



Barrens to Bayous Fire Monitoring Network 2012



A. Summary

All-hazard incidents, amplified wildfire activity, and the hiring of our vacant fire effects position were the highlights of 2012. All members of the network were dispatched to both out of state wildfire and all-hazard incidents. Crewmembers were present at the Hurricane Sandy response as either sawyers or resource advisors. Two crewmembers also spent several pay-periods at Gulf Islands National Seashore assisting the recovery efforts after the MS Canyon Oil Spill as resource advisors and/or documentation unit leaders. During a busy prescribed fire season, the crew provided assistance in the following positions: FEMO, ATVO, FFT1, FFT2, and FALA on over 40 prescribed fires throughout the southeast region. Six of the NPS units within the monitoring network had prescribed fires in 2012. Thirty eight FMH post-burn reads were conducted following NPS prescribed fires. Interagency cooperation was provided to Holly Springs National Forest, Tombigbee National Forest, Noxubee National Wildlife Refuge, and Tishomingo State Park.

Roles served on suppression incidents included: FFT2, FFT1(T), ICT5(T), FALA, HECM, and ABRO in Alabama, Mississippi, Florida, Arkansas, Oregon, Oklahoma, and Virginia. Everyone spent time assisting with local wildfire response. This was important this summer, as the fire activity was elevated outside the typical fire season of this part of the region. Jesse burton spent a 21-day detail with the GRSM Wildland Fire Module as a squad boss trainee. Jennifer Falkey went on a 29-day assignment on the Ocala National Forest as an engine crewmember and ICT5 trainee. In addition to serving in multiple roles on all-hazard, wildfire, and prescribed fire events, the crew was still able to monitor 99 fire effects plots and enter 100% of the year's data in 2012.

Travel constraints were a primary concern for the fiscal year. A park mandatory travel stand-down from August to September impaired the crew's ability to conduct scheduled monitoring at MACA and STRI. Twenty four annual plot reads were missed, which accounted for approximately 20% of the scheduled monitoring in 2012. An additional challenge to this year's monitoring was the new 10-hour travel day restriction. This has had effects on the number of days required to be in-travel status for normal operations, including burn unit preparation, prescribed fire operations, and normal fire monitoring duties. Additionally, variables sampled within FMH plots have been further modified or abridged in order to reduce time spent within travel status. The network will continue to explore remote sensing and/or surrogates for the monitoring of arduous variables in the future.

We were fortunate to be able to fill a vacant permanent position early in 2012 with William Hilton. He has served in many parks over the years working with endangered birds, vegetation, and fire monitoring. He began his career as a seasonal fire effects monitor with the Ozark Highlands Cluster, our neighbor to the west. His first year with the crew, William was able to go out on two wildfire assignments to Oklahoma, assist with multiple prescribed burns, and assist with much of the year's fire effects monitoring.

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

Park	Monitoring Type	Type Code	Plot Type	Pre-burn 2012	Immed. Post 2012	Post-burn/Annual 2012	Annual Total (2012)	Total Plots
Gulf Islands National Seashore	Sand Pine - Scrub Oak	PICL	FMH Forest Plot	0	0	5	5	12
	Longleaf - Slash Pine	PIPA	FMH Forest Plot	0	0	10	10	12
	Pitcher Plant Savannah	SAAL	FMH Forest Plot	0	1	0	1	1
	Fuels Monitoring	FUELS	Fuel Plot	0	1	0	1	4
Mammoth Cave National Park	Redcedar – Oak Glade	JUVI	FMH Forest Plot	0	0	6	6	7
	Indiangrass Grassland	SONU	FMH Grass Plot	0	1	2	3	8
	Big Bluestem Grassland	ANGE	FMH Grass Plot	0	0	3	3	5
	Oak – Hickory Woodland	OAHI	FMH Forest Plot	0	2	2	4	9
	Chestnut Oak Woodland	QUMO	FMH Forest Plot	0	0	0	0	3
	Fuels Monitoring	FUELS	Fuel Plot	0	0	0	0	4
	Old Field	OLFI	FMH Forest Plot	0	2	0	2	2
Little River National Preserve	Shortleaf Pine Forest	PIEC	FMH Forest plot	0	0	2	2	12
	Green Pitcher-plant Bog	SAOR	FMH Forest plot	0	0	3	3	6
	Chestnut Oak Forest	QUMO	FMH Forest plot	0	0	2	2	7
Natchez Trace Parkway	Oak – Hickory Woodland	OAHI	FMH Forest Plot	1	4	1	6	6
	Post Oak Savanna	QUST	Mod. F. Plot [†]	0	3	0	3	3
	Redcedar Encroached Prairie	JUVI	FMH Brush Plot	0	4	1	5	4
	Loblolly Pine Forest	PITA	FMH Forest Plot	0	5	2	7	14
	Redcedar Encroached Prairie	BLACK BELT	FMH Grass Plot	0	0	4	4	4
	Tennessee Barrens	TNBA	Mod. F. Plot [†]	3	0	0	3	3
	Japanese Grass Invaded Streamside Forest	MIVI	FMH Grass plot	0	5	0	5	10
Horseshoe Bend NMP	Mixed Montane Longleaf Forest	PIPA	FMH Forest Plot	0	1	1	2	5
Stones River National Battlefield	Little Bluestem Fields	SCSC	FMH Grass Plot	0	0	0	0	15
	Central Basin Barrens	ANTE	FMH Grass Plot	0	8	0	8	9
	Grassland Restoration Areas	ANVI	FMH Grass Plot	0	0	0	0	10
	Fuels Monitoring	FUELS	Fuel Plot	0	1	0	1	3
	Redcedar Woodland	JUVI	FMH Forest Plot	0	0	0	0	1
Russell Cave NM	Chestnut Oak Forest	QUMO	FMH Forest Plot	0	0	0	0	1
Vicksburg NMP	Exotics Monitoring	VICK	Photo Plot	1	3	9	13	6
Total				5	41	53	99	186

[†]See 2011 B2B Annual Report for plot layout and methods.

Table 2. Fire Ecology Staffing 2012

Ecologist and Monitors	Starting Date	Ending Date	# of Pay Periods	READ Qualified	Training and Development
Jesse Burton Ecologist	01/01/12	12/31/12	26	Yes	Ignition Operations (S-234), Followership to Leadership (L-280), ICT5(T) during BUFF Severity, Fire Program Management (M-581), Faller-B Taskbook Initiated, 21-day WFM detail
Carol Fields Lead Monitor	01/01/12	12/31/12	26	Yes	Biodiversity and Conservation of Birds (Resource Management funded project), Black Belt Prairie Plants Workshop
Jennifer Falkey Monitor	1/1/12 9/10/12	5/18/12 12/31/12	10 8 (18* total)	Yes	Emergency Medicine and Trauma Conference, ICT5(T) during Ocala NF Severity, Ignition Operations (S-234), Followership to Leadership (L-280), Wilderness First Aid, EMT-B Refresher, Documentation Unit Leader (DOCL) Taskbook Initiated
William Hilton Monitor	2/28/12	11/2/12	18*	No	Faller-A Taskbook Initiated/Completed, Faller-B Taskbook Initiated, ATV Operator Training

Help was also provided by the NATR Fire Management Suppression and Fuels programs, NATR Natural Resource Specialist, and LIRI Resource Management staff. Their field support greatly aided the crew this past year.

*Number of pay periods worked may not include additional time worked on wildfire and all-hazard incidents.

Jesse Burton serving as an ICT5 trainee on the lightning caused Iceledo Wildfire, Ozark National Forest, AR.

August 15, 2012

Will Hilton assists with Hurricane Sandy recovery efforts and sharpens sawyer skills as a FALB trainee, Hamilton Grange National Memorial, New York, NY. November 11, 2012



Table 3. Management Objectives and Monitoring Results 2012

The monitoring results for this report are broken down by park in the following pages. Data entry is current up to the end of calendar year 2012 and all analyses conducted this year have used the most recent data entered and checked. Results are reported with 80% confidence intervals of the mean unless otherwise noted. Basic formulas for each analysis are now displayed in the management objectives column. Significant changes in monitoring results are in **bold** font. An underlined number of plots denote that minimum sample sizes have been achieved. Estimations of minimum sample size were conducted in 2010 with the 'SS Two Samples' tool created by Ken Gerow (available online at www.statsalive.com). Sample sizes needed with current variance are given in brackets when minimum size has not been achieved. When brackets are not given, variance and correlation of samples do not yet allow for an estimate of minimum sample size.



Typical fire behavior in this mixed oak – shortleaf pine ridge vegetation. Primary objectives for the interagency Tishomingo prescribed fire were to reduce encroachment of exotic woody species and fuel loading. Photo taken on NATR/State Park boundary. March 27, 2012

Orange-fringed orchid (*Platanthera ciliaris*) is likely one of hundreds of species that benefited from a summer prescribed fire (August 2011) within this pitcher-plant bog. This unique community can contain as many as 50 plant species per square meter, likely one of the highest small-scale bio-diversities in the world (Forgotten Grasslands of the South, by Reed Noss, 2012)



Green Pitcher-plant Bog Forest – SAOR 01 (LIRI)
July 23, 2012

Table 3.1. Summary of Long-term Monitoring Results at Gulf Islands National Seashore

Vegetation Type	Management Objectives (Restoration)	Monitoring Results (80% Confidence Intervals)	Objective Achieved?	Year Analysis Completed (Range)
Sand Pine – Scrub Oak (FPICL1D07)	20-40% litter and duff reduction immediate post-burn $\frac{\beta_{Post} - \text{before } \beta}{\text{before } \beta}$	Decrease of Duff = 14.9 % (± 26 %) after 1 st fire <i>n</i> =8 [32], 3 burn units 1.1 % (± 58 %) after 2 nd fire <i>n</i> =6 [25], 4 burn units 54.5 % (± N/A) after 3 rd fire <i>n</i> =1, 1 burn units Decrease of Litter = 42.0 % (± 19 %) after 1st fire <i>n</i> =8, 3 burn units +20.0 % (± 98 %) after 2nd fire <i>n</i> =6 [42], 4 burn units 8.7 % (± N/A) after 3 rd fire <i>n</i> =1, 1 burn units	Uncertain Data are highly variable, may be confounded by hurricanes Ivan, Dennis, & Katrina [Objective to be changed in 2013 to reflect long-term management of fuel loading]	2012 (2000-2012)
	40-60% reduction of pole-sized trees by 2 nd year after 3 rd burn $\frac{\beta_{YR02} - 00Pre}{00Pre}$	Pole density reduction= 9.6 % (± 4 %) after 1st fire <i>n</i> =10, 5 burn units 21.8 % (± 8 %) after 2nd fire <i>n</i> =3, 2 burn units	Uncertain Plots have not been burned three times and objective reduction has not been met	2010 (2000-2010)
	20-40% increase in herbaceous cover by 2 nd year after 3 rd burn $\frac{\beta_{YR02} - 00Pre}{00Pre}$	Increase in relative cover = 96.1 % (± 65 %) after 1st fire <i>n</i> =8 [80], 4 burn units 210.7 % (± 124 %) after 2nd <i>n</i> =3 [230], 2 burn units)	Yes/Uncertain Plots have not burned three times	2010 (2000-2010)
Longleaf – Slash Pine Savanna (FPIPA1D07)	50-90% hardwood pole reduction by one Year after the 3 rd burn. $\frac{\beta_{YR01} - 00Pre}{00Pre}$	Density Reduction = 59.3 % (± 15 %) after 1st fire <i>n</i> =9, 4 burn units 67.6 % (± 15 %) after 2nd fire <i>n</i> =9, 4 burn units 82.6 % (± N/A %) after 3 rd fire <i>n</i> =1, 1 burn units	Yes All plots have not burned three times	2010 (2000-2010)
	20-40% litter and duff reduction immediate post-burn $\frac{\beta_{Post} - \text{before } \beta}{\text{before } \beta}$	Decrease of Duff = 14.2 % (± 15 %) after 1 st fire <i>n</i> =8 [18], 3 burn units 19.2 % (± 15 %) after 2nd fire <i>n</i> =10 [18], 4 burn units 42.3 % (± 12 %) after 3rd fire <i>n</i> =8, 3 burn units 28.3 % (± 30 %) after 4 th fire <i>n</i> =3, 2 burn units Decrease of Litter = 61.9 % (± 6 %) after 1st fire <i>n</i> =8, 3 burn units 59.7 % (± 13 %) after 2nd fire <i>n</i> =10 [19], 4 burn units 38.6 % (± 28 %) after 3rd fire <i>n</i> =8 [68], 3 burn units) +36 % (± 99 %) after 4th fire <i>n</i> =3 [68], 2 burn units)	Yes Reductions of litter with initiation of Rx fire and duff reductions occurred in later treatments [Objective to be changed in 2013 to reflect long-term management of fuel loading]	2012 (2000-2012)
	20-40% increase of herbaceous cover by 2 nd year after 3 rd burn.	Increase in cover = 36.9 % (± 32 %) after 1 st fire <i>n</i> =7 [13], 3 burn units 147.5 % (± 82 %) after 2nd fire <i>n</i> =6 [191], 3 burn units)	Yes/Uncertain Increase in graminoid and forb cover by second burn; however, plots	2010 (2000-2010)

	$\frac{\beta_{YR02} - 00Pre}{00Pre}$		have not burned three times	
	Limit mortality of longleaf and slash pine to 20%	Density Reduction = 12.0 % ($\pm 13\%$) after 1 st fire $n=11$, 4 burn units 20.8 % ($\pm 22\%$) after 2 nd fire $n=6$ [22], 3 burn units	Uncertain Data are highly variable	2010 (2000-2010)
	$\frac{\beta_{YR02} - 00Pre}{00Pre}$			
Pitcherplant Savannah (FSAAL1G010)	Decrease litter and duff loading by 20-40% immediate post-burn	Decrease of Duff = 12.5 % ($\pm 14\%$) after 1 st fire $n=4$, 1 burn units 11.8 % ($\pm 0\%$) after 2nd fire $n=2$, 1 burn units) 19.0 % ($\pm N/A\%$) after 3 rd fire $n=1$, 1 burn units	Yes/Uncertain Plots do not reach minimum 20% duff reductions per treatment.	2012 (2001-2012)
Wet Pine Savanna/Mesic Flatwoods Fuels (added to increase sample size of fuels analysis)	$\frac{\beta_{Post} - before \beta}{before \beta}$	Decrease of Litter = 63.2 % ($\pm 5\%$) after 1st fire $n=4$, 1 burn units) 23.3 % ($\pm 72\%$) after 2 nd fire $n=2$, 1 burn units 17.4 % ($\pm N/A\%$) after 3 rd fire $n=1$, 1 burn units	[Objective to be changed in 2013]	
	Limit mortality of overstory pine trees to less than 20% measured 2 years post burn	Density Reduction = 4.5 % ($\pm N/A\%$) after 1 st fire $n=1$, 1 burn units 25.0 % ($\pm N/A\%$) after 2 nd fire $n=1$, 1 burn units	Yes/Uncertain* Mortality after 2 nd fire is likely a result of hurricanes Ivan, Dennis, & Katrina	2010 (2001-2010)
	$\frac{\beta_{YR02} - 00Pre}{00Pre}$			
	Reduce pole tree density by 40-90%	Density Reduction = 0 % ($\pm N/A\%$) after 1 st fire $n=1$, 1 burn units 16.7 % ($\pm N/A\%$) after 2 nd fire $n=1$, 1 burn units	No/Uncertain* Pole densities were very low at pre-burn levels (< 50 per/acre)	2010 (2001-2010)
	$\frac{\beta_{YR02} - 00Pre}{00Pre}$			
	Reduce shrub density by 40-90%	Density Reduction = +108 % ($\pm N/A\%$) after 1st fire $n=1$, 1 burn units) +92.5 % ($\pm N/A\%$) after 2nd fire $n=1$, 1 burn units)	No/Uncertain*	2010 (2001-2010)
	$\frac{\beta_{YR02} - 00Pre}{00Pre}$			
	Cause no net decrease in cover of yellow trumpets (<i>Sarracenia alata</i>)	Increase in cover = 100 % ($\pm N/A\%$) after 1 st fire $n=1$, 1 burn units 100 % ($\pm N/A\%$) after 2 nd fire $n=1$, 1 burn units	Yes/Uncertain* Only one plot is installed in this monitoring type	2010 (2001-2010)
	$\frac{\beta_{YR02} - 00Pre}{00Pre}$			
	Increase herbaceous component of the understory by 20-40% measured 2 years after the 3rd burn	Increase in cover = -1.4 % ($\pm N/A\%$) after 1st fire $n=1$, 1 burn units) -36.6 % ($\pm N/A\%$) after 2nd fire $n=1$, 1 burn units)	No/Uncertain* Only one plot is installed in this monitoring type and plot has not burned three times	2010 (2001-2010)
	$\frac{\beta_{YR02} - 00Pre}{00Pre}$			

*No statistical analysis was conducted on the FSAAL1G01 plots because of the limited number of plots.



Pitcherplant (*Sarracenia alata*) Savannah/Mesic Flatwoods (SAAL01) after 2 burns, Davis Bayou, MS (GUIS)



Sand Pine Scrub (PICL06) after 2 burns and 12 years, Naval Live Oaks (NLO), FL (GUIS)

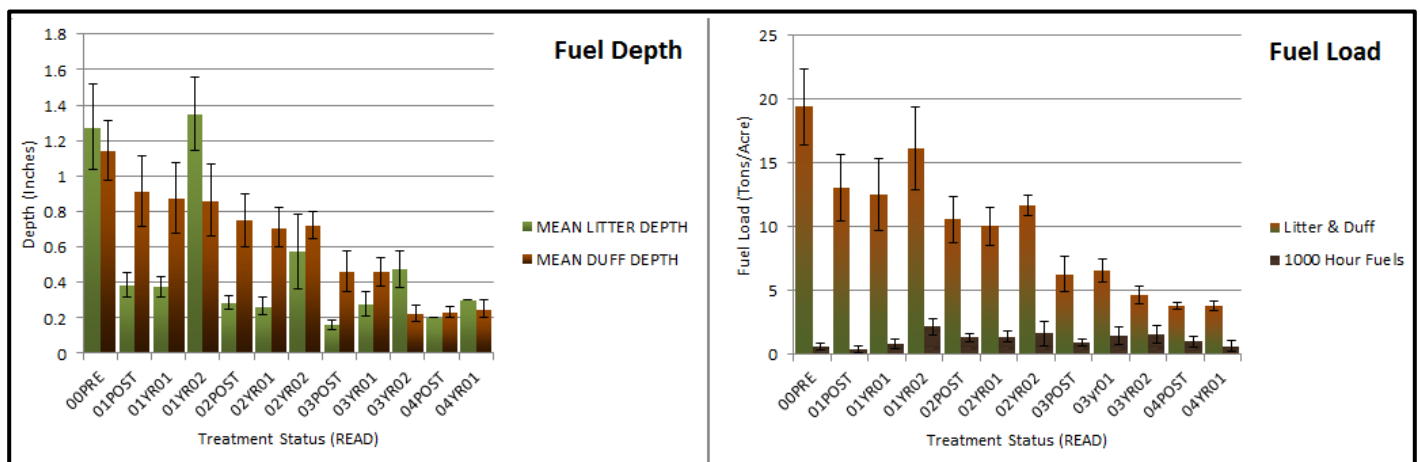


Live fuel moisture analysis immediately prior to prescribed fire in the Park Unit, Davis Bayou, MS, (GUIS)

January 7, 2012



Longleaf – Slash Pine Savanna (PIPA06) after 4 burns and 11 years, NLO, FL (GUIS)



Depths and loading for primary fuel constituents of Naval Live Oaks' longleaf – slash pine savanna (PIPA) over the last 10 years. There has been an 82% reduction in litter & duff fuel depth (inches) and an 80% reduction in load (tons/acre) from 00PRE to 04POST. Hurricanes Ivan and Katrina are responsible for the significant increase in 1,000 hour fuels between 01YR01 and 02POST monitoring. Subsequent burning is beginning to reduce coarse woody debris to pre-hurricane levels.



Listed as a threatened plant in the Preservation of Native Flora of Florida Act, this panhandle meadow-beauty (*Rhexia salicifolia*) is greatly benefiting from the recent (2011) prescribed fires in the NLO 6 burn unit. (GUIS) May 3, 2012

Table 3.2. Summary of Long-term Monitoring Results at Horseshoe Bend National Military Park

Vegetation Type	Management Objectives (Restoration)	Monitoring Results (80% Confidence Intervals)	Objective Achieved?	Year Analysis Completed (Range)
Mixed Montane Longleaf Pine Forest (FPIPA1D07)	Decrease density of all pole trees by 20-90% as measured 1 year post burn $\frac{\beta YR01 - 00Pre}{00Pre}$	Density Reduction = 16.7 % (± 23 %) after 1 st fire <i>n</i> =5 [19], 4 burn units 59.0 % (± N/A %) after 2 nd fire <i>n</i> =1, 1 burn units	Uncertain	2010 (2004-2010)
	Decrease litter loading by 40-90% as measured immediately post burn $\frac{\beta Post - before \beta}{before \beta}$	Decrease of Duff = 2.3 % (± 13 %) after 1 st fire <i>n</i> =5, 4 burn units +50.0 % (± 1 %) after 2nd fire <i>n</i> =2, 2 burn units Decrease of Litter = 38.5 % (± 16 %) after 1 st fire <i>n</i> =5 [6], 4 burn units 45.1 % (± 13 %) after 2 nd fire <i>n</i> =2, 2 burn units	Uncertain Reductions of litter do not yet meet objective and no reduction of duff [Objective to be changed in 2013]	2010 (2004-2010)
	Limit mortality of overstory longleaf pine (<i>Pinus palustris</i>) trees to less than 10% as measured 2 years post burn $\frac{\beta YR02 - 00Pre}{00Pre}$	Density Reduction = 4.8 % (± 4 %) after 1 st fire <i>n</i> =2 [7], 2 burn units 18.2 % (± N/A %) after 2 nd fire <i>n</i> =1, 1 burn units	Yes/Uncertain Not all plots have been monitored two years post	2010 (2004-2010)
	Cause no net gain in percent cover of exotic plants as measured one year and five years post burn $\frac{\beta YR01 - 00Pre}{00Pre}$	Increase in cover = 0.0 % (± N/A %) after 1 st fire <i>n</i> =5, 4 burn units 0.0 % (± N/A %) after 2 nd fire <i>n</i> =1, 1 burn units	Yes No exotic species have been detected in FPIPA1D07 plots and no plots have been monitored five years post-burn	2010 (2004-2010)



Mixed Montane Longleaf Pine Forest (PIPA01) after two fires and eight years.
October 27, 2004 & October 18, 2012

(HOBE)

Table 3.3. Summary of Long-term Monitoring Results at Little River National Preserve

Vegetation Type	Management Objectives (Restoration)	Monitoring Results (80% Confidence Intervals)	Objective Achieved?	Year Analysis Completed (Range)
Shortleaf Pine Forest (FPIEC1DG09)	25-80% reduction in pole-sized trees by 3 rd burn <i>$\beta_{YR01} - 00Pre$</i> <i>00Pre</i>	Density Reduction = 6.2 % (± 4 %) after 1 st fire <i>n=11, 4 burn units</i> 36.0 % (± 20 %) after 2 nd fire <i>n=9 [27], 4 burn units</i> 69.1 % (± 20 %) after 3 rd fire <i>n=4 [14], 2 burn units</i>	Yes	2010 (1999-2010)
	25-50% increase native grass and forb cover <i>$\beta_{YR02} - Earliest Read$</i> <i>Earliest Read</i>	Increase in Cover = 225.2 % (± 103 %) after 1 st fire <i>n=5, 2 burn units</i> 194.5 % (± 136 %) after 2 nd <i>n=6, 3 burn units</i> 418.2 % (± 129 %) after 3 rd <i>n=2, 1 burn units</i>	Yes	2010 (1999-2010)
	50% reduction in duff, litter, and downed woody fuel by 3 rd burn <i>$\beta_{Post} - 00Pre$</i> <i>00Pre</i>	Decrease of Duff = 0.6 % (± 12 %) after 1 st fire <i>n=12, 6 burn units</i> 43.6 % (± 8 %) after 2 nd fire <i>n=6, 2 burn units</i> 37.4 % (± 23 %) after 3 rd fire <i>n=5, 3 burn units</i> Decrease of Litter = 51.3 % (± 6 %) after 1 st fire <i>n=12, 6 burn units</i> 56.6 % (± 14 %) after 2 nd fire <i>n=6, 2 burn units</i> 78.6 % (± 4 %) after 3 rd fire <i>n=5, 3 burn units</i> Decrease in Total Wood = +15.1 % (± 23 %) after 1 st fire <i>n=12, 6 burn units</i> +63.5 % (± 54 %) after 2 nd fire <i>n=6 [13], 2 burn units</i> +117 % (± 75 %) after 3 rd fire <i>n=5 [31], 3 burn units</i>	Uncertain Objective has been achieved for litter fuel loading; however, duff has had limited reductions and total woody debris is increasing during initial treatments [Objective to be changed in 2013]	2010 (1999-2010)
Green Pitcherplant Bog Forest (FSAOR1G10)	30-90% decrease in shrub cover by second year after 3 rd burn <i>$\beta_{YR02} - Earliest Read$</i> <i>Earliest Read</i>	Decrease in cover = 29.3 % (± 12 %) after 2 nd fire <i>n=6, 3 burn units</i> 32.1 % (± 25 %) after 3 rd fire <i>n=2 [3], 1 burn units</i> +61.6 % (± 56 %) after 4 th fire <i>n=2 [6], 1 burn units</i>	Uncertain All plots must burn 3 times	2010 (1998-2010)
	20% increase cover of green pitcherplant (<i>Sarracenia oreophila</i>) by second year after 3 rd burn <i>$\beta_{YR02} - Earliest Read$</i> <i>Earliest Read</i>	Increase in cover = 21.4 % (± 26 %) after 2 nd fire <i>n=6 [18], 3 burn units</i> 80.1 % (± 26 %) after 3 rd fire <i>n=2 [26], 1 burn units</i> 70.1 % (± 90 %) after 4 th fire <i>n=2, 1 burn units</i>	Yes/Uncertain Plots have not burned 3 times and high variability due to low numbers of individuals along transects; additional methods have been added to these plots to address this issue	2010 (1998-2010)
	30-90% decrease in pole-sized trees by second year after 3 rd burn	Pole reduction = 13.2 % (± 21 %) after 1 st fire <i>n=3 [5], 1 burn units</i> 57.8 % (± 15 %) after 2 nd fire <i>n=5 [10], 3 burn units</i>	Yes Local park staff is also applying mechanical treatment to pole	2010 (1998-2010)

	$\beta YR02 - 00Pre$ 00Pre	68.7 % (± 20 %) after 3 rd fire <i>n</i> =3 [20], 2 burn units 58.3 % (± 34 %) after 4 th fire <i>n</i> =2 [7], 1 burn units	size trees	
Chestnut Oak Forest (FQUM01G10)	20-60% reduction in pole-sized trees	Density Reduction = 37.6 % (± 14 %) after 1 st fire <i>n</i> =4 [19], 3 burn units 41.0 % (± 0 %) after 2 nd fire <i>n</i> =2 [6], 1 burn units 69.0 % (± 17 %) after 3 rd fire <i>n</i> =2 [7], 1 burn units	Yes/Uncertain All plots must burn and have annual read to reach minimum sample size	2010 (2002-2010)
	$\beta YR01 - 00Pre$ 00Pre			
	25-50% increase native grass and forb cover	Increase in Cover = 145.1 % (± 197 %) after 1 st fire <i>n</i> =4 [10], 3 burn units 383.7 % (± 105 %) after 2 nd fire <i>n</i> =2, 1 burn units 0.0 % (± 0.0 %) after 3 rd fire <i>n</i> =2, 1 burn units	Uncertain All plots must burn and have annual read to reach minimum sample size	2010 (2002-2010)
	$\beta YR01 - 00Pre$ 00Pre			



First burned in 1999, this green pitcher-plant bog (SAOR01) has been treated 5 times over the last 13 years. Understory tree density was reduced after the initial treatments; however, subsequent dormant season fire has only appeared to limit height of persistent resprouts. The wet nature of these Southern Appalachian Low Mountain Seepage Bogs in the early spring greatly reduces fire intensities when surrounding upland mixed forests burn well. (LIRI)



Chestnut oak forest (QUM034) after 2 burns and 6 years. (LIRI)

Table 3.4. Summary of Long-term Monitoring Results at Mammoth Cave National Park

Vegetation Type	Management Objectives (Restoration)	Monitoring Results (80% Confidence Intervals)	Objective Achieved?	Year Analysis Completed (Range)
Oak-Hickory Forest (FOAHI1D09)	Decrease density of shade tolerant pole trees by 30-90% ¹ $\frac{\beta YR01 - 00Pre}{00Pre}$	Density Reduction = 58.5 % (± 15 %) after 1st fire n=7 [9], 5 burn units	Yes Density of shade intolerant species significantly reduced by > 30%, All plots must burn and be monitored during annual read to meet min sample size	2010 (2005-2010)
	Limit mortality of overstory trees to less than 20% $\frac{\beta YR01 - 00Pre}{00Pre}$	Density Reduction = 7.4 % (± 5 %) after 1st fire n=7, 5 burn units	Yes	2010 (2005-2010)
	Increase native herbaceous cover by 10-25% by 1 year after the 3 rd burn $\frac{\beta YR02 - 00Pre}{00Pre}$	Increase in cover = 148.3 % (± 63 %) after 1st fire n=7, 5 burn units	Yes All plots have experienced increases in herbaceous cover; however, plots have not burned 3 times	2010 (2005-2010)
	Reduce total fuel load by 25-50% immediately postburn. $\frac{\beta Post - before \beta}{before \beta}$	Decrease in total fuels = 33.3 % (± 10 %) after 1st fire n=7, 5 burn units	Yes Reduction objective does not fall outside range of confidence	2010 (2005-2010)
Redcedar Glade Forest (FJUUV1D09)	Reduce litter, duff, and downed woody fuel load by 25-50% $\frac{\beta Post - before \beta}{before \beta}$	Decrease of Duff = +24.1 % (± 32 %) after 1st fire n=7 [9], 4 burn units 25.7 % (± 32 %) after 2 nd fire n=3 [25], 1 burn units Decrease of Litter = 46.3 % (± 10 %) after 1st fire n=7 [21], 4 burn units 31.3 % (± 27 %) after 2 nd fire n=3 [27], 1 burn units Decrease in Total Wood = 3.4 % (± 19 %) after 1 st fire n=7 [8], 4 burn units 36.5 % (± 27 %) after 2 nd fire n=3 [4], 1 burn units	No/Uncertain Significant reductions in litter fuel loading; however, duff and downed woody fuels do not yet show responses to treatment [Objective to be changed in 2013]	2010 (2002-2010)
	Reduce pole-sized trees by 40-60% $\frac{\beta YR01 - 00Pre}{00Pre}$	Density Reduction = 12.3 % (± 12 %) after 1 st fire n=6, 3 burn units	No This objective is being reevaluated as very low fire intensities are advised for this ecotype	2010 (2002-2010)
	Limit mortality to overstory species to less than 20% $\frac{\beta YR01 - 00Pre}{00Pre}$	Density Reduction = +2.2 % (± 4 %) after 1 st fire n=6, 3 burn units	Yes	2010 (2002-2010)

	<i>00Pre</i>			
Chestnut Oak Woodland (FQUM01D09)	Decrease density of shade tolerant pole trees by 30-90 % ¹ $\frac{\beta_{YR01} - 00Pre}{00Pre}$	Density Reduction = 33.3 % (± N/A %) after 1 st fire <i>n</i> =1, 1 burn units	Yes/Uncertain Limited sample size	2010 (2000-2010)
	Limit mortality of overstory trees to less than 20 % $\frac{\beta_{YR01} - 00Pre}{00Pre}$	Density Reduction = 4.0 % (± N/A %) after 1 st fire <i>n</i> =1, 1 burn units	Yes/Uncertain Limited sample size	2010 (2000-2010)
	Reduce total fuel load by 25-50 % after 3 burns $\frac{\beta_{Post} - before \beta}{before \beta}$	Decrease in total fuels = 20.2 % (± 7 %) after 1st fire <i>n</i>=3, 2 burn units +14.4 % (± N/A %) after 2st fire <i>n</i> =1, 1 burn units	Yes/Uncertain Significant reduction in total fuels; however, fuels not reduced by > 25% after first treatment	2010 (2000-2010)
	Increase native grass and forb cover by 10-25 % after 3 burns $\frac{\beta_{YR01} - 00Pre}{00Pre}$	Increase in cover = -68.3 % (± 18 %) after 1st fire <i>n</i>=2, 1 burn units 21.7 % (± N/A %) after 2 nd fire <i>n</i> =1, 1 burn units	Uncertain Limited sample size and plots have not burned three times	2010 (2000-2010)
Indian Grass Grassland (BSONU1T02)	Reduce density of shade tolerant seedlings 30% to 60% one year after second fire ² $\frac{\beta_{YR01} - 00Pre}{00Pre}$	Density Reduction = 39.1 % (±21 %) after 1 st fire <i>n</i> =3 [20], 1 burn unit 45.8 % (±25 %) after 2nd fire <i>n</i>=2 [4], 1 burn unit	Yes/Uncertain Reductions are occurring; however, >30% is not outside the confidence interval	2010 (2002-2010)
	Reduce density of shrubs 30% to 60% one year after second fire $\frac{\beta_{YR01} - 00Pre}{00Pre}$	Density Reduction = 35.3 % (±9 %) after 1st fire <i>n</i>=3, 1 burn unit 23.2 % (±54 %) after 2 nd fire <i>n</i> =2 [43], 1 burn unit	Uncertain Significant reduction occurred after first treatment; however, all plots must burn 2 two times	2010 (2002-2010)
	Cause no net gain in percent cover of exotic plants after five years of burning ³ $\frac{\beta_{YR02} - 00Pre}{00Pre}$	Increase in cover = 156.1 % (± 136 %) after 1 st fire <i>n</i> =3, 1 burn units 371.2 % (± 550 %) after 2 nd fire <i>n</i> =2, 1 burn units	Uncertain Plots have not burned 5 times and minimum sample size not met	2010 (2002-2010)
	Increase relative cover of Indiangrass (<i>Sorghastrum nutans</i>) 15% after five years of burning $\frac{\beta_{YR02} - 00Pre}{00Pre}$	Increase in cover = 534.6 % (± 319 %) after 1 st fire <i>n</i> =3, 1 burn units 81.9 % (± 142 %) after 2 nd fire <i>n</i> =2, 1 burn units	Uncertain Plots have not burned 5 times and minimum sample size not met	2010 (2002-2010)

¹ Shade intolerant species include *Carya*, *Pinus*, and *Quercus* genera. Density analyzed for all other species.

² Density analyzed for *Acer*, *Juniperus*, *Sassafras*, and *Ulmus* genera.

³ Exotics in SONU plots include; *Digitaria* spp., *Kummerowia* spp., *Lespedeza cuneata*, *Lonicera japonica*, *Microstegium vimineum*, *Ligustrum* spp., and *Setaria* spp.

Big Bluestem Grassland (BANGE1D02)	Cause no net gain in percent cover of exotic plants as measured one year and five years post burn $\frac{\beta YR01 - 00Pre}{00Pre}$	Decrease in cover = 56.4 % (± 12 %) after 1 st fire <i>n=2, 1 burn units</i> 96.3 % (± 1 %) after 2 nd fire <i>n=2, 1 burn units</i>	Yes Limited sample size and all plots must burn	2010 (2000-2010)
	Decrease invading woody species by 30% as measured 1-year post burn $\frac{\beta YR01 - 00Pre}{00Pre}$	Density Reduction = +38.5 % (± 135 %) after 1 st fire <i>n=4 [13], 1 burn unit</i> 49.7 % (± 5 %) after 2 nd fire <i>n=2 [4], 1 burn unit</i>	Yes/Uncertain Limited sample size and all plots must burn	2010 (2000-2010)
Old Field (FOLFI1D08)	Increase density of oak and hickory seedlings after three burns, as measured one year post-burn $\frac{\beta YR01 - 00Pre}{00Pre}$	Density Increase = N/A	Uncertain Plots have not had annual read	2011 (2011-)
	Reduce density of shade tolerant pole by greater than %50 after three burns $\frac{\beta YR01 - 00Pre}{00Pre}$	Density Reduction = N/A	Uncertain Plots have not had annual read	2011 (2011-)
	Reduce total fuel load by >25 % after 3 burns $\frac{\beta Post - before \beta}{before \beta}$	Decrease in total fuels = 7.1 % (± 19 %) after 1 st fire <i>n=2, 1 burn units</i>	Uncertain Plots have not burned 3 times	2012 (2011-2012)



Mammoth Cave NP Chestnut Oak Woodland (QUM031) after 2 fires and 10 years.



Big Bluestem Grassland (ANGE03) after 2 fires and 12 years. Since its last fire in 2007, shrub and tree encroachment is rapidly occurring at this restored Kentucky Barren site at Chaumont Prairie. (MACA)

Table 3.5. Summary of Long-term Monitoring Results at Natchez Trace Parkway

Vegetation Type	Management Objectives (Restoration)	Monitoring Results (80% Confidence Intervals)	Objective Achieved?	Year Analysis Completed (Range)
Mixed Loblolly Pine Forest (FPITA1D09)	Reduce total fuel load by 20-40% immediately post-burn $\frac{\beta_{Post} - \text{before } \beta}{\text{before } \beta}$	Total fuel reduction = 40.2 % (± 5 %) after 1st fire <i>n=12, 7 burn units</i> 2.0 % (± 15 %) after 2 nd fire <i>n=6 [9], 2 burn units</i> 4.6 % (± 17 %) after 3 rd fire <i>n=6 [8], 2 burn units</i> 28.4 % (± 14 %) after 4th fire <i>n=4 [7], 2 burn units</i>	Yes Significant reduction after 1 st and 4 th burns; however, only first treatment exceeds 20 % reduction	2010 (2001-2010)
	Reduce conifer poles (2.5-15.0 cm dbh) > 25% one year after 3 rd fire $\frac{\beta_{YR01} - 00Pre}{00Pre}$	Density reduction = 8.3 % (± 10 %) after 1 st fire <i>n=4 [10], 3 burn units</i> +12.5 % (± 14 %) after 2nd fire <i>n=4 [11], 2 burn units</i> 41.7 % (± 29 %) after 3rd fire <i>n=4 [34], 2 burn units</i> 33.3 % (± 33 %) after 4 th fire <i>n=3 [15], 2 burn units</i>	Yes/Uncertain Significant reduction after 3 rd treatment and few plots now contain conifer poles	2010 (2001-2010)
	Cause no net gain in percent cover of exotic plants after 5 burns ⁴ $\frac{\beta_{YR01} - \text{earliest read}}{\text{earliest veg. read}}$	Average reduction = +10.0 % (± 3.1 %) after 1st fire <i>n=2, 2 burn units</i> + 1.5 % (± 1.5%) after 2nd fire <i>n=2, 1 burn unit</i> 5.8 % (± 3.4 %) after 3 rd fire <i>n=4, 2 burn unit</i>	Uncertain All existing plots must burn to meet sample size and plots containing exotic species have not experienced five treatments	2010 (2001-2010)
Black Belt Prairie (BJUVI1D06)	25-50% reduction of redcedar (<i>Juniperus virginiana</i>) density after 5 years of burning $\frac{07YR01 - 00Pre}{00Pre}$	Density reduction = 86.2 % (± 17 %) after 7th fire <i>n=4 [18], 1 burn units</i>	Yes Significant reduction after 7 th burn, data not available immediately after 5 th burn	2011 (2002-2011)
	20-40% reduction in woody exotic species density by 4 th burn $\frac{07YR01 - 00Pre}{00Pre}$	Density reduction = +1580 % (± N/A %) after 7th fire <i>n=4, 1 burn units</i>	No Plots are highly variable in exotic species density and plots that did not have exotics now do	2011 (2002-2011)
Black Belt Savanna (FQUST1D09)	Increase cover of native herbaceous plants by >200% after three burns $\frac{\beta_{YR01} - 00Pre}{00Pre}$	Native Herb Cover = N/A	Uncertain Plots have not yet been monitored one year post burn	2011 (2011- _)
	Reduce mean density of pole-sized trees by >50% after 3 burns $\frac{\beta_{YR01} - Pre00}{Pre00}$	Density reduction = N/A	Uncertain Plots have not yet been monitored one year post burn	2011 (2011- _)

⁴ Exotics in PITA plots include; privet (*Ligustrum spp.*), Japanese honeysuckle (*Lonicera japonica*), & and others.

Oak-Hickory Woodland (FOAHI1D09)	Reduce litter and duff load by 30-40% after 3 burns $\beta_{Post} - 00Pre$ 00Pre	Duff Reduction = 52.1 % (± 8) after 1 st fire $n=3$, 2 burn units Litter Reduction = 66.3 % (± 21) after 1 st fire $n=3$ [7], 2 burn units	Yes All plots must burn three times to meet minimum sample size requirements	2010 (2006-2010)
	Reduce mean density of pole-sized trees by 20-30% after 3 burns $\beta_{YR01} - Pre00$ Pre00	Density reduction = 19.8 % (± 7 %) after 1 st fire $n=3$ [5], 2 burn units	Yes/Uncertain Plots have not been burned three times and all plots must burn to meet minimum sample size requirements	2010 (2006-2010)
Japanese Grass Invaded Streamside Forest (FMIVID09)	Decrease percent cover of Japanese grass (<i>Microstegium vimenium</i>) by 50% one year post treatment $\beta_{YR02} - Pre00$ Pre00	Cover reduction = 90.0 % (± 4 %) 1 st treatment $n=10$, 1 burn units	Uncertain A significant reduction occurred; however, there was no significant difference in the control and the experimental plots	2010 (2007-2010)



Mixed Loblolly Pine Forest (PITA12) after two fires & six years. Rocky Springs, MS (NATR)



Smoke column over the Tennessee River and Natchez Trace Parkway from the Colbert Ferry Prescribed Fire.

PITA10
November 30, 2012

Table 3.6. Summary of Long-term Monitoring Results at Stones River National Battlefield

Vegetation Type	Management Objectives (Restoration)	Monitoring Results (80% Confidence Intervals)	Objective Achieved?	Year Analysis Completed (Range)
Little Bluestem Grassland (GSCSC1G02)	Reduce exotic ⁷ species cover by 20-70% after 5 burns $\frac{\beta YR01 - 00Pre}{00Pre}$	Exotic Cover Reduction = 42.5 % (± 17%) after 1 st fire n=11 [27], 3 burn unit	Yes/Uncertain Significant reductions in exotic species after one burn; however, plots have not been burned five times and include additional treatments such as mowing and herbicide	2010 (2003-2010)
	Increase native grass and forb cover by 20-50% after 3 fires $\frac{\beta YR01 - 00Pre}{00Pre}$	Native Herb Cover = 14.1 % (± 18%) after 1 st fire n=11 [21], 3 burn unit	Uncertain All plots must burn three times	2010 (2003-2010)
Central Basin Glades (GANTE1D05)	Reduce exotic ⁵ and eastern redcedar cover by 20% by 5 years post-burn $\frac{\beta YR01 - 00Pre}{00Pre}$	Exotic Cover Reduction = 0.0 % (± 23%) after 1 st fire n=8 [41], 1 burn unit -11.5 % (± 25%) after 2 nd fire n=8 [104], 1 burn unit Redcedar Reduction = 82.4 % (± 11 %) after 1 st fire n=8 [23], 1 burn unit 73.1 % (± 17 %) after 2 st fire n=8 [22], 1 burn unit	Yes/Uncertain Redcedar is being reduced; however, significant reductions in exotic cover have not yet occurred Plots have not been monitored five years post burn	2010 (2003-2010)
	Increase native herbaceous species cover and diversity ⁶ by 20-75% $\frac{\beta YR01 - 00Pre}{00Pre}$	Native Herb Cover = -16.7 % (± 8%) after 1 st fire n=8, 1 burn unit -26.1 % (± 10%) after 2 nd fire n=8, 1 burn unit Native Herb Richness = -37.4 % (± 4%) after 1 st fire n=8, 1 burn unit -38.2 % (± 8%) after 2 nd fire n=8, 1 burn unit Native Herb Diversity = -15 % (± N/A%) after 1 st fire n=1, 1 burn unit -15.5 % (± N/A%) after 2 nd fire n=1, 1 burn unit	No/Uncertain Native species have not increased in cover; however, this may be a result of changes in the seasonality of monitoring and misidentification of species in the past Native herbaceous cover, richness, and diversity was reassessed during the growing season in 2010 resulting in increases of -14.8%, +5.7%, +12.6% respectively	2010 (2003-2010)

⁵ Exotics include *Albizia julibrissin*, *Kummerowia* spp., *Leucanthemum vulgare*, *Ligustrum sinense*, *Lonicera japonica*, *Paspalum dilatatum*. *Lespedeza cuneata* is present at the site(s) but is not included in the current analysis as it may have been misidentified in previous reads.

⁶ Calculations conducted on relative changes in plots' herbaceous species richness and then on total change in diversity utilizing Shannon's diversity index.

B. Fire ecologist accomplishments and areas of focus

Table 4. Fire Ecologist 2012 Accomplishments/Focus Areas

Category	Percent Time	Accomplishments and/or areas of activities
Planning	16%	Reviewed 2013-2015 LIRI Omnibus Rx Fire Plan Reviewed 2013 HOBE & NATR Burn Plans Wrote 2012 Fire Monitoring Plan and review of FMP for MACA Wrote and Maintained Sec. 7 (ESA) Compliance concerning Rx Projects Assisted with PEPC compliance documentation Consultation, compliance, and site visits for Rx burns
Presentations	1%	Assisted with local high school field trips discussing succession & fire ecology
NPS Meetings/ task groups	4%	Attended park meetings with resource management staff at local and network parks Attended regional and national fire conference calls
Interagency work	1%	Information sharing with U.S. Forest Service, U.S. F.W.S., and TN Div. of Nat. Areas Reviewed manuscripts for Interagency Conference Proceedings Member of Tennessee and Mississippi Rx Fire Councils
Wildfire assignments	12%	Served as FFT2, FFT1(T), ICT5(T) - NATR wildfire incidents - Severity Assignment at BUFF/Ozark National Forest, AR - Severity Assignment at BIA/Osage Nation, OK
Prescribed fire projects	18%	Served as FFT2, FEMO, FFT1(T), FALA, ATVO - NATR, GUIS, HOBE, MACA, KIMO, & CONG - Noxubee National Wildlife Refuge, Tombigbee National Forest Assisted with burn unit preparation, mapping, FEMO reports, etc. - MACA, STRI, NATR, LIRI, HOBE, GUIS
Non-fire projects	1%	Assisted with NPS bat monitoring, NPS I&M Herp Monitoring Assisted with WUI vegetation clearing/saw work
Research	4%	Reviewed, summarized, and shared historical and recent ecological literature Assisted with historic fire regime mapping for MACA
Data collection	13%	Assisted with the collection of FMH, non-FMH vegetation, and fuel moisture data Installed FMH and modified fire effects plots Calibration of fuel moisture monitoring equipment
Data entry	3%	Assisted with entering backlogged data Made corrections to erroneous data in FFI Troubleshooting database issues
Data analysis	6%	Performed statistical tests and analysis of fire effects data Prepared Fire Ecology Annual Report and other park specific reports Prepared handouts with summaries of fire effects for field tours & resource management meetings Summarized and shared fire effects data with USGS and NPS I&M Networks
Supervision/Admin	7%	Supervised fire effects monitors, rewrite of EPAPs Interviews, reference checks, and hiring of new employee Timesheets, travel, and other administrative paperwork
Training	6%	Physical Training, Firefighter Refresher, and other safety programs Ignition Operations (S-234), Followership to Leadership (L-280), Fire Program Management (M-581)
Miscellaneous	8%	Collected, identified, and preserved plant specimens for long-term reference Served as Fire Ecology Associate Editor for Natural Areas Journal Peer reviewed manuscripts concerning fire ecology, disturbance, and fire management in a diversity of journals and publications Assisted with wildland fire outreach tasks (parades, programs, etc.) All-hazard assignment (Saw crew for Hurricane Sandy relief) Wrote paper summarizing a decade of fire effect monitoring at MACA for the 10 th Mammoth Cave Research Symposium proceedings

C. Fire effects team accomplishments and areas of focus

Table 5. Fire Effects Crew 2012 Accomplishments/Focus Areas

Category	Percent Time	Notes
FMH plots	16%	Monitored 78 standard FMH Plots, 8 modified FMH plots, & 13 photo plots
WUI plots	0%	No scheduled WUI plots for 2012
CBI plots	0%	No CBI plots were requested in 2012
Other plot work	2%	Duff and live vegetation fuel moisture monitoring Assist with NPS I&M plots, NATR Breeding Bird Survey
Wildfire assignments	16%	Served in variety of roles including: FFT2, FFT1, FEMO, HECM - NATR wildfire incidents - Wildfire assignments in Oklahoma, Oregon, and Florida
Prescribed fire projects	11%	Served in variety of roles including: FFT2, FFT1, FEMO, ENB(T), EMT(B) NATR, STRI, KIMO, GUIIS, CONG, MACA, ... Assisted with burn unit prep work Consultation for Rx burns FEMO Reports for GUIIS, STRI, NATR, KIMO, and HOBE
Non-fire fuels projects	2%	NATR Blackbelt Restoration, exotic, and hazard fuels removal projects Assisted with WUI vegetation clearing/saw work
Travel out-of-park for plot or project work	3%	Traveled to GUIIS, HOBE, LIRI, MACA, NATR & VICK for FMH plot reads
Data entry	13%	Entered and scanned FMH and other fire effects data
Data analysis	0%	N/A
Supervision/Admin	4%	Payroll, travel authorization/voucher, etc.
Training	6%	Firefighter Refresher Emergency Medicine and Trauma Conference Ignition Operations (S-234), Followership to Leadership (L-280), Wilderness First Aid, EMT-B Refresher, Wildland Fire Chainsaws (S-212) ATV Operator Training Plants of the Blackbelt Prairie Workshop Biodiversity and Conservation of Birds
Miscellaneous	27%†	All-hazard Assignments† Co-Instructed in house First Aid/CPR course for fire management Collected, identified, and preserved plant specimens for long-term data collection consistency and reference NATR Recycling Committee Herpetile and Bat Monitoring

† All members of the Network spent considerable amounts of time on all-hazard assignments in CY2012.

- Deepwater Horizon Oil Spill (Falkey & Hilton)
READ & DOCL ~ 935 hours (base-8 charged to incident)
- Hurricane Sandy (Burton, Fields, & Hilton)
READ & FALA/B ~ 740 hours (Hilton's base-8 charged to incident)

Fields assisting with hurricane recovery efforts as a READ

(FIIS) November 13, 2012



D. Additional Program Information

Table 6. Planning - 2012

Park	Does Park have written DFCs? (yes or no)	Date Park-level Monitoring Plan completed (or revised)	Number of Project- or Community-level Monitoring Plans	BAER Plan Assists in 2012
Abraham Lincoln Birthplace NHP	No	N/A	0	0
Chickamauga and Chattanooga NMP	No	N/A	0	0
Cumberland Island National Seashore	No*	N/A	0	0
Fort Donelson National Battlefield	No*	N/A	0	0
Gulf Islands National Seashore	No*	2010 (Draft)	0 (3)†	0
Horseshoe Bend National Military Park	No	N/A	0 (1)	0
Jean Lafitte NHP and Preserve	No	N/A	0	0
Little River Canyon National Preserve	No	N/A	0 (3)	0
Mammoth Cave National Park	No	2012 (Draft)	0 (6)	0
Natchez Trace Parkway	No	2007	0 (6)	0
Russell Cave National Monument	No	N/A	0 (1)	0
Shiloh National Military Park	No*	N/A	0 (1)	0
Stones River National Battlefield	No*	N/A	0 (3)	0
Vicksburg National Military Park	No*	N/A	0	0

*Does not have written DFCs that have measurable objectives for park vegetation, but does have general desired landscape goals.

†Number in brackets represents number of Monitoring Type Descriptions (FMH 4).

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*
Gulf Islands National Seashore	100%	50%†	5	0	0	0
Horseshoe Bend National Military Park	100%	100%	2	0	0	0
Little River Canyon National Preserve	100%	5%†	5	0	0	0
Mammoth Cave National Park	100%	100%	9	0	0	0
Natchez Trace Parkway	100%	20%†	14	1	0	0
Stones River National Battlefield	100%	100%	1	0	0	0

* Number of treatment units with treatment effects monitoring conducted. Include pre-burn and post-burn monitoring but not burn-day monitoring. (Most fire effects monitoring is conducted on previous year's projects)

† As of January 28, 2013, 100% of 2012 data had been entered and checked for all parks.



William Hilton assisting with WUI mechanical treatments.

(NATR) August, 2012



A timber rattlesnake (*Crotalus horridus*) discovered while monitoring in the Slant Rock burn unit is a reminder to be careful where you step.

(LIRI) July 25, 2012

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?*
Cumberland Island Nat. Seashore	0	1	0	No
Gulf Islands National Seashore	1	1	0	Yes
Horseshoe Bend NMP Park	1	0	0	Yes
Jean Lafitte NHP and Preserve	0	0	0	No
Little River Canyon National Pres.	0	1	0	Yes
Mammoth Cave National Park	1	3	1	Yes
Natchez Trace Parkway	3	0	0	Yes
Russell Cave National Monument	0	1	0	No
Shiloh National Military Park	0	1	0	No
Stones River National Battlefield	1	0	0	Yes
Vicksburg National Military Park	0	0	0	No

Table 9. Research - 2012

Park	Are research needs identified in FMP or Monitoring Plan? (yes or no)	# of Proposals Submitted in 2012	# of Proposals Funded in 2012	# of Research Projects Supported in 2012*	Additional Comments
Cumberland Island National Seashore	No	0	0	0	
Gulf Islands National Seashore	Yes	0	0	0	
Horseshoe Bend National Military Park	No	0	0	0	
Jean Lafitte NHP and Preserve	No	0	0	0	
Little River Canyon National Preserve	No	0	0	0	
Mammoth Cave National Park	Yes	0	0	2	Ongoing research concerning fire and Indiana bat habitat/LIDAR vegetation mapping & presettlement vegetation map
Natchez Trace Parkway	Yes	0	0	0	
Shiloh National Military Park	No	0	0	0	
Stones River National Battlefield	No	0	0	0	
Vicksburg National Military Park	No	0	0	0	

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

E. 2013 Direction

Crew

We were able to refill a crewmember position in late February 2012. The personnel change allowed for an alteration to our old furlough period. Our new crew member is working a schedule similar to that of the Appalachian/Piedmont fire effects crew, in-pay status during the growing season and furloughed during the dormant season. This schedule is allowing the network to have more support during peak monitoring season as well as better year-round coverage for operational incidents.

Budget

The Barrens to Bayous fire effects crew spent considerable amounts of time assisting with out of network incident response in 2012, partly as a measure to assist with cost savings. We will continue to implement cost saving measures such as consolidated monitoring trips, utilizing alternative housing/camping when available, and limiting purchases. Other options that will have to be visited will be the prioritization of Parks and/or monitoring types. All members of the crew will be working closely with both fire management and resource management staff to ensure management objectives are being met and the adaptive management process is being implemented.

New Plans & Programs

Ongoing projects include revising Fire Management Plans for Mammoth Cave National Park, Natchez Trace Parkway, Jean Lafitte NHP and Preserve, and Cumberland Island National Seashore. Nearly all FMPs for parks in this monitoring network are either expired or will expire in the near future. During this update period Barrens to Bayous Fire Monitoring Network will continue to provide resources when available to assist with these plans. In addition, many parks are also in need of Fire Monitoring Plans. As time allows, these plans are being revised and/or drafted.

It was anticipated that 2012 would be a busy season with the addition of several parks; however, budgetary constraints are severely limiting the implementation of new programs and monitoring. The network will work closely with regional staff to ensure prioritization of programs and monitoring where needed. The Barrens to Bayous Fire Monitoring Network will likely be organizing the installation and monitoring of fire effects plots at Cumberland Island National Seashore and Shiloh National Military Park late summer 2013.



2012 Fire Monitoring Network Staff: Jesse Burton, Jennifer Falkey, Carol Fields, and William Hilton. Big Woods FMU (MACA) October 23, 2012



Recently discovered by an I&M vegetation mapping project, this Western Highland Rim Barren is scheduled to get its first prescribed fire in the spring of 2013. The fire monitoring network installed modified FMH plots and then assisted with the cutting and scattering of encroaching eastern redcedar in August 2012.

(NATR)

August 7, 2012

F. Optional Information

2012 Prescribed Fire Monitoring Report Summaries

Summarized below from CY2012 FEMO reports is additional information regarding prescribed fire for the parks within the network. Members of the monitoring network staff also generated FEMO reports for a couple out-of-network NPS parks and a FWS refuge; however, these reports are not summarized here. The descriptions are only intended to be brief summaries. For additional information please contact a member of the monitoring network to obtain a complete FEMO Report.

Gulf Islands National Seashore – Davis Bayou



Park Unit, Davis Bayou, MS (GUIS)

January 28, 2012

Fire personnel from Great Smoky Mountains National Park, Natchez Trace Parkway, and Gulf Islands National Seashore gathered at Davis Bayou, Mississippi to burn the 60 acre Park Unit prescribe fire unit on January 28, 2012. The Park unit consists primarily of wet pine flatwoods with some mature oak hammocks. Additionally, the park manages for a community of sundews (*Drosera spp.*) and near threatened pitcher-plants (*Sarracenia alata*). Rapid regrowth of highly flammable shrub species gallberry (*Ilex coriacea*) and redbay (*Persea borbonia*) with the exotic shrub privet [*Ligustrum spp.*] is hindering restoration efforts. This block had been burned in 2002 and again in 2008. A trace of rain was recorded 2 days prior; however, December 26, 2011 was the most recent rain event with more than 1/10 of an inch (0.14in).

Fire behavior near the unit's FMH and fuels plots was low to moderate. Fire moved slowly through the needle cast with a rate of spread between $\frac{1}{4}$ and $\frac{1}{2}$ chain per hour with observed flame lengths of 6-12" and an 8" flame zone depth. These observations were less than what the IAP described as "optimal" fire behavior. However fire behavior did increase in the presence of grass, fluffy needle cast, gusts of wind, and along edges. These bursts of intensity carried fire from the ground into the lower shrub canopy as patches of palmetto (*Serenoa repens*), sweetbay (*Magnolia virginiana*), and gallberry torched. While some fuels objectives were achieved, greatly reducing the vigor of the understory shrubs will undoubtedly require growing-season fire (See Table 3.1).

Original Report – Carol Fields

Mammoth Cave National Park – Crystal Cave

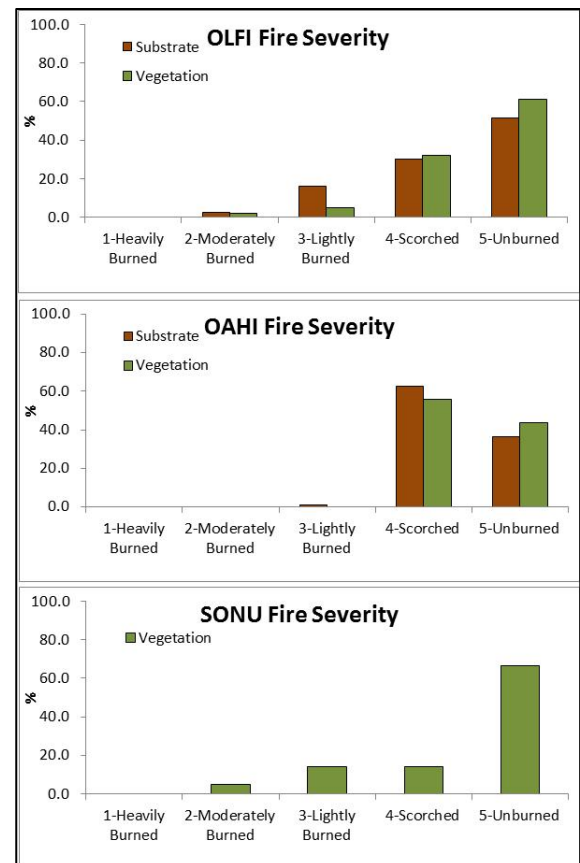


Crystal Cave Burn Unit (MACA)

March 21, 2012

The Crystal Cave prescribed fire unit is roughly 2,230 acres of xeric oak-hickory woodlands, conifer and hardwood dominated old-fields, and mesic hardwoods integrating into mesic slope forest. Primary ecological objectives for this fire were to reduce total fuel loadings from pre-burn levels by 25-50% measured immediately post-burn, reduce mean density of shade tolerant pole-size trees (2.5-15cm dbh) by >30% by 3rd burn, limit mortality of overstory trees to less than 20%, and increase native herbaceous cover by 10-25% by 1 year after the 3rd burn. FMH monitoring plots are located in three different fuel/vegetation types for this burn; oak-hickory forests, Indiangrass (*Sorghastrum nutans*) grasslands, and old-fields. The unit was broken down into two separate blocks and burned on March 20 and 21, due to staffing and time limit concerns. The local Resource Management staff goals, communicated to the operational personnel, were to keep fire intensities low.

It was very apparent that ridges dominated by mature oaks and hickories burned most effectively, though patchy overall. Old-fields burned slightly at best, likely limited by minimal fine fuels and significant unavailable logs creating barriers to fire spread. Some areas of low-lying creek drainages and hardwood sinks burned slightly, with some backing fires with flame lengths less than 3 inches, but overall experienced little fire interface. Glade areas within the prescribed fire area also experienced very little fire due to the lack of flashy fuels and abundance of compact redcedar (*Juniperus virginiana*) litter. Some heavy fuels may have continued to burn for an additional day or two, but in general all active fire ceased by the following day, March 22. Reports from the helicopter on the day after the burn suggested that perhaps slightly more than 50% of the entire area was black, and a rapid survey by the fire effects crew also supports this estimate. Monitoring showed that total fuel loading was not reduced and fire treatment area within target vegetation types was limited. Other ecological benefits were certainly realized, but secondary effects are not easily measured immediately post-burn.



Post-burn assessment of the Crystal Cave Rx Fire, March 20-21, 2012

OLFI – Forested Old Fields
 OAHI – Oak-hickory Forests
 SONU – Indiangrass Prairie

Natchez Trace Parkway – ML Hiking Trails South



Meriwether Lewis Hiking Trails South, TN (NATR)

February 28, 2012

On February 28, 2012, personnel from the Natchez Trace Parkway treated the Meriwether Lewis Hiking Trails South prescribed fire unit. The 193 acre burn unit consists primarily of rolling hills covered with a relatively open stand of oak/hickory and in some areas, cured grasses. Resource objectives for this burn were to reduce total fuel loadings from pre-burn levels by >30% as measured immediately post burn, reduce mean density of pole size trees (2.5-15 cm dbh) by >20% by 3rd burn, and to maintain a pole density of 250-600 trees per hectare (100-250 poles/acre) after 3rd burn. The ML Hiking Trails South was a low intensity burn that most likely was successful in knocking back woody encroachment, eliminating much of the litter layer, and maintaining an open, healthy oak/hickory stand.

Analysis of oak-hickory fire effects plots in the unit indicated a 19% (± 13) reduction in total fuel loading after the burn. Litter fuel was reduced from 2.3 to less than 0.7 tons/acre, an average plot reduction of 70% (± 7). Fine woody debris (1-100 hour fuels) was reduced from 7.1 to 5.1 tons/acre, an average plot reduction of 29% (± 8).

Original Report – Carol Fields



Meriwether Lewis Hiking Trails South, TN, NATR



February 28, 2012

Natchez Trace Parkway – Chickasaw Village Prairie



Chickasaw Village Subunit F & G, MS (NATR)

September 26, 2012

The Chickasaw Village Prairie prescribed fire unit has been treated with at least seven prescribed fires over the last 12 or so years. All of those burns were conducted during a short window in the early months of spring. This year a small 20 acre portion was excluded from normal spring burning so that it could be targeted by a late growing season fire, closer replicating a naturally ignited fire regime and allowing for a qualitative analysis of changed seasonality.



Chickasaw Village, MS (NATR)

September 26, 2012

Overall the fire pulled together well and there was torching of some five-foot shrubs (*Cornus drummondii* & *Rhus* spp.). Many plants that were green immediately prior to the burn quickly showed signs of scorching and leaf drop. Within two weeks of the burn, the site was already greening-up. Resource and fire management staff are eagerly awaiting the results of this burn on woody plants that have plagued this site since initial fire treatments.

Original Report – Lisa McInnis
(Chief, Resource Mgmt., NATR)

Horseshoe Bend National Military Park – Northeast Cluster Rx



Northeast 3 & 4 Unit (HOBE)

March 7, 2012

This unit contains remnant longleaf pine trees, which require bare soil in order to germinate. Fire is being used to consume and remove litter and duff, which is necessary if the trees are to regenerate. Portions of this unit were last burned in January 2007, which is too long of an interval between burns to meet restoration objections of longleaf pine regeneration. Litter depths have since reverted to pre-burn levels. General objectives for burning in this ecotype are to limit mortality of overstory longleaf pines to 20% as measured 2 years post burn; reduce shading on the forest floor, allowing for regeneration of desirable trees and herbaceous species; have exposed mineral soil available for longleaf pine regeneration; and burn litter layers, but not significant amounts of duff. Duff moisture samples were taken throughout the day. It was sampled to ensure that there would be no smoldering duff and to see if it would be possible to alter the requirement of burning a set number of days post rain. The prescribed fires were split into two subunits due to time constraints, Northeast 3 & 4 were burned on March 7 and Interior 1 & 2 were burned the following day. 142

The unit(s) stretches down to the river and includes the floodplain, which predominantly did not burn. Based on a preliminary survey, it appears that the burn did meet the objective of consuming ~50% of fine fuels and of not burning duff. It also appears that the burn did meet the objective of burning >80% of the unit and limiting mortality of overstory trees. However, it does not appear that bare soil was exposed. There was no residual smoldering litter or duff observed anywhere in the unit. Additionally, rain moved in in the late evening the day of the burn and eliminated the majority of the residual smoke issues in the unit. It rained late on 3.8.12 and early 3.9.12. The local RAWS station registered 0.80 inches by 0900 on March, 9. NE 4 contains one long term monitoring plot which was also read on March 9.



02POST, PIPA04

March 9, 2012

Original Report – Jennifer Falkey

Stones Rivers Nation Battlefield – March Complex



Beasley Tract (STRI)

March 5, 2012

From March 5-7th 2012 fire personnel from the Natchez Trace Parkway and staff from Stones River National Battlefield burned 8 units within STRI, for a total of 200 acres. Resource objectives include reduce litter and duff by >30% immediately post-burn and induce mortality in exotic species by >30% over 5 years post burn. The fuels here were shaded by dense forest canopy and were composed of thick briars and waist-high cured grass. Under the tall grass however, the understory grasses were low and green with little thatch to carry the fire. Portions of units



North End of Interior Tour Loop (STRI)

March 7, 2012

containing continuous waist-high warm season grasses burned quickly and intensely. Areas with deciduous leaf litter and woody debris piles carried fire. However, the majority of the Interior Tour Loop unit consisted of a closed canopy of eastern redcedar trees with characteristic dense litter layer that did not support fire at all. This unit also contains Pyne's ground-plum (*Astragalus bibullatus*), an endangered species found only in Rutherford county. It is seriously threatened at this site by the encroachment of redcedar.

Original Report – Carol Fields



Network staff hiking to one of five Big Bluestem Grassland FMH plots (BANGE1D02) located in Chaumont Field, Part of the Kentucky Barrens Prescribed Fire Unit.