



**National Park Service
Ozark Highlands Cluster
Fire Ecology Annual Report
Calendar Year 2010**

A. Summary

Nationally Rare Newton's larkspur

The highlight of the 2010 field season was Erin Yeoman's discovery of a large population of Newton's larkspur (alias Moore's larkspur, *Delphinium newtonianum*) in the Point Peter/Robinson Hill prescribed burn unit at Buffalo National River (BUFF). The 1,116 plants make this a significant population for this nationally rare wildflower. Newton's larkspur is ranked globally vulnerable to extirpation in the wild by The Nature Conservancy. Newton's larkspur is only recorded from 7 counties in Arkansas and nowhere else in the world.

According to my conversations with Dr. Edith Hardcastle, Theo Whitsell, and other experts on the species there is virtually no information on the fire ecology of this rare plant. My anecdotal observations of the Yeoman population at BUFF suggests that these plants benefitted from the canopy thinning that occurred from the Feb. 2009 ice storm. The ice storm was especially hard on the cedar trees in this area.

I believe that the understory thinning and nutrient release from the March 2010 prescribed burn also benefitted this population. Interestingly, 99.5% of the larkspurs in this population were reproductive. I believe that this high percentage indicates that the population is getting the right balance of sun, shade, moisture, nutrients, and other variables needed for reproduction.

We also found a population of 174 plants along the Ben Branch intermittent drainage about 3/4 mile due east of the Yeoman population, 90.6% were reproductive. We inventoried another population of 472 plants recently discovered by CD Scott in the Sod Collier prescribed burn unit near the Tyler Bend area, 99.4% were reproductive. This population was on a south facing toe-slope adjoining a county road. It went upslope about 70 feet.

To me, these observations suggest that Newton's larkspur is a disturbance dependent species that may specialize in using mesic woodlands as opposed to true forests. Mesic woodlands are the first natural community to be degraded by succession to fire-intolerant species due to the absence of the historic fire regime.

Of the 1,780 Newton's larkspurs that we inventoried, only 2 were basal rosettes (possibly seedlings), and another 25 plants only had leaves on the stalk with no sign of making flower buds. According to Dr. Hardcastle, no longevity or demographic studies exists for D.

newtonianum, a critical missing link in understanding this species. My ultimate goal is to understand (with certainty) how we can sustain seedling recruitment in these wild populations.

Table 1. Fire Effects Plot Workload (2010) and Total Plots Installed

Complete the following table. In the “Pre” and “Postburn” columns, fill in the number of plots visited this year only. In the “Total Plots” column, fill in the total number of plots installed in the Monitoring Unit to date, not only those visited this year. The number of plots visited Pre-burn, Immed. Post, and Postburn (1-20 yrs) in 2010 for a Monitoring Unit likely will NOT add up to the Total Plots installed to date. Denote any pilot sampling plots with a symbol, such as an asterisk.

Park	Monitoring Unit	Type of Plot (FMH, photo point, other)	Pre-burn	Immed. Post	Postburn (1-20 yrs)	Total # of Plots for type
Ozark NSR	Glade/Woodland Transition (SCSC)	FMH forest plot	4	11	17	23
Ozark NSR	Dry Mesic Woodland Oak/Hickory (QUAL)	FMH forest plot	0	8	11	14
Ozark NSR	Dry Woodland Oak/Hickory/Pine (QUVE)	FMH forest plot	0	12	17	19
Ozark NSR	Various (Brown's lines)	Fuels	0	0	0	61
Ozark NSR	Various	CBI	0	0	0	101
Ozark NSR	Tall larkspur	Rare species count/photo points	1* contrl	0	4*	5*
Ozark NSR	Riddell's goldenrod	Rare species count/photo points	2*	0	0	2*
Ozark NSR	Cedar removal	Photo point	3*	0	0	3*
Buffalo NR	Glade/Woodland Transition (SCSC)	FMH Forest plot	0	0	0	10
Buffalo NR	Dry Woodland Oak/Hickory/Pine (QUVE)	FMH Forest plot	0	0	6	17
Hot Springs NP	Dry Woodland Pine-oak (HOSP)	FMH Forest plot	0	0	2	7
Hot Springs NP	Dry Woodland Pine-oak (HOSP)	Modified Forest plot	0	4	4	8
Pea Ridge NMP	Oak Hickory forest/Woodland (OAH)	FMH Forest plot	0	0	0	6
Pea Ridge NMP	Post Oak – Black Jack Oak Woodland (QUMA)	FMH Forest plot	0	0	0	6
Total			10	35	61	282

* Pilot sampling plots

Table 2. Fire Ecology Staffing 2010

Complete the staffing and personnel development table for fire ecologist and monitors. Include fire training (e.g. S-290, RX-310), NPS training, distance learning or on-campus college credit, technology training, NWCG taskbooks initiated or completed, conferences attended, etc.

Ecologist and Monitors	Starting Date	Ending Date	# of Pay Periods	READ Qualified (Yes or No)	Training and Development
Dan Drees Fire Ecologist	1/1/10	12/31/10	26	No	M-580, RX-310 lead instructor, S-216, S-131 Task book opened, FOBS task book opened, Ozark Botany, ArcGIS 9.3 with GPS integration, Red-carded, PMIS, IDEAS, COTR, USERRA, FISSA, Hiring Reform for Supervisors, Safety Training for Supervisors, SMIS accident reporting and Worker's Comp, Green purchasing. Fire workshop and field trip leader for National Natural Areas Conference.
Erin Yeoman, Lead Monitor	1/3/10	10/9/10	20	Yes	3 courses at UNLV – Principles of Plant Ecology, Field Ecology, and Ecosystem Management, Assistant lead instructor for RX-310, Ozark Botany, RXB2 task book opened, ArcGIS 9.3 with GPS integration, Green Purchasing,
Angela Sokolowski, Asst. Lead monitor	2/1/10	9/24/10	17	Yes	RX-510, S-216, Ozark Botany, Red-carded, ArcGIS 9.3 with GPS integration,
Emily Baker, monitor	5/10/10	9/23/10	10	No	S-212, Ozark Botany,
Janice Ralls, monitor	5/10/10	9/23/10	10	No	RX-310, S-212 Ozark Botany, Red-carded,
Chris Kopek, monitor	5/10/10	7/29/10	6	No	S-130/190, I-100, I-700, S-133, S-212, Ozark Botany, Red-carded,
Jen Shelby, monitor	5/24/10	9/23/10	9	No	S-130/190, I-100, I-700, S-133, S-212

Table 3. Management Objectives and Monitoring Results

Complete the following Summary table for each monitoring units for which analysis is available. Monitoring results should include time frame, confidence interval, and sample size. Note the new column indicating the year the analysis was last completed.

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 = 29% Decrease (n=13 plots, 2 fires)	No	2008
	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 = 29% (n=13 plots, 2 fires)	No	2008
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 = 49% Decrease (n=11 plots, 2 fires)	Yes	2008
	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 = 15% Increase (n=9 plots, 2 fires)	No	2008
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 = 52% (n=9 plots, 2 fires)	YES	2008
	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 = 19% Increase (n=11 plots, 2 fires)	No	2008
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	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 in 2004	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, 2 fires	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 in 2004	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 in 2004	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 in 2004	2008

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	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	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	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	2008

B. Fire ecologist accomplishments and areas of focus

This section deals with roles and functions of the ecologist. Identify accomplishments and/or focus areas along with a rough estimate of the amount of time spent in these areas. This includes planning documents produced or reviewed (e.g. fire management plans, monitoring plans, prescribed fire or mechanical treatment plans, etc.), presentations given and audience, meetings and task groups attended, contracts reviewed, interagency collaboration efforts, volunteer hours managed, and scientific or research publications produced.

Category	Percent Time	Accomplishments and/or areas of activities
1. Planning	15%	- Determined 3 years of fire effects travel costs to 3 parks per new NFPORS requirements. - Developed a supplemental budget request for 4 seasonal-FEMO pay periods. - Made maps for all of the 2010 and 2011 OZAR burn plans. - Wrote a 15-page NEPA scoping response for new or expanded OZAR burn units. - Wrote questions and expected outcomes for the contracted Indiana bat researchers at OZAR. - Developed the plot read schedule for OZAR, BUFF, and HOSP.
2. Presentations	12%	- Lead instructor for the RX-310 class at the Midwest Fire Academy. - Coordinator for the Prescribed Fire Workshop and 2 all-day field trips for the 2010 National Natural Areas Conference. 2 presentations on the Fire Ecology of the Current River Watershed for TNC crews. - Wrote Fire Success Story for HOSP. - OZAR burn unit tour for U. of MO.
3. NPS Meetings/ task	8%	Meetings and coordination with OZAR terrestrial ecologist on

groups		- several issues. 3 days of GMP meetings, - Met with the fire and resource staffs of BUFF, and HOSP to get their support for adding nationally-rare endemic fire-dependent plants to their fire effects monitoring programs.
4.Interagency work	1%	- Helped coordinate both established and future interagency burn units with the MO. Dept. of Conservation. - Attended MO Wildland Fire Summit
5.Wildfire assignments	5%	- FFT2 on 8 local wildfires (8 operational periods) - Several days of wildfire severity patrols
6.Prescribed fire projects	3%	2 Rx fires at OZAR, one as a READ trainee. - READ trainee on a Rx fire at HOSP.
7.Non-fire fuels projects	2%	- Helped justify and guide the Sweezie and Mill Mt. fens mechanical projects at OZAR. - Helped guide the Pruitt glades mechanical project at BUFF.
8.Research	4	- Conducted literature reviews and tracked down knowledgeable experts on the ecology of Newton's larkspur, Ouachita blazingstar, and Indiana bats. - Drafted NPS Reserve Fund Research Request
9.Data collection	15%	21 days in the field with plot reads, plot establishment, photostations, and rare plant searches in Rx burn units.
10.Data entry	0%	Monitors worked on data entry until their 6 month furloughs.
11.Data analysis	5%	- Worked on 2009 data. - Ozark Highlands area parks fire effects data analysis was not begun for 2010, data entry is still incomplete. - Used FFI data to discover that no FMH plots at OZAR have invasive exotics.
12.Supervision/Admin	15%	- Supervision, performance appraisal plans, & 2 sets of PA's for each of my 6 staff. - Recruited aggressively for seasonal botanists with numerous job board postings on botany, fire, and natural resource websites. - Botany training MOU, travel, payroll, etc.
13.Training	10%	M-580, RX-310 lead instructor, S-216, S-131 Task book opened, FOBS task book opened, Ozark Botany, ArcGIS 9.3 with GPS integration, PMIS, IDEAS, COTR, USERRA, FISSA, Hiring Reform for Supervisors, Safety Training for Supervisors, SMIS accident reporting and Worker's Comp, Green purchasing.
14.Miscellaneous	5%	- Submitted detailed weekly reports to FMO. - Fire monitoring trip reports were submitted to BUFF, PERI, and HOSP. - Functioned as the map maker for the OZAR Fire Shop. - Duties of acting FMO

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 2010 and 2011 burn plans that the PFS wrote for OZAR.

I conducted a thorough review of the OZAR Fire Management Plan (FMP) and its appendices, such as the Biological Evaluation. I utilized my familiarity with the FMP, and a scientific literature search, to develop a 15-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.

I also developed a deeper knowledge of the Indiana bat portion of the FMP and the scientific literature. This was required to prepare 3 pages of questions and expected outcomes for an upcoming meeting (1/21/2011) with the contracted Indiana bat researchers at OZAR. I worked hard to develop a strong understanding of Indiana bat ecology, Indiana bat management issues, and how to responsibly apply prescribed fire at OZAR without harming Indiana bats. This appears to be the key to resolving the limiting Oct. 15 through March 31 prescribed-fire season currently authorized by the existing FMP. We are hoping to broaden the prescribed-fire season to Aug. 16 through April 30.

I attended the 1.5 day OZAR fire mgmt. strategic planning meeting as well as numerous shorter fire management planning meetings throughout the year.

B. 1. b. Budgets

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 4 seasonal-FEMO pay periods to cover our above average plot read schedule and August prescribed burns at WICR and GWCA.

I attended numerous meetings related to the ever-evolving FY2011 budget cuts. This frustrating process started in early May of 2010 and continued into the new year, with no end in sight. My supervisor and I were forced to meet about every 3 weeks to formulate new plans on how we would address some aspect of the latest budget cur scenario.

B. 2. Presentations

B. 2. a. RX-310

I was assigned to be the lead instructor for Intro to Fire Effects (RX-310) at the Midwest Fire Academy. Unfortunately, this 32-hour NWCG course did not come with any NWCG handouts, training aids, or support materials since it is currently under revision. In fact, it took repeated requests to get even minimal guidance from Noble Dunn, my assigned NWCG contact person who was virtually unresponsive.

RX-310 also did not come with a budget to support the travel expenses or lodging costs of any speakers. It was very challenging to recruit speakers when most agencies were cutting their travel budgets.

Fortunately, the 12 instructors that I recruited to assist in this course were extremely helpful, especially Erin Yeoman. Erin volunteered to provide 3 hours of the instruction and participate throughout the week as my co-leader. Her significant contributions were especially noteworthy considering that this course came immediately on the heels of Erin completing her intense ecology classes at the Univ. of Nevada in Las Vegas and the start of our new Fire Effects Crew.

Despite the helpfulness of my superb instructor cadre, the course demanded an enormous investment of my time to develop several hours of my own presentations, develop pre-course reading and homework assignments, recruit willing subject matter experts, produce numerous handouts, produce a student manual, and develop a hands-on real-life fire effects field trip/practicum. It also took half a day just to write thank you letters to the supervisors of all my recruited speakers.

One of the positive outcomes of this effort was locating several sets of good pre-burn and post-burn photopoints from OZAR, BUFF, and HOSP. Below are two photos from a FMH plot at OZAR on one of our moister woodland restoration units. The top photo was taken on 7/25/2000 and it shows numerous young sugar maples dominating the understory. The bottom photo shows that the same spot on 8/26/2009 is almost devoid of sugar maples in the understory. This is a tremendous achievement. When this area was originally surveyed in the early 1800's, fire-intolerant sugar maples comprised only 0.3% of the witness trees. However, sugar maples have increased dramatically in some parts of the Ozarks where they are displacing white oak regeneration that historically dominated these sites. Sugar maples are also notorious for inhibiting ground flora diversity and abundance. If sugar maples become unnaturally abundant due to fire exclusion they have the potential to degrade natural community diversity and function.



B. 2. b. Natural Areas Conference

I was asked to coordinate a half day workshop, followed by an all day field trip, for the National Natural Areas Conference in Missouri. The workshop was standing room only and the field trip had 44 people. I dealt with several issues created by the loss of 2 of my field trip co-leaders due to medical emergencies the week before the conference. The theme of both the workshop and the field trip was applying prescribed fire in ways that emulate the diversity of any regions historic fire regime.

Not only was there no travel budget to offer invited speakers, but speakers had to pay the full \$140 registration fee to attend. Again, it was very challenging to recruit speakers when most agencies were cutting their travel budgets. Consequently, to get Eric Knapp to the conference to speak on his new publication titled *Ecological Effects of Prescribed Fire Season: A Literature Review and Synthesis for Managers*, I had to petition several sources for grants. Thankfully the Joint Fire Science Program and the Mark Twain National Forest collectively provided \$1,200 to cover Eric's travel expenses from CA.

I was also asked to provide handouts and a day-long pre-conference fieldtrip on the Fire Ecology of the Current River Watershed. Fortunately the weather was wonderful for both of these all-day field trips.

B. 2. c. Nature Conservancy

At the request of The Nature Conservancy's MO. FMO, I provided presentations on the Fire Ecology of the Current River Watershed for both their spring and fall prescribed fire crews.

B. 2. d. Fire Success Story and Posters

I wrote a Fire Success Story for the Sugarloaf North burn at HOSP. I worked closely with our Fire Education Specialist helping her develop 2 Fire Success Story posters for the NPS Fire and Aviation Management Conference, one on our discovery of the nationally-rare Tall larkspur in a OZAR burn unit and another on expansion of collared lizard populations in several burn units at OZAR. I also provided her ecology edits for several fire program information sheets.

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 Resource Management (RM)

Invasive mimosa - At the request of the OZAR terrestrial ecologist and my FMO, I lead a mixed crew of OZAR fire staff and MWR detailers to complete chainsaw removal and stump treatment of a large population of invasive exotic mimosa around the Alley Spring Mill. I wrote a report on the mimosa removal project at Alley Mill for RM's files. I attended a productive meeting with the OZAR terrestrial ecologist and OZAR fire staff to discuss further goals and opportunities for collaboration to enhance the natural integrity of terrestrial resources.

Feral hogs - I made a map and filed a report with RM regarding feral hog sign that the crew discovered on Vance Mt. Our Fire Effects Monitoring Crew (FEMO) has been given training to

recognize feral hog sign. The FEMO Crew is often the only NPS staff to visit many of the more remote areas of the park. Consequently, they often function as the “eyes and ears” for a whole array of resource management issues.

This is especially true regarding the detection of invasive exotic plant populations. We routinely notify RM when we encounter invasive exotic plant populations that we believe RM would want to know about.

Feral horses - I also filed a report on a new herd of feral horses that we discovered heavily using the Russell Mt Burn Unit. It was no surprise that grazers were being attracted to the increased quality and quantity of forage produced by prescribed burning. This was the first time that feral horses have been documented using a woodland restoration unit in the park. It was also the farthest south that feral horses have been discovered in the park and it is an alarming development.

The discovery of feral horses at Russell Mt. suggests that the park’s feral horse population may exceed the 50 horse maximum. It also concerns me that our efforts to restore healthy fire-dependent natural communities may be adversely impacted by a non-native species that prefers our burn units. A significant percentage of the park’s fire-managed lands are in the vicinity of Russell Mt. and may be subjected to future grazing pressure if this herd expands. Feral horses certainly compete with some of the park’s native wildlife for vegetation and they have broad ecological impacts that have not been studied in the park.

Elk – The fact that a predominantly grazing animal like the horse is attracted to the quality and quantity of the herbaceous vegetation in our burn units near MDC’s Peck Ranch Conservation Area indicates that these burn units are likely to be utilized by elk in the near future. MDC plans to release up to 150 elk starting in 2011 on Peck Ranch, which borders 2 of our OZAR burn units.

Deer – Just like last year, I investigated, photographed, and reported that deer were eating the bark off of elm trees in the Big Spring refuge-area of the park. It is representative of an unnaturally dense deer population causing unnatural levels of resource damage. It raises the question whether deer are inhibiting the recovery of the herbaceous layer in the prescribed burn units in this portion of the park.

B. 3. b. BUFF Resource Management

At the request of the new Chief of Resource Management, I was asked to articulate the need/vision for the fire ecology program at BUFF. I investigated the fire regime and fire-dependent species of conservation concern at BUFF and provided a report for Barbara at our first meeting in March (the first of 4 in 2010).

I obtained a copy of the rare plant and animal shapefile/data for BUFF. I used it to search for fire-sensitive and fire-dependent rare species in or near the burn units. I developed a list and maps of these rare species and shared them at a special meeting of the fire staff and resource management staff in June. At the request of the FMO, I gathered info and discussed implications of the proposed Federal-listing of Ozark chinkapin and implications for fire management.

However, my main reason for the meeting was to propose abandoning our “modified” plots at BUFF that only monitored common tree species so we could reallocate that time to fire-dependent rare species. This proposal received unanimous agreement.

B. 3. c. HOSP Resource Management

Rare species - Pursued and obtained rare plant and animal location shapefiles from Arkansas Natural Heritage Commission for HOSP, since no one else in NPS seemed to have these. Obtained burn units, and other shapefiles for HOSP. Made maps of rare fire-dependent plant populations relative to our Rx burn units at HOSP.

Invasive exotics – Submitted a trip report to HOSP and AR NPS fire management, to again warn them that the south portion of the North Mt. Rx burn unit was developing a serious outbreak of sapling-sized Princess tree and Tree-of-Heaven.

Old growth - Submitted 2 trip reports and a Fire Success Story to HOSP and AR NPS fire management to document the perfect application of Rx fire in the Sugarloaf North Burn Unit in March. We observed no old-growth mortality, optimal fuel reduction, good reduction of fire-intolerant species, and excellent germination of shortleaf pine seedlings.

B. 3. d. PERI Resource Management

I made maps and reports for Kevin James to use in the Natural Resource Condition Assessment for PERI.

B. 3. e. OZAR GMP

I participated in three days of GMP meetings at HQ.

B. 4. Interagency work

B.4.a. Dual agency burn units

I was encouraged to utilize my contacts with the MO. Dept. of Conservation (MDC), to lobby for the inclusion of some of their acreage in the Booming Shoals Rx Unit. The additional acreage that they agreed to made this burn safer and more productive. I also assisted our PFS with MDC’s request to expand 3 of our dual agency burn units.

B.4.b. Rx Fire Council

Attended the two-day MO Wildland Fire Summit in Columbia that resulted in the formation of the MO Prescribed Fire Council.

B. 5. Wildfire assignments

I worked locally on 8 wildfires in or near the park. I participated in several days of wildfire severity patrols and firetower staffing as directed by the FMO.

B. 6. Prescribed fire projects

I worked on 2 Rx fires at OZAR, one as a READ trainee. I worked as a READ trainee on a Rx fire at HOSP.

B. 7. Non-fire fuels projects

B.7.a. OZAR

I taught the crew how to use an increment borer to core cedars on the Sweezie glades. We established that there were no old-growth (presettlement) cedars on these glades. Hence I recommended a fuels project to remove all of the invasive cedar from these glades. I showed the Prescribed Fire Specialist how to conduct a timber stand inventory on the Sweezie glades to quantify basal area reduction goals for the restoration plan. I also established 3 photostations in the Sweezie glades cedar removal project area. I also showed the cedar fallers what the protocols should be.

B.7.b. BUFF

At the request of Buff fire and RM staff, I toured the Pruitt Glades Rx Burn Unit and made management recommendations, along with recommendations on how to write the bid specifications and contract specifications for cedar cutting.

B. 8. Research

I drafted a NPS Reserve Fund Research Request to study nationally-rare fire-dependent plants at BUFF that are only found in the Ozarks.

B. 9. Data collection

B. 9. a. Plot reads

I assisted the crew with 10 days of plot reads at either OZAR, BUFF, or HOSP. I spent 3 days scouting routes and sites for new plot installs.

B. 9. b. Cane

Erin and I made a site assessment of the proposed Big Tree Rx Burn Unit. The terrestrial ecologist at OZAR requested us to establish a monitoring plot(s) in this river bottom old-field where the goal is to reduce softwood tree saplings and stimulate giant cane (*Arundinaria gigantea*) restoration. Unfortunately, we determined that this monitoring project was best suited to dormant season monitoring and we lacked the stability of funding to take on such a commitment.

In March, we burned the Partney Rx Burn Unit, including a small stand of cane. I made 3 follow-up visits during the growing season to ensure that the cane stand was recovering from the top-killing of the cane. There were numerous new sprouts and it did not appear there was a net-change in the number of viable cane stems.

B. 9. c. Fens

I initiated an evaluation of 2 fens adjoining the Mill Mt. Rx burn unit at OZAR where Erin Yeoman and I found sizeable populations of the fire-dependent Riddell's goldenrod, a state-listed vulnerable species (S3). Bobby Bloodworth also visited the site with me and supported an expansion of the Mill Mt. Rx Burn Unit (along with chainsaw removal of invasive cedars), to stop the cedar encroachment that was threatening these rare natural communities. This became one of the nine projects that I addressed in my 15-page NEPA scoping assessment.

B. 9. d. Tall larkspur

In mid-March I checked the Tall larkspur population in the Pistol Barrel Rx unit to ensure that they were not growing yet. We would like to burn this unit in March 2011 but we want the larkspur to still be dormant. In July, I also worked closely with my crew to establish 5 new plots to monitor the larkspur population response in this area.

In August, I searched for Tall larkspur in 4 NPS areas of the upper Current that are under consideration as additions to NPS or MDC burn units but found no larkspur or other rare plants. The MO. Dept. of Conservation (MDC) requested an expansion of their existing Bay Branch burn unit onto adjoining NPS land to improve safety and operational efficiency.

B. 10. Data entry

Data entry was not completed for 11 plots due to the higher than normal plot read schedule and the 6 month furloughs of both the Lead Monitor and Assistant Lead Monitor at the end of the plot read season. Nor did I find the time to tackle more than half a day of data entry.

B. 11. Data analysis

I started learning the FFI data analysis protocols for the 2009 annual report with intermittent help from Erin Yeoman who was often at UNLV last fall, winter, and spring. Erin is a very good and knowledgeable FFI teacher, but both of our schedules were high jacked by other obligations.

I read Scott Bressler's 2007 report *Determining Prescribed Fires' Effects On Exotic Plant Species In The Ozark Highlands Eco-Region*. I checked the FFI data to learn more about Scott's findings and discovered that the 2 invasive exotics he listed were actually *Festuca obtusa* and *Lysimachia lanceolata*, both native species, that had only been entered in FFI to their respective genus. As a result the percentage of OZAR FFI plots that had invasive exotics went from 4.5% to none.

B. 12. Supervision/Admin

B. 12. a. HR Upheaval

A low point of 2010 was losing the 2 extremely knowledgeable and helpful HR staff at OZAR. While some of these duties were shifted to the MWR, and the OZAR FPMA, others became my responsibility. It certainly feels like I have greater HR responsibilities with less accessibility to HR assistance.

B. 12. B. Recruiting

I aggressively disseminated our 2010 seasonal fire effects job announcement to numerous fire and botany contacts. I believe that this effort played a significant role in the fact that we had 50 certified qualifying applicants in 2010, versus having only 7 in 2009 when there was no ecologist to do recruiting.

I completed 6 recruiting request documents totaling 21-pages to the MWR for 2011 seasonal fire effects monitors. Marsha Mears was extremely helpful, responsive, and efficient. We had a better and earlier job announcement than the previous year when it was handled by NIFC.

B. 12. c. PA's

All 6 mid-season and 6 final performance appraisals were completed on time, and with detailed dialogue with the employee.

B. 12. d. Credit cards

Processing credit card statements has gotten totally dysfunctional. When I finished adding the supporting documentation to Erin Yeoman's last statement (she was on 6-month furlough), it was over 100 pages long! Granted, it included FEMO crew travel to do plot reads in Arkansas and prescribed burns at WICR and GWCA. Nevertheless, the administrative bureaucracy of doing this job continues to increase exponentially just in the 20 months that I have been here.

B. 13. Training

It seems that a week rarely goes by that I do not have a mandatory supervisor's training obligation. I wish that I was getting as much FFI training as I am supervisor training!

B. 13. a. M-580

The course Fire in Ecosystem Management required 7 days of my time. Although I did learn some new information, very little of it was applicable to the Ozark ecosystem. Understandably, the course was strongly focused on the western US, but most of the information I had heard before. I was disappointed that there was extremely little emphasis on developing unique fire management goals for various sites or geographies across the US. There are nationally rare fire-dependent natural communities and nationally rare fire-dependent species, yet this topic was almost untouched.

B. 13. b. Botany

I attended a week of Ozark botany training to try and preserve my declining botany skills.

B. 13. c. Staff training

I conducted several staff safety training meetings related to vehicles, heat exposure, wildland fire, and stinging insects.

B. 13. d. ArcGIS

I was very pleased that Erin, Angela, and I got to attend ArcGIS 9.3 with GPS Integration Training with Kathie Hansen in Green Bay for 3 days in September. Unfortunately, Erin and Angela started their 6-month furloughs immediately afterward, so it will be hard for them to retain what they learned in this course.

B. 14. Miscellaneous

B. 14. 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, while I am being given strong encouragement and opportunity for professional growth and development.

B. 14. 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. I mapped wildfire perimeters and made all of the prescribed burn unit maps for OZAR. My FMO rewarded me for performing GIS duties by authorizing me to get a replacement laptop with enhanced GIS capability.

B. 14. c. SCA

One of our seasonal crew members got a full time job, so I investigated how to replace them mid-season. I got everything lined up with the Student Conservation Association to get us a replacement but then the budget was withdrawn due to concerns about coming up short of funds.

C. Fire effects crew accomplishments and areas of focus

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

Table 5. Fire Effects Crew Accomplishments/Focus Areas

Category	Percent 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	3	Fire-dependent rare plant plots.
Wildfire assignments	1	LM was Task Force Leader on 1 local wildfire (1 operational period). ALM was FFT1 trainee on 1 wildfire and FFT2 on 1 wildfire (1 operational period each).
Prescribed fire projects	10	LM was RXB2 trainee on 6 OZAR burns and ENGB on 1 USFS burn. ALM was FEMO on 2 burns, FFT1 trainee on 5 burns, FFT2 on 10 others at 5 parks. 2 seasonal staff were FFT2's on a total of 10 burns at 2 parks.
Non-fire fuels projects	0	Estimated amount of time spent assisting with non-fire fuels projects; include READ activities
Data entry	16	Estimated amount of time spent entering data from paper to PC
Data analysis	5	LM guided/trained FE on 2009 data.
Supervision/Admin	6	LM and ALM typically supervised crew during plot reads. LM handled most of the travel.
Training	10	LM had 3 courses at UNLV – Principles of Plant Ecology, Field Ecology, and Ecosystem Management, Assistant lead instructor for RX-310, RXB2 task book opened, Green Purchasing. LM & ALM had ArcGIS 9.3 with GPS integration. ALM had RX-510 & S-216 Seasonal staff had a mix of Rx-310, S-212, S-130/190, I-100, I-700, S-133, All had Ozark Botany and PT
Miscellaneous	4	ALM was READ for Gulf Oil Spill

- At OZAR staff installed 3 pre-burn FMH glade plots, 5 Tall larkspur woodland plots (1 control & 4 in a previously burned unit), 2 Riddell's goldenrod pre-burn fen plots, and 3 photopoints to monitor mechanical removal of cedar at the Sweezie glades.
- At OZAR staff read 14 pre-burn plots during the growing season, 31 immediate post-burn plots during the dormant season, and 45 FMH plots during the growing season.

- At BUFF staff read 6 FMH plots during the growing season.
- At HOSP staff read 4 immediate post-burn plots during the dormant season, and 6 plots during the growing season.
- At PERI there were no 2010 or 2009 prescribed burns thus no plots were due for reads.
- Data entry was not completed for 11 plots due to the higher than normal plot read schedule and the 6 month furloughs of both the Lead Monitor and Assistant Lead Monitor at the end of the plot read season

D. Additional Information

****Note that the entire Annual Report Supplement (Excel spreadsheet) will not need to be completed this year. We will only request a completed supplement as part of the annual report every other year, as many of the requested pieces of information do not change on an annual basis.**

Please complete the new table below which contains the information from the supplement that we feel is valuable to compile on an annual basis to help assess the fire ecology program workload.

Table 6. Data Entry and Projects Monitored

Park	% 2010 Data Entered	% 2010 Data Quality Checked	# Prescribed Fires Monitored*	# Non-fire Fuels Treatments Monitored*	# Wildfires Monitored*	# BAER Treatments Monitored*
Ozark National Scenic Riverways	78%	0%	12	0	0	0
Buffalo National River	83%	0%	4	0	0	0
Hot Springs National 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.

E. Optional Information

Attach additional material not already covered: Describe in narrative form alternative monitoring activities, unique solutions to problems, and challenges facing monitoring program. Include any collaboration with natural resource managers, other federal agencies, or research institutions. Provide graphics and/or tables of data analysis results presentations, photographs of monitoring and fire activities.

It seems to me that in these times of declining budgets it behooves us to focus sharply on where we can get the most return on our fire effects monitoring budgets. Our FMH protocols do a wonderful job of capturing what is happening to fire managed natural communities, both in terms of changes to the vegetation and the fuel loads. I believe that fire management and monitoring must be anchored at the natural community level. We must understand how common species are responding to fire management.

Unfortunately, FMH protocols are so intensive that we can only read a limited number of FMH plots in a typical field season. The odds of a random-plot vegetation transect, or quadrat, intersecting a rare fire-dependent plant is miniscule. It is even more unlikely that any meaningful

number of rare plants would be intersected. Yet there are nationally rare fire-dependent and fire-sensitive species that are often endemic to a limited geography.

It seems to me that we have an obligation to account for what effect our fire management programs are having on rare species, even if that requires a reallocation of some of the time we once spent monitoring common species. I believe that monitoring rare species has great potential for helping to guide fire management in ways that maintain or increase rare plant populations.

I also believe that the targeted inclusion of rare plant monitoring gives the public enhanced value for their tax dollars by helping ensure that nationally rare fire-dependent and fire-sensitive species populations are not declining due to human factors. This may save species from becoming federally-endangered and it may help demonstrate the value of our fire management programs.