensis Total		40
	Juniperus virginiana	large pole	320
		small pole	240
	Juniperus virginiana Total		560
	Quercus muehlenbergii	large pole	40
	Quercus muehlenbergii Total		40
00pre Total			720
01yr02	Bumelia lanuginosa	large pole	40
	Bumelia lanuginosa Total		40
	Carya glabra	small pole	40
	Carya glabra Total		40
	Cercis canadensis	small pole	40
	Cercis canadensis Total		40
	Juniperus virginiana	large pole	280
		small pole	280
	Juniperus virginiana Total		560
	Quercus muehlenbergii	large pole	40
	Quercus muehlenbergii Total		40
01yr02 Total			720
02yr01	Cercis canadensis	small pole	40
	Cercis canadensis Total		40
	Fraxinus quadrangulata	small pole	40
	Fraxinus quadrangulata Total		40
	Juniperus virginiana	lg_pole	200
		small pole	120
	Juniperus virginiana Total		320
02yr01 Total			400

The one woodland plot at Pruitt had 1,200 pole-sized trees per hectare pre-treatment, 1,120 by the second year after the first burn, but only 200 by the first year after the second burn **and** mechanical thinning (an 83% reduction from pre-treatment). The BUFF Fire Effects Monitoring Plan sets a goal of reducing pole tree density by 60% after 10 years. This plot also had 320 pole-sized eastern red cedar trees per hectare pre-treatment, 280 by the second year after the first burn, and only 80 by the first year after the second burn **and** mechanical thinning (a 75% reduction from pre-treatment).

BUFF Pruitt Glades Rx unit, number of pole-sized trees (0.98-5.9 in.) per hectare

Sum of Density						
Woodland Plot_ID	BurnStatus	LatinName	DBH	Total		
FQUVE1D0908	00pre	Carya texana	large pole	40		
		Carya texana Total		40		
		Carya tomentosa	small pole	40		
		Carya tomentosa Total		40		
		Cornus florida	large pole small pole	40 120		
		Cornus florida Total		160		
		Fraxinus americana	large pole small pole	160 240		
		Fraxinus americana Total		400		
		Juniperus virginiana	large pole small pole	160 160		
		Juniperus virginiana Total		320		
		Prunus americana	small pole	40		
		Prunus americana Total		40		
		Quercus muehlenbergii	large pole	40		
		Quercus muehlenbergii Total		40		
		Viburnum rufidulum	small pole	160		
		Viburnum rufidulum Total		160		
		00pre Total				1200
		01yr02	Carya texana	large pole	40	
			Carya texana Total		40	
	Carya tomentosa		small pole	40		
	Carya tomentosa Total		40			
	Cornus florida		large pole small pole	40 120		
	Cornus florida Total		160			
	Fraxinus americana		large pole small pole	120 240		
	Fraxinus americana Total		360			
	Juniperus virginiana		large pole small pole	160 120		
	Juniperus virginiana Total		280			
	Prunus americana		large pole	40		
	Prunus americana Total		40			
	Quercus muehlenbergii		large pole	40		
	Quercus muehlenbergii Total		40			
	Viburnum rufidulum		small pole	160		
	Viburnum rufidulum Total		160			
	01yr02 Total				1120	
	02yr01		Carya tomentosa	small_pole	40	
			Carya tomentosa Total		40	
		Fraxinus americana	small_pole	40		
		Fraxinus americana Total		40		
		Juniperus virginiana	lg_pole	80		
		Juniperus virginiana Total		80		
		Quercus muehlenbergii	lg_pole	40		
		Quercus muehlenbergii Total		40		
	02yr01 Total				200	

EPMT work at Pruitt The Heartland I&M Exotic Plant Mgt. Team deserves recognition for building on the work of the mechanical thinning and prescribed burning. Adam Throckmorton and Jordan Bell cut and applied herbicide to a formidable infestation of tree-of-heaven that erupted in 2012 in the Pruitt glade and woodland restoration unit. Thanks to their diligent efforts the natural community integrity gains of the fire management program were not squandered by replacing native (but invasive) eastern red cedars with exotic invasive tree-of-heaven. Hopefully the synergy between the Heartland EPMT crew and the MWR fire programs will continue to accelerate.

Bush's Poppy Mallow On 6/12/2012, the 4-person Ozark Highlands Fire Effects Monitoring (FEMO) Crew met with CD Scott, Adam Throckmorton, and Jordan Bell to inventory the 2 known populations of Bush's poppy mallow (*Callirhoe bushii*) at BUFF. This was a priority project for the FEMO crew because Bush's poppy mallow is currently believed to be the rarest of the nationally-rare fire-dependent plants at BUFF.

The primary goal of fire management at BUFF 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 BUFF. Previous fire effects monitoring at BUFF lacked the resolution to assess fire effects on the rarest species.

I believe our inventories were very accurate because of the 7 experienced people who lined up in formation to systematically inventory these populations and search the adjoining habit. We counted a total of 93 Bush's poppy mallow in the "Charcoal population", located near the junction of the North River Road and the gated road that goes to the East Charcoal field. We found 34 plants near the east side of the East Charcoal Field Road and 59 plants near the west side of the East Charcoal Field Road. Both sides of the East Charcoal Field Road are within the North River Road prescribed burn unit.

Significantly, 75% (52 of 69) of the stem producing plants were browsed off. This meant we were unable to determine if these plants would have made flowering stems or non-flowering stems. Presumably the majority of the browsed stems were eaten by deer or elk, and would have been reproductive stems. **Perhaps prescribed burning as much of this area as possible would spread out the deer and elk herbivory.**

It was also notable that the stem producing plants within both of these subpopulations were in the sunniest areas of their woodland habitat. Although it appeared that the larger plants were a consequence of strong but filtered sunlight, it was not apparent what else was special about the relatively small area that contained almost all of the plants. We systematically searched the area south and east of the Bush's poppy mallow in the "Charcoal population" but only found one plant about 30 meters out that was not part of the 2 primary populations.

We established a 10 meter by 25 meter permanent monitoring plot on the east side of the East Charcoal Field Road that included all of the Bush's poppy mallow on that side of the road. Our intention was to establish another plot on the west side of the East Charcoal Field Road the following day but we got called back to OZAR to deploy a crewmember to Colorado wildfire duty.

Near Pruitt, we counted a total of 122 Bush's



poppy mallow in the “Pruitt population” along the Buffalo River Trail (BRT) southwest of the Hwy 7 bridge. It was notable that 82% of this population (100 plants) were within 1.5 meters of the BRT. We searched the area between the BRT and Hwy 7 (uphill of the 100 trailside Bush’s poppy mallow) but only found 22 scattered plants.

Presumably, the Bush’s poppy mallow was disproportionately abundant along the trail edge due to the increased amount of sunlight. However, other factors may be responsible. We did not establish a permanent Bush’s poppy mallow monitoring plot at Pruitt due to its proximity to the trail. **Of the 100 stem producing Bush’s poppy mallow in the Pruitt population only 7% were browsed off.**

CD Scott and I discussed the day’s Bush’s poppy mallow observations but unfortunately we could not define a habitat characteristic that would help us target future searches. For now, it appears that BUFF staff with botany skills will just have to get lucky to be in the right place and have the situational awareness to understand that they have found the nationally-rare Bush’s poppy mallow as opposed to the more common purple poppy mallow.

While at BUFF in April to do immediate post burn Brown’s line reads at Pruitt, Drees and Sokolowski searched the Flat Top Glade for the Federally-threatened fire-dependent Ozark bladderpod but found none. If we had it would have been a new county record.

A. 3 OZAR (Ozark National Scenic Riverways):

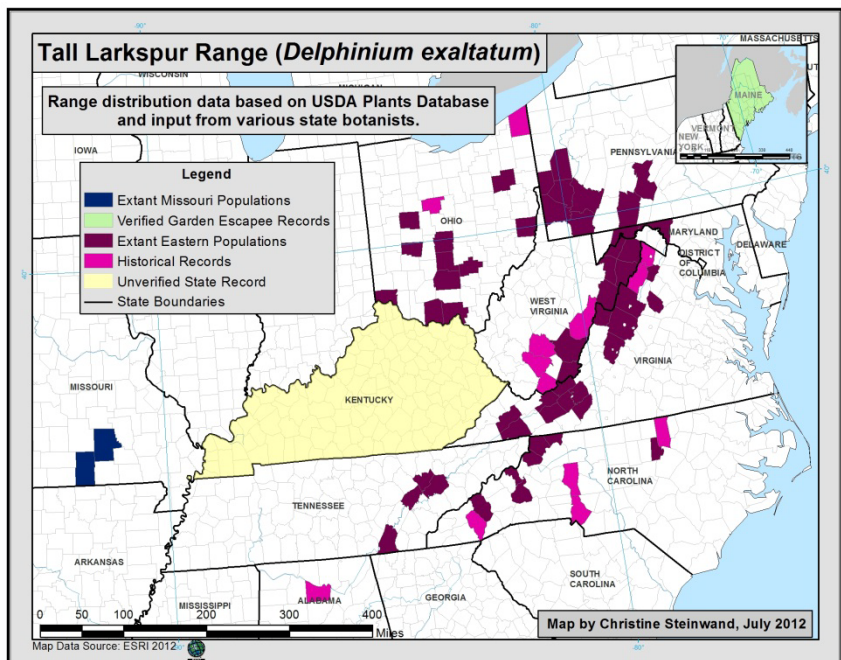
We received a grant for a second summer from the Youth Intern Program. This grant funded a graduate student, Christine Steinwand to continue the fire ecology research and monitoring of tall larkspur (*Delphinium exaltatum*) at OZAR. Christine was hired to be the 2012 tall larkspur intern at Ozark National Scenic Riverways because of her excellent local botany credentials, previous experience with tall larkspur, and proven stamina in brutal field conditions.

Unfortunately, just before Christine was to continue the tall larkspur field work, she sustained a severe knee injury that required surgery and rehabilitation. This limited her mobility in the field this summer. Consequently, Christine’s main contribution to our understanding of tall larkspur took off in a new direction. Botanists had wondered for many years if the tall larkspur in the Ozarks had evolved into a distinct species.

Christine initiated and facilitated a genetic study of tall larkspur across its geographic range.

Christine made many contacts while searching for an institution that

would assist in this new dimension of the ONSR tall larkspur project. Fortunately, she found the helpful understanding of several key staff at the Missouri Botanical Garden. These individuals recognized the need and the opportunity to partner on the tall larkspur genetics project. Soon, the Missouri Botanical Garden’s molecular



genetics lab in St. Louis was providing the guidance, and the essential collection materials needed to get the genetic study underway.

Christine developed genetic collection kits, which included materials and instructions, and distributed them to the appropriate botanists throughout Missouri and the 7 eastern states within the range of tall larkspur. The collection sites have turned in their specimens to the molecular genetics lab where these samples are in line to be processed.

Another challenge that Christine worked hard to overcome was the lack of a budget to pay for the lab supplies used in the genetic analysis. Thanks to her efforts, \$1,500 in state and private grants were provided to the Missouri Botanical Garden's molecular genetics lab to complete the analysis of the Missouri specimens. Christine also wrote a grant request for funding of the collections from eastern states.

Thanks to Christine's contagious enthusiasm and persistence, it appears that botanists will soon know whether the Ozark populations of tall larkspur are distinct enough to be designated as a separate species. If that happens, it will be the only species of plant known to grow solely in the state of Missouri, and will have significant implications for how managers approach the conservation of both the eastern and Ozark populations of tall larkspur.

Christine also compared the 2012 data from two prescribed burn units. These units were expanded in order to include previously unburned tall larkspur monitoring plots (which were established by the 2011 intern). The monitoring plots were then burned in March, 2012. The plot inventories showed that the number of plants in burned tall larkspur populations increased by an average of 11.6% from 2011 to 2012, despite record-breaking drought and heat. Monitoring data from an unburned "control" population nearby showed a 64% decrease in tall larkspur.

Table 1. Fire Effects Plot Workload (2012) and Total Plots Installed

Park	Monitoring Unit	Plot Type (FMH Brush plot, photo point, CBI, etc.)	Pre-burn 2012	Immed. Post 2012	Postburn (1-20 yrs) 2012	Annual Total (2012)	Total Plots
Ozark NSR	Glade/Woodland Transition (SCSC)	FMH forest plot	0	2	6	8	23
Ozark NSR	Dry Mesic Woodland Oak/Hickory (QUAL)	FMH forest plot	0	0	2	2	14
Ozark NSR	Dry Woodland Oak/Hickory/Pine (QUVE)	FMH forest plot	0	3	5	8	19
Ozark NSR	Various (Brown's lines)	Fuels	18	18	0	36	58
Ozark NSR	Various	CBI	0	0	0	0	67
Ozark NSR	Tall larkspur*	Rare species count/photo points	0	3	6 + 1 control	10	10
Ozark NSR	Riddell's goldenrod*	Rare species count/photo points	0	0	2	2	2
Ozark NSR	Cedar removal	Photo point	0	3	0	3	3
Ozark NSR	Deer exclosure & open deer control	Species richness	0	0	0	0	6
Buffalo	Glade/Woodland	FMH Forest plot	0	2	2	4	10

NR	Transition (SCSC)						
Buffalo NR	Dry Woodland Oak/Hickory/Pine (QUVE)	FMH Forest plot	0	1	2	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
Buffalo NR	Bush's poppy mallow*	Rare species count/photo points	1	0	0	1	1
Hot Springs NP	Dry Woodland Pine-oak (HOSP)	FMH Forest plot	0	3	3	6	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	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	2	2	4	6
Total			22	37	31	90	283

* Pilot sampling plots

Table 2. Fire Ecology Staffing 2012

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	1/1/12	12/31/12	26	No	Ozark Botany, Red-carded, Fire Safety refresher, USERRA, FISSA, Discrimination & Whistleblowing in the Workplace, and VET-FHM on-line trainings, Approving Official and Cardholder mandatory charge card trainings, mandatory 10 hours of annual training for Supervisors, EEO course, all OZAR-all day Safety training.
Angela Sokolowski, promoted from Asst. Lead to Lead Monitor	1/1/12	11/2/12	22	Yes	S-230, 2-day Rare Mo. plant ID workshop, 2-day Operational Leadership Course, Less Lethal LE training, mandatory 10 hours of annual training for Supervisors, EEO course, 2-day Timber Quality & Rx Fire Workshop, ENOP task book development, Ozark Botany, Red-carded, Fire Safety refresher, USERRA, FISSA,
Asst. Lead Monitor	Held vacant				
Jen Shelby, monitor	4/23/12	8/24/12	9	No	Ozark Botany, Red-carded, Fire Safety refresher, USERRA, FISSA
Heather Bosserman, monitor	5/7/12	8/24/12	8	No	Ozark Botany, Red-carded, Fire Safety refresher, USERRA, FISSA

Erin Hagland, monitor	5/7/12	8/24/12	8	No	S- 130/190, Ozark Botany, Red-carded, Fire Safety refresher, USERRA, FISSA
GS-5 FEMO	Held vacant				
Christine Steinwand, YIP grant larkspur intern	5/21/12	8/24/12	7	No	S-130/190 S-290, Ozark Botany, Red-carded, Fire Safety refresher, USERRA, FISSA,

Table 3. 2012 Management 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)
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	2012 (1999-2011)
	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	2012 (1999-2011)
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 = 54% Decrease (n=13 plots, 2 fires)	Yes	2012 (1999-2012)
	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 = 45% Increase (n=13plots, 2 fires)	Yes	2012 (1999-2012)
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 = 57% (n=16 plots, 2 fires)	Yes	2012 (1999-2012)
	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 = 59% Increase (n=16 plots, 2 fires)	Yes	2012 (1999-2012)

OZAR data analysis interpretation – OZAR is meeting goals to reduce pole trees in dry woodlands and moist woodlands. OZAR is also meeting goals to increase herbaceous richness in dry woodlands and 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 this discussion on page 11 of the 2011 annual report, regarding further information on the shortcomings of using only fire for Ozark glade restoration.

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 hectare, 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	from 1240 to 40 = -97%	from 2.8 to 8.2 = up 193%		
Moist woodland	14	Angel Ridge	3/22/2007	3/12/2011	from 560 to 280 = -50%	from 3.5 to 5.6 = up 60%		
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 = 54% Decrease (N=13 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	from 840 to 640 = -67%	from 0.7 to 0.8 = up 14 %		
Dry woodland	16	Angel Ridge	3/22/2007	3/12/2010	from 920 to 560 = -94%	from 1.2 to 8.3 = up 592%		
Dry woodland	17	Peavine	3/10/2009	3/21/2012	NA	NA		
Dry woodland	18	Peavine	3/10/2009	3/21/2012	NA	NA		
Dry woodland	19	Peavine	3/10/2009	3/21/2012	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 = 57% Decrease (N=16 plots with 2 fires)		Total increase in average number of species (per quadrat) in the herbaceous layer = 59% (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.)

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	3/21/2012	NA	NA		
Glade	20	Peavine	3/10/2009	3/21/2012	NA	NA		
Glade	21	Alley	3/13/2012		NA	NA		
Glade	22	Alley	3/13/2012		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	2012 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 were in 2004	2012 No new 10 yr data since 2008
	Reduce new growth of 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.	2012 No new 3 burn 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	2012 No 20 yr data
	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	2012 No new 10 yr 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 10 yr data since 2008

BUFF data analysis interpretation –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 received its second burn in 2012 along with mechanical thinning on all trees ≤ 9 inches. Thus we will have an added set of 02yr02 plots to analyze at the end of 2013. See analysis and interpretation of the Pruitt pole tree data on pages 1- 4 of this report.

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, some units with 2 burns & some with 1	2012 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 24% after 1 burn. (n=3 plots, 1 fire)	NA, some units with 2 burns & some with 1	2012 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 6% after 1 burn. (n=5 plots, 1 fire)	NA, some units with 2 burns & some with 1	2012 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 burn. (n=5 plots, 1 fire)	NA, some units with 2 burns & some with 1	2012 No 4 burn data yet.

PERI data analysis interpretation – After 4.5 years without any of the 12 FMH plots at PERI being burned, PERI became a beehive of Rx burning starting in the fall of 2011 and continuing through the fall of 2012. Three plots were burned in 2 units prior to the 2012 field season and 9 plots were burned in several units in

the fall of 2012. Regrettably, I was not aware that any of these units were going to be burned. Notification that these units had been burned came several days to several weeks afterwards. When word of the fall burns arrived, the Lead Monitor had 1 day left to work before furlough and no crew. Nevertheless, we are looking forward to collecting data in 2013 since several of the plots will now be at the midpoint to their 4 burn evaluation target.

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
---------------------------------------	--	---	-----	------

B. Fire ecologist accomplishments and areas of focus

Table 4. Fire Ecologist 2012 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. - Made maps (NEPA, Operations, & Vicinity) for all 10 of the 2012 and all 8 of the 2013 OZAR burn plans. Calculated numerous acreage figures, coordinates, and other GIS-related elements to be incorporated into Rx burn plans. 7 days scouting expansions of the Mill/Buzzard, Stegall Mt., Macy/Reed & Devils Well Rx units. 4 days scouting the proposed new Red Bluff, Jerktail Mt., and Thorny Creek Rx fire units. 1 day scouting a potential Rx unit that would incorporate Flat Top Bluff.
2. Presentations	5%	- OZAR Rx fire effects data presentation for Resource Mgt. staff. - Presentation on the Fire Ecology of the Current River Watershed for OZAR fuels crew & fire staff. - Wrote Fire Success Story for OZAR. - Developed custom handouts & lead 2 days of OZAR burn units tours for U. of MO forestry field camp (Devils Well, Stegall Mt., Denning Hollow, & Mill/Buzzard). - Presentation on the Fire Ecology of the Current River Watershed for the MDC/AmeriCorps fireline prep crews working in the Current River watershed. - Developed custom handouts & lead a 2-day fire ecology field trip of several OZAR Rx units for 27 ecology faculty & students from the U of Illinois. - Led a half day tour of the Spurgin Hollow glades for 34 people from the MO Prairie Foundation and the MO Native Plant Society.
3. NPS Meetings/ task groups	7%	- Meetings and coordination with OZAR resource management on several issues. - Frequent meetings and coordination with OZAR fire staff on numerous issues. - Assisted FMO in a tour of the Sweezie Rx Unit for Jim Loach from MWR. - Served as Fire's rep on the OZAR Safety Committee. - Served as advisor and reviewer for BUFF GIS glade mapping project. - Served as chairman of the Kelley inholding acquisition committee at OZAR. - Attended several supervisor's meetings at HQ.
4. Interagency work	2%	- Met with several staff from Pioneer Forest to finalize expansion of 2 existing Rx units onto their lands and to initiate planning for a 2,500+ acre Jerktail Mt. Rx burn. - Attended the MO. Dept. of Conservation's Fire Mgt. Coordination Team meeting in Osage Beach in order to help coordinate established and future interagency burn units. - Scouted the 4,010 acre inter-agency Stegall Mt. Rx unit post-burn with fire ecologists from MDC and TNC. Authored a detailed trip report and map of our fire effects observations. - Led group of 5 botanists from 3 agencies to conduct tall larkspur inventories in Rx units. - Attended 2 meetings of the Current River Conservation Opportunity Area.
5. Wildfire assignments	7%	- FFT1 on 1 local wildfire (2 operational periods) - FFT1 on wildfire in Maynard, AR (1 operational period)

		• Several days of wildfire severity patrols at OZAR. • ENOP trainee on 4 wildfires while deployed to Grand Junction, CO. (18 operational periods).
6.Prescribed fire projects	5%	• 9 Rx fires at OZAR, 2 as FEMO. 1 Rx fire on MDC as FFT1.
7.Non-fire fuels projects	1%	• Helped guide the Mill Mt. fens mechanical projects at OZAR. • Mapped & calculated acreage for several mechanical cedar removal projects.
8.Research	4%	• Hired and supervised a graduate intern to coordinate the Ozark and National tall larkspur genetic sampling project to determine if the Ozark population is a distinct species. • Led the field collection of tall larkspur genetic samples at 4 dispersed sites at OZAR.
9.Data collection	14%	• 16 days in the field with plot reads, plot establishment, photostations, and rare plant searches in Rx burn units. • Led an inventory of American barberry in the proposed new Red Bluff Rx unit. • Scouted the Mill Mt. fens Rx addition for Hine's emerald dragonfly habitat.
10.Data entry	0%	• All data entry was accomplished by the FEMO crew.
11.Data analysis	14%	• Worked on 2012 data analysis for OZAR, BUFF, and HOSP.
12.Supervision /Admin	15%	• Supervision, performance appraisal plans, & PA's for each of my 5 staff. • Botany training, travel, payroll, etc. • Recruiting and hiring for 5 employees to fill 3 types of positions. • Coordinated transition of 2 FEMO crewmembers into an OZAR EPMT crew after their FEMO service ended.
13.Training	7%	• Ozark Botany, Red-carded, Fire Safety refresher, USERRA, FISSA, Discrimination & Whistleblowing in the Workplace, and VET-FHM on-line trainings, Approving Official and Cardholder mandatory charge card trainings, mandatory 10 hours of annual training for Supervisors, EEO course, all OZAR-all day Safety training.
14. Travel out-of-park for plot or project work	2 %	• 2 trips to HOSP totaling 5 days and 2 trip to BUFF totaling 5 days.
15.Miscellaneous	7%	• Developed a 7-page ecological justification for burning Stegall Mt. under late green-up conditions. These late green-up conditions made inter-agency partners nervous about adverse fire effects and adverse media. • 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

B. Fire ecologist accomplishments and areas of focus

B. 1 Planning

B.1.a Fire Operations Plans

I worked closely with the Prescribed Fire Specialist (PFS) to make the GIS maps for all of the 2012 and 2013 burn plans that the PFS wrote for OZAR.

B.1.b. Budgets

I applied for and received a \$12,870 grant to support the 2012 work of our tall larkspur research intern.

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 attended numerous meetings related to the ever-evolving FY2013 budget cuts. Because of budget cuts we were not able to refill our vacant Assistant Lead Monitor position. Fortunately, our FMO recognized the critical need to refill our Lead Monitor position and provide more than the guaranteed 13 pay periods. I am grateful for

the additional pay periods for the Lead Monitor which partially compensated for the vacant Assistant Lead and seasonal FEMO positions.

B.1.c. New or expanded burn units

I spent 7 days helping to scout, flag, and GPS new firelines, cultural exclusions, butternut tree exclusions, and other notable elements across significant expansions of the Mill/Buzzard, Stegall Mt., Macy/Reed & Devils Well Rx units. I spent a total of 4 days helping to scout the proposed new Red Bluff, Jerktail Mt., and Thorny Creek Rx fire units by helping to identify and GPS significant fire-dependent and fire-sensitive resources.

I led a group comprised of Alan Templeton, Neal Humke, Brandon Kunz, Jen Shelby, Renata Culpepper, Susan Farrington, George Kipp, and Juliet Lao through the Jerktail Mt. area to scout for fire-dependent natural communities in order to formulate prescribed burn recommendations.

B. 2. Presentations

B.2.a. OZAR Fire & Resource Mgt. meeting

I organized our OZAR fire effects data analysis into a PowerPoint program and presented it at a meeting between all of the fire staff and all of the RM staff.

B.2.b. OZAR Fire Ecology Program

I gave presentations of my Fire Ecology of the Current River Watershed program for the OZAR fuels crew & fire staff. I also presented this program for the AmeriCorps Rx Fire crews under contract to help local MDC work teams.

B.2.c. Fire Success Story

I wrote a Fire Success Story about the tall larkspur genetic sampling internship project at OZAR (see p. 6).

B.2.d. Burn units tours

At the request of the U. of MO. Forestry summer camp I prepared handouts and talks for 2-days of tours of our Devils Well, Mill/Buzzard, Denning, and Stegall Mt. prescribed burn units. I was also asked to give this same tour to a field ecology class from the U. of Illinois.

B.3 NPS Meetings/task groups

B.3.a. OZAR Fire Operations

On average, I met 2 times a week with our FMO or Prescribed Fire Specialist (PFS). Both of these colleagues were good at integrating me into the fire operations strategic and operational planning. Furthermore, both colleagues were interested in optimizing the biodiversity benefits to fire-dependent natural communities as part of the fuel load reduction strategy at OZAR.

B.3.b. Safety Committee

At some parks this may be a light duty assignment, but OZAR being on the Safety Committee means attending monthly throughout the park and having homework assignments between meetings. Our chairwoman takes her responsibility seriously.

B.3.c. Inholding Committee

I was asked by OZAR administration to serve as chairman of a committee to investigate acquisition of an important inholding within the park. This involved site visits to assess and GPS important resources, make maps, coordinate meetings, and write update reports.

B. 4. Interagency work

B.4.a. Pioneer Forest

Pioneer Forest owns over 100,000 acres within or adjoining OZAR's park boundary. In 2011, I initiated requests to Pioneer Forest that they work with us to include 2 of their properties adjoining 2 of our existing burn units for the benefit of the nationally-rare tall larkspur. We successfully quadrupled and burned the Welch Lodge unit, and successfully tripled and burned the Devils Well unit.

I provided Pioneer Forest with multi-paged detailed fire effects reports for each burn. I led a group of 5 botanists from 3 agencies to conduct tall larkspur inventories in these Rx units. I also provided Pioneer with a detailed fire effects monitoring report on their tall larkspur populations after our summer field season. We documented a 9% overall population gain, despite our record setting summer heat and drought. A nearby control plot had a 64% population decline.

During a meeting with the administrative staff of Pioneer Forest, our FMO, and our PFS, I requested Pioneer's consideration of a collaborative prescribed fire management unit anchored on our jointly owned Jerktail Mountain. Pioneer was very pleased with the OZAR fire programs professional execution of the Welch Lodge and Devils Well Rx burns and the follow-up reports we provided. Consequently, they recently requested us to move from conceptual planning to operational planning for a Jerktail Mt. unit that will be at least 2,500 acres.

B.4.b. 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.

In concert with our PFS, I attended the MDC Fire Management Coordination Team meeting to help MDC staff understand the reasons for significantly expanding two of our large interagency burn units.

I scouted the 4,010-acre inter-agency Stegall Mt. Rx unit post-burn with fire ecologists from MDC and TNC. I authored a detailed trip report and map of our fire effects observations.

B. 5. Wildfire assignments

I was FFT1 on 1 OZAR wildfire and 1 wildfire in Maynard, AR (1 operational period each). I was ENOP trainee on 4 wildfires while deployed to Grand Junction, CO. (18 operational periods).

B. 6. Prescribed fire projects

I was FEMO, FFT1 or ATVO on 9 OZAR prescribed burns (9 operational periods).

B. 7. Non-fire fuels projects

I met with staff on-site who were conducting the mechanical removal and pile burning of cedars on the Mill Mt. fens at OZAR. I confirmed for them that they were executing our plan just as the FMO, PFS, and I had envisioned it.

B. 8. Research

B. 8. a. Tall larkspur internship performed by graduate student Christine Steinwand

Please see report starting on page 6.

B. 9. Data collection

B. 9. a. Plot reads

I assisted the crew with 16 days of plot reads at OZAR, BUFF, and HOSP.

B.9.b. American barberry

I led 4 coworkers in an inventory of the nationally-rare and fire benefitted American barberry in the proposed new Red Bluff Rx unit. We inventoried 1,114 stems, making this the largest population of American barberry west of the Mississippi. I wrote and submitted a report on our findings to the state botanist.

B.9.c. Mill Mt. fen crayfish

I scheduled a trip to survey the Mill Mt. fens prescribed burn unit addition with MDC's crayfish biologist, Emily Imhoff. Emily specializes in burrowing crayfish and I needed her expertise to tell us if the burrows I found in the Mill Mt. fens were crayfish burrows. Emily determined that they were not but she is eager to return in future years to determine if the burrowing crayfish colonize these fens. If they do, those burrows could provide larvae habitat for the federally-endangered Hine's emerald dragonfly

B.10. Data entry

All data entry was accomplished by the FEMO crew.

B. 11. Data analysis

I was able to stay caught up on most of the data analysis at OZAR, BUFF, PERI, and HOSP.

B. 12. Supervision/Admin

B. 12. a. HR duties

Working with the wonderful HR staff at the Central SHRO frequently remains very daunting. The HR staff seem to work very hard to provide excellent customer service but they seem to be stretched too thin to stay up-to-date on new WASO HR requirements. Nevertheless, all 4 of my seasonal staff in 2012 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.

I had the privilege to supervise and write performance appraisals for 5 very talented colleagues. All 5 final PA's were completed on time, and included detailed dialogue with the employee.

B. 13. Training

B. 13. a. Botany

I was unable to hire a contractor to teach our week-long Ozark botany training in 2012 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. Stegall Mt. Rx green-up burn

I developed a 7-page ecological justification for burning the 4,010-acre Stegall Mt. unit under late green-up conditions. The late green-up conditions made one of our inter-agency partners (TNC) especially nervous about adverse fire effects and adverse media. The day before the scheduled burn, TNC announced that they were going to withdrawn from the burn. This would have killed the burn and wasted all the prep considering that we could safely accomplish the burn within the parameters of the historic fire regime.

I simply reminded the TNC fire ecologist that he had often lamented how seldom we replicated the historic fire regime's natural range of variability. I showed him the ecological justification handout for burning during late green-up and assured him that we were prepared to respond to media questioning. I also agreed to provide him with a detailed post-burn fire effects scouting report.

The TNC fire ecologist, the MDC fire ecologist, and myself, were all predicting a low-intensity but high-severity burn. What we actually saw 31 days post-burn was that the fire had been both low-intensity and low-severity.

B. 15. b. Acting FMO

I am grateful to have been given the opportunity for professional growth and development by serving on occasion as the Acting Fire Management Officer (FMO).

B. 15. c. 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 in order to give staff from other parks the best maps possible. I also make a large number of maps for our strategic planning of new or expanded burn units. I fulfilled MWR Fire GIS requests for OZAR wildfire and Rx fire shapefile perimeters for 2011 through 2012.

C. Fire effects crew accomplishments and areas of focus

Table 5. Fire Effects Crew 2012 Accomplishments/Focus Areas

Category	% Time	Notes
FMH plots	45	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	5	LM was Engine Operator trainee on 3 wildfires while deployed to Grand Junction, CO. (18 operational periods). LM was FFT1 & 3 seasonal FEMO's were FFT2 on wildfire in Maynard, AR (1 operational period each).
Prescribed fire projects	8	LM was FEMO, FFT1, or ATVO on 10 OZAR burns and 1 MDC burn.
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	2	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	20	Estimated amount of time spent entering data from paper to PC
Data analysis	0	
Supervision/Admin	6	LM typically supervised crew during plot reads. LM handled all of the travel and most of the crew training.
Training	5	LM had S-230, 2-day Rare Mo. plant ID workshop, 2-day Operational Leadership Course, Less Lethal LE training, mandatory 10 hours of annual training for Supervisors, EEO course, 2-day Timber Quality & Rx Fire Workshop, ENOP task book development, Ozark Botany, Red-carded, Fire Safety refresher, USERRA, FISSA. Seasonal staff had a mix of S-130/190, I-100, I-700. All had Ozark Botany, fireline refresher, and PT
Miscellaneous	5	2 seasonals were READ's for Gulf Oil Spill

D. Additional Program Information

Table 6. Planning - 2012

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 - 2012

Park	% 2012 Data Entered	% 2012 Data Quality Checked	# Prescribed Fires Monitored*	# Non-fire Fuels Treatments Monitored*	# Wildfires Monitored*	# BAER Treatments Monitored*
Buffalo National River	100%	50%	1	0	0	0
Hot Springs National Park	100%	20%	1	0	0	0
Ozark National Scenic Riverways	100%	65%	8	2	0	0
Pea Ridge National Military Park	100%	0	2	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 - 2012

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	0	0	
Hot Springs National Park	1	0	0	
Ozark National Scenic Riverways	2	1	1	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 - 2012

Park	Are research needs identified in FMP or Monitoring Plan?	# of Proposals Submitted in 2012	# of Proposals Funded in 2012	# of Research Projects Supported in 2012*	Additional Comments
Buffalo National River	no	0	0	0	
Hot Springs National Park	no	0	0	0	
Ozark National Scenic	yes	1	1	1	park-requested tall

Riverways					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.

No 2012 Reserve Fund Research Projects:

E. 2013 Direction

What are program plans for the near future? This section can be brief and include changes to focus areas, any approved changes to monitoring protocols as a result of a program review, or plans to address future challenges (e.g. budget and staffing changes, travel caps, etc.).

I was warned early in FY2013 by my FMO that I might not have a budget for a 2013 fire effects crew. At this point in the fiscal year I have been allocated funding for a Lead Monitor to finish the fiscal year 2 seasonal FEMO's for 10 pay periods each. This leaves a subject-to-furlough Assistant Lead Monitor position vacant and 2 seasonal FEMO positions vacant.

I have also been warned by the OZAR FMO that fire effects travel to Arkansas will be seriously curtailed, but I have heard nothing on the subject from the AR FMO. Consequently, my program plans for the near future are to find ways to deliver essential fire effects information to decision makers at minimal costs while still meeting the objectives of approved fire effects monitoring plans.

In addition to looking for cost-cutting efficiencies, I also hope to supplement our fire effects monitoring program with grants to help pay for salaries, vehicle costs, and other related expenses.

In the past four years I feel that I have contributed enormously towards helping OZAR expand/consolidate Rx burn units in ways that have delivered a far greater return for the taxpayer's dollar. Several of these burn unit expansions have been facilitated by the fire effects crew's discovery and monitoring of rare fire-dependent flora. Additionally, I know that the veteran credibility of the OZAR fire effects program has helped in earning the trust and confidence which our agency partners have in our fire operations program.

F. Optional Information

To help in the ongoing effort to improve FFI, please include any feedback or suggestions here based on your experiences using FFI.

INSTRUCTIONS FOR UPLOADING 2012 ANNUAL REPORT

1. Save your report as a PDF file using the following file naming convention "2012 *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 2012 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.