



**National Park Service
Southern Appalachian Fire Ecology Annual Report
Calendar Year 2005**

Summary

As the earth took another loop around the great fire ball in the sky, the Southern Appalachians Fire Effects Team took another loop around the southeast.

Plot Work

We started monitoring at Cumberland Gap National Historic Park (6 forest plots total) and Big South Fork National River Recreation Area (4 brush plots and 5 forest plots total). We continued monitoring Congaree Swamp National Park (8 forest plots total), Kings Mountain National Military Park (25 forest plots total) and Great Smoky Mountains National Park (lots of plots).

Prescribed Burns

We assisted the Great Smoky Mountains and Cumberland Gap Fire Use Module with prescribed burns at Cumberland Gap National Historic Park (two burn units), Big South Fork River and Recreation Area (two burn units), Kings Mountain National Military Park (four burn units), Great Smoky Mountains National Park (one burn unit: 2000 acres!) and Mammoth Cave National Park (one burn unit).

Monitoring Plans

Monitoring Plans were written for Kings Mountain National Military Park and Congaree Swamp National Park. Both are currently in revision. A large portion of the Great Smoky Mountains National Park monitoring plan has been completed.

Details

Nunally Benzing spent three weeks working with Yosemite fire use module, Wylie Paxton spent two weeks on a newly wed detail, Virginia McDaniel went on twin nephew detail and Rob Klein had a new daughter detail.

Presentations

We presented at two conferences: Southern Appalachian Man and the Biosphere (SAMAB) and Fire in Eastern Oak Forests.

McDaniel, V.L., M.A. Jenkins, and R.N. Klein. 2005. Changes in the stand structure and species composition of oak-dominated communities following prescribed fire. Abstract in proceedings of 16th Annual SAMAB Conference. Cherokee, NC.

McDaniel, V.L., M.A. Jenkins, and R.N. Klein. 2005. Changes in the stand structure and species composition of oak-dominated communities following prescribed fire. Abstract in proceedings of Fire in Eastern Oak Forests. Columbus, OH.

Table 1. Management Objectives and Monitoring Results 2005

Big South Fork National River Recreation Area (BISO)

In the first year of the BISO prescribed-fire program 2 forest plots and 3 grass plots were treated in two prescribed fires. Pole-sized tree density was reduced by 50% in the shortleaf pine monitoring type and 80% in the white oak monitoring type while litter and duff reductions were between 30 and 40% in both monitoring types. The Bluestem monitoring unit has unclear objectives at this time, and further comment on those will await further study. While seemingly on target in our forested monitoring units, we must qualify these results by saying we have just begun a monitoring program at this park and have a single plot in these monitoring units. These results are included here simply to illustrate the ongoing efforts at BISO.

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (XX% confidence interval)	Objective Achieved?
Shortleaf Pine	20-60% litter and duff reduction	Litter and duff reduction = 32-36% From 3.04 kg/m ² to 2.00 kg/m ² (<i>n=1 plots, 1 fire</i>)	Yes, but need more plots
	20-80% pole-sized tree reduction	Pole reduction = 45-50% From 1600 stems/ha to 840 stem/ha (<i>n=1 plots, 1 fire</i>)	Yes, but need more plots
White Oak	20-60% litter and duff reduction	Litter and duff reduction = 35-40 % From 4.33 kg/m ² to 2.72 kg/m ² (<i>n=1 plots, 1 fire</i>)	Yes, but need more plots
	20-80% pole-sized tree reduction	Pole reduction = 75-85 % From 400 stems/ha to 80 stem/ha (<i>n=1 plots, 1 fire</i>)	Yes, but need more plots
Little Bluestem	20-80% pole-sized tree reduction	Pole-sized tree reduction = 6-10% (<i>n= 3 plots, 1 fires</i>)	No, but need more plots

Cumberland Gap National Historic Park (CUGA)

It was also the first season for a prescribed fire program at CUGA. In all, three forest plots were burned. In the scarlet oak monitoring type pole-sized trees were reduced by 70% and litter and duff by 40%. While moving in the right direction, we will need to install more plots in each monitoring type before we can determine if objectives are being met.

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (XX% confidence interval)	Objective Achieved?
Virginia Pine	20-60% litter and duff reduction	Litter and duff reduction = 0 % (<i>n=1 plots, 1 fires</i>)	NO (plot did not burn)
	20-80% pole-sized tree reduction	Pole reduction = 0 % (<i>n=1 plots, 1 fires</i>)	NO (plot did not burn)
Scarlet Oak	20-60% litter and duff reduction	Litter and duff reduction = 37-42% From 3.23 kg/m ² to 1.92 kg/m ² (<i>n=3 plots, 1 fire</i>)	Yes, but need more plots
	20-80% pole-sized tree reduction	Pole reduction = 70-75 % From 1213 stems/ha to 341 stem/ha (<i>n=3 plots, 1 fire</i>)	Yes, but need more plots

Congaree National Park (COSW)

Fuel reduction levels for each of these monitoring types looks quite low. One explanation is that fuel seems to build up quite quickly in this ecosystem. The fires consume about 50% of the total fuel loading and by two years after the burn (when each of these plots was measured) the fuel has built up again to near pre-burn conditions. Additionally, not all of the plots have been burned consistently. Pole reduction, on the other hand, appears to be trending toward meeting objectives. Establishing an appropriate sample size has been problematic, and we continue to look for opportunities to add plots to a scarce monitoring unit. Future analyses will need to focus on seedling/sapling density/recruitment of longleaf pine.

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (XX% confidence interval)	Objective Achieved?
Longleaf Pine	20-80% total fuel reduction	Total fuel reduction = 7.5 % From 4.56 kg/m ² to 4.22 kg/m ² (<i>n=3 plots, 4 fires, 04yr2</i>)	NO
	20-80% pole-sized tree reduction	Pole reduction = 60-65 % From 330 stems/ha to 40 stem/ha (<i>n=3 plots, 4 fire, 04yr2</i>)	YES but we need more plots
Loblolly Pine	20-80% total fuel reduction	Total fuel reduction = 5.6 % From 8.63 kg/m ² to 8.15 kg/m ² (<i>n=3 plots, 2 fires, 02yr2</i>)	NO
	20-80% pole-sized tree reduction	Pole reduction = 60-65 % From 1480 stems/ha to 560 stem/ha (<i>n=3 plots, 2 fire, 02yr02</i>)	YES but we need more plots

Great Smoky Mountains National Park (GRSM)

Ongoing plot work at GRSM centers on two monitoring units: Pine Woodland and Oak Forest. Monitoring objectives for these units are currently being revised, so the results below are taken from last year's report. These results still provide important indications of the status of what will undoubtedly remain key objective variables...at least in the very short term. More plots are needed in the Oak Forest monitoring unit.

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (80% confidence interval)	Objective Achieved?
FPIRI1D08 – Pine Woodland	Minimum 25% reduction of duff loading after 1 burn	Duff loading reduction = 29-(39)-50% (<i>n=17 plots, 5 fires</i>)	YES
	Minimum 50% reduction in pole density after 1 burn	Pole density reduction = 50-(64)-79% (<i>n=17 plots, 5 fires</i>)	YES
FQUCO1D08 Oak Forest	Minimum 20% reduction of duff loading after 1 burn	Duff loading reduction = 2-(14)-25% (<i>n=5 plots, 2 fires</i>)	NO
	Minimum 40% reduction in pole density after 1 burn	Pole density reduction = 3-(6)-10% (<i>n=5 plots, 2 fires</i>)	NO

Kings Mountain National Military Park (KIMO)

Similar to the GRSM data, these results are lifted from last year's report. No attempt was made to conduct a new analysis using these objectives. Revised objectives are in draft form and are undergoing a final review.

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (80% confidence interval)	Objective Achieved?
FQUMO1D09 Chestnut Oak Forest	Minimum 20% reduction of total fuel loading after 1 burn	Total fuel load reduction = 16-(23)-30% (<i>n=19 plots, 7 fires</i>)	NO*
	Minimum 30% reduction in pole density after 1 burn	Pole density reduction = 22-(34)-46% (<i>n=19 plots, 7 fires</i>)	NO*
FQUMA1D09 Blackjack Oak Woodland	Minimum 20% reduction of total fuel loading after 1 burn	Total fuel load reduction = 6-(29)-50% (<i>n=3 plots, 2 fires</i>)	NO*
	Minimum 30% reduction in pole density after 1 burn	Pole density reduction = 4-(20)-37% (<i>n=3 plots, 2 fires</i>)	NO

* Indicates that the mean value (in parentheses) for the result suggests that the objective was achieved.

Table 2. Fire Effects Plot Workload 2005

Park	Monitoring Unit	Type of Plot (FMH, photo point, other)	Pre-burn	Immed. Post	Postburn (1-20 yrs)	Total Plots
Big South Fork	Shortleaf Pine	FMH forest plot	1	1	1	3
	White Oak	FMH forest plot	4	1	1	6
	Little Bluestem	FMH shrub plot	1	3	2	6
Cumberland Gap	Virginia Pine	FMH forest plot	0	1	1	2
	Scarlet Oak	FMH forest plot	2	3	3	8
Congaree Swamp	Loblolly Pine	FMH forest plot	2	0	3	5
	Long Leaf Pine	FMH forest plot	0	0	4	4
Great Smoky Mountains	Scarlet Oak	FMH Forest plot	0	0	5	5
	Pitch Pine	FMH Forest plot	0	6	10	16
	RCW	FMH Forest plot	0	0	0	0
	Table Mt Pine	FMH Forest plot	1		0	1
Kings Mountain	Blackjack Oak	FMH Forest plot	2	1	2	5
	Chestnut Oak	FMH Forest plot	0	6	9	15
Total			13	22	41	76

Table 3. Fire Ecology Staffing 2005

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

Monitor	Starting Date	Ending Date	# of Pay Periods	Training and Development
Rob Klein	1/1/05	12/31/05	26	Feat training; Asheville conf
Virginia McDaniel	1/1/05	12/31/05	26	Feat Training; S-211; S-390; S-234; Squad boss taskbook completed
Nunally Benzing	3/7/05	12/31/05	23	GPS in Fire
Wylie Paxton	2/7/05	12/10/05	22	S-390, GPS in Fire, completed FEMO taskbook
Julie Proell (SCA)	5/23/05	8/11/05	6	S-130/190

Table 4. Fire Ecologist Accomplishments/Focus Area

Wow, the total is nearly 115%. Does that mean I get a raise?

Category	Percent Time	Accomplishments/Focus Areas
General Planning	5%	Section 7 consultations for GRSM and CUGA, general consultation on burn plans, development/revision of rx burn schedules, evaluation of future burn units.
Monitoring Plans	10%	Drafted several sections of GRSM plan, guided development of complete drafts from COSW and KIMO. Developed monitoring unit concepts/protocols for BISO and CUGA.
Presentations	5%	Presented GRSM data at Fire Conference in Asheville, NC. Assisted with development of poster presenting data from KIMO.
NPS Meetings/ Task Groups	< 5%	FMH to FEAT data conversion working group, FEAT/Stats training
Interagency Work	5%	LANDFIRE, FPA, FEIS Advisory Committee
Fire Assignments and Fuels Projects	5%	FEMO, ignition, and/or holding on 4 rx fires. 8 shift assignment as FFTII in Nez Perce NF, ID.
Research	5%	Served as Federal cooperator for a JFSP proposal to conduct a fire history at GRSM.
Monitoring Field Work	20%	Pre-monitoring reconnaissance. Continued to collect immediate postburn, preburn and year-postburn reads at all parks. Gained invaluable knowledge of veg/fuels.
Data Entry	<5%	
Data Management and Conversion	20%	Estimated amount of time spent converting FMH data to FEAT and to manage monitoring data; includes preparing species lists, error checking, learning conversion program, etc.
Data Analysis	5-10%	Estimated amount of time spent analyzing monitoring data.
Supervision/Admin	10%	Hiring, supervision, new performance plans, various training experiences
Training & Professional Development	5%	FEAT training, PT
Miscellaneous	5%	Annual report, various requests for information/input

Table 5. Fire Effect Crew Accomplishments

Category	Percent Time	Notes
FMH plots	40%	
Mechanical Treatment plots	0%	
CBI plots	0%	
Other plot work	5%	Nested subplots data collection in each FMH plot
Fire Assignments and Fuels Projects	10%	• Crew assisted in 10 prescribed burns (39 shifts) • Assistant went on three week detail (21 shifts)
Data Entry	13%	Complete all data entry from 2005
Data Management and Conversion	2%	
Data Analysis	5%	Lead worked with Forest and Fire Ecologist to analyze data for Fire in Eastern Oak Forests Conference
Supervision/Admin	3%	Travel; Payroll; Purchasing and procurement
Training & Professional Development	12%	Lead attended Feat Training; S-211; S-390; S-234 Assistant and crew member attended GPS in Fire class Crew member attended S-390 All attend Fire in Eastern Oaks and SAMAB conferences
Monitoring Plans	5%	Congaree Swamp National Park and Kings Mountain National Military Park fire effects monitoring plans currently written and in revision
Miscellaneous	5%	??