



**National Park Service
Shenandoah National Park
and
The Mountains to the Sea Fire Management Group**

**Fire Ecology Annual Report
Calendar Year 2007**

Summary

In 2007, the Northeast Region Fire Effects Monitoring Crew, based at Shenandoah National Park, collected data at four parks and participated in several prescribed burns across the NPS Northeast Region. Data were collected at Fredericksburg, Richmond, Saratoga, and Shenandoah. The crew also assisted with pre- and post-burn data collection and burn-day monitoring at Cape Cod National Seashore, which has its own research/monitoring program. Antietam was dropped from the program; Appomattox is expected to take Antietam's place next year.

The Fire Ecologist completed compliance on George Washington Birthplace's and Thomas Stone's FMP EAs and wrote and finalized the FONSI, attended DO-12 and Section 106 training, participated in LANDFIRE modeling, and continues to represent Shenandoah in the Central Appalachian Fire Learning Network. Monitoring Plans for Richmond and Saratoga are mostly complete and are beginning the final review process. The Lead Monitor continued to work with programmers developing and testing the FFI software, attended READ training at Yosemite, and completed the USDA Graduate School's Aspiring Leader Program. We were both very busy on initial attack fires in the park during the summer season.

The following photos accompany this report (MTTS FE&M AnRpt - photo #x.jpg):

1. Missy Forder taking notes during the operational briefing before the Beahms Gap Prescribed Fire, March, 2007 (NPS file photo by B.Stewart).

2. *Rubus* we had to walk through during ignition of the Beahms Gap Prescribed Fire. The *Rubus* was also one of the species we wanted to reduce. March, 2007 (NPS file photo by B.Stewart).
3. *Pinus rigida* (pitch pine) sprouting one year after the April, 2006, Lewis Peak Wildfire. June, 2007 (NPS file photo by N.Fisichelli).
4. *Pinus pungens* (table mountain pine) regeneration starting to bear cones, X years after the Rocky Top Wildfire, Shenandoah NP. Summer 2007 (NPS file photo by M.Forder).
5. Saving the last *Betula populifolia* (gray birch) during the Big Meadows Prescribed Fire, March, 2007 (NPS file photo by A.Williams).
6. Ignition of the Big Meadows Prescribed Fire, March, 2007 (NPS file photos by N.Fisichelli).

Table 1. Fire Effects Plot Workload 2007.

Park	Monitoring Unit	Type of Plot (FMH, photo point, other)	Pre-burn	Imm. Post	Post-burn	Total Plots
Antietam NB	Burnside Bridge Vista	non-FMH brush transect	(abandoned all 5 plots)			(-5)
	Otto Grasslands	non-FMH brush transect	-	-	-	0
	Pry House Vista	non-FMH brush transect	(abandoned 2 plots)			(-2)
	Snively Ford Woods	non-FMH forest transect	(abandoned all 6 plots)			(-6)
	West Woods	non-FMH forest transect	0	0	0	5
	Sherrick Farm Woods	FMH forest plot	(abandoned 1 plot)			(-1)
Cape Cod NS (assist)	Lombard -Paradise Hollow	non-FMH research plot	9	9	5	9(54)
	JFSP Demo plots	non-FMH research plot	0	0	0	6(?)
Fred/Spots NMP	fields	FMH brush plot	0	0	4	4
		non-FMH brush transect	-	-	-	0
Richmond NBP	Cold Harbor	photo points	0	0	0	4
		FMH forest plot	0	0	0	2
	Malvern Hill	FMH brush plots	0	0	5	5
Saratoga NHP	fields	FMH brush plots	1*	0	4	21
Shenandoah NP	Big Meadows (assist)	non-FMH transects	0	0	8	8(40?)
	Fultz Run	CBI	-	0	0	20
	Grey Birch	FMH forest plots	0	0	0	10
	Lewis Mountain	CBI	-	0	16	16
	Rocky Top	CBI	-	0	0	19
	Sawmill	Brown's lines	0	0	0	10
	Shenandoah Complex	CBI	-	0	0	11
	Shenandoah NP	LTEM (assist)	-	-	10	10 (lots)
Total			1	9	56	156±

* indicates new installations

Table 2. Fire Ecology Staffing 2007.

	Starting Date	Ending Date	# of Pay Periods	Training and Development
KellyAnn Gorman	01/01/07	12/31/07	26	Fire refresher, DO-12 and 106, All-Hazard C&GS Academy (Logistics)
Missy Forder	02/04/07	12/22/07	24	ArcGIS 9.2, fire refresher, Designing Monitoring Surveys short-course, READ Training at YOSE, AHA CPR, USDA Aspiring Leader Program
Melissa Bruggeman	05/27/07	08/18/07	6	Fire refresher, S-290 Fire Behavior
Laura Kangas	05/27/07	08/18/07	6	SAR training, DDC-8, Basic Firefighter (130, 190, 180, 100)
Teresa Van Diest	05/27/07	08/18/07	6	SAR training, DDC-8, AHA Heartsaver CPR and First Aid, Basic Firefighter (130, 190, 180, 100)

Table 3.1. Management Obj.s and Monitoring Results, Richmond NBP Cold Harbor Unit, 2007.

Management Objectives	Monitoring Results	Objective Achieved?
Reduce understory vegetation by at least 50% within 2 years following fire.	Using pole density: Fire is decreasing the number of live pole-size trees.	Yes
	Using shrub density: Shrub density increased after the first and second treatments, but this is not unexpected and the decline which appears the second summer after the 2005 burn may continue after additional treatments.	No (not yet)
	Using point-transect data to look at average height of herbaceous vegetation: After treatment there is less vegetation in the tallest height class than there was before the 2004 burn. As expected, the second summer after the 2005 burn the amount of vegetation in the tallest class is increasing.	Yes
Preserve an acceptable duff layer. Note: measurements were made the summer following treatment, not immediately post-burn.	Looking at duff depth on fuels transects, and using $\geq 0.5''$ as acceptable: The data show an acceptable layer.	Yes
	Looking at duff depths of 0 on fuels transects, and using an acceptable mineral soil exposure of $\geq 10\%$: The fuels data show less than 7% cover of exposed mineral soil following each burn.	Yes
	Looking at duff depths of 0 (substrate=soil) on the point transect, and using an acceptable mineral soil exposure of $\geq 10\%$: The data show less than 2% relative cover of mineral soil the summer following each burn.	Yes
Manage vegetation to maintain vistas ... Using images from photo points, subjectively evaluate the views into the unit from four key points on the tour road.	In some areas (photo points #1 and #2), fire appears to be successful at keeping understory vegetation low and maintaining the vistas. In other areas (photo points #3 and #4), it appears that more treatments are necessary to achieve an acceptable vista; this was expected. Photo points #3 and #4 also suggest, as expected, that periodic treatments will be necessary to maintain the vistas because the understory will re-grow over time.	Yes
Manage vegetation ... to promote growth of native warm-season grasses. (Use point intercept data to compare the relative percent cover of native grasses at each read.)	The relative percent cover of native grasses appeared to increase slightly following the 2004 burn, but there were no native grasses found in either plot the first or second summer following the 2005 burn. Note that even in the first summer following the 2004 burn native grasses comprise a very small fraction of the total relative percent cover on the plots.	No
Treatment Objective: Limit average flame height to not more than 6 ft .	Reviewed Monitoring Report prepared by G. Kneipp: "Flame lengths on the backing fire were generally 1-2 feet with flanking fire of 2-3 feet."	Yes
Reduce hazard fuels by 50% immediately post burn. Note: This really depends on which fuels are identified as the source of the unacceptable hazard. Also, measurements were made the summer following treatment, not immediately post-burn.	If woody fuels are the source of the hazard, then we are clearly not reducing hazard fuels (especially in the case of the smaller woody fuels which are the primary carrier of the fire).	No
	If surface (litter) or ground (duff) fuels are the source of the hazard, we appear to be reducing the hazard, but litter and duff depths are more sensitive to the winter snowpack than to the amount of available fuel.	Maybe
	If the source of the hazard is ladder fuels, and we represent ladder fuels by shrubs and pole-size trees ... (see the first discussion regarding reducing understory vegetation).	Yes

Table 3.2. Management Obj.s and Monitoring Results, Richmond NBP Malvern Hill Unit, 2007.

Management Objectives	Monitoring Results	Objective Achieved?
Maintain the historic scene much as it was July 1, 1862. (Measurable objective: Vegetation is maintained at less than 1 m (3.3 ft) in height.).	The vegetation is shorter after one treatment. It would be useful to refine the Resource Goal to define a threshold (for example, 25% of vegetation is over 1 m tall) that would trigger the next treatment.	Yes
Reduce the density of woody species.	The density of woody species has increased after one treatment, but this was expected and the true test will not be until three years after the third burn.	no (not yet)
Reduce the density of the exotic species of tree of heaven, Japanese honeysuckle, tall fescue, and orchard grass.	There appears to be little change in the relative percent cover of nonnative herbs after one treatment.	No (not yet)
	There appears to be little change in the frequency of nonnative herbaceous species after one treatment. (Tried this because I don't think density is helpful.)	No (not yet)

Table 3.3. Management Objectives and Monitoring Results, Saratoga NHP, 2007.

Management Objectives	Monitoring Results	Objective Achieved?
Herbaceous species are maintained as at least 90% of the total cover.	Relative percent cover of herbaceous species is hovering right around 88% each year, with a range of 82% to 93%. Burning, mowing, and burning-and-mowing treatment patterns appear to be equally effective in maintaining the percent cover of herb. species.	Yes
Native species comprise at least 60% cover of the total herbaceous cover.	In most years, native species comprise approximately 60% of the total cover of herbaceous species. Burning and burning-and-mowing treatment patterns appear to maintain the highest cover of native herbaceous species.	Yes
Increase the cover of native herbaceous species by 20% to 40%; reduce the cover of nonnative herb. species by the same.	Burning reduced the cover of native herbaceous species by an average of 20% and increased the cover of non-natives by the same; mowing did not have any noticeable effect on the percent cover.	No
Woody species are maintained at a density of less than 25,000 stems per ac (10,000 stems per ha).	The average stem density is about twice the target density each year ($p < 0.2000$ for 2002, 2003, 2004, and 2006), but I'm not sure density is what they really care about - maybe percent cover or simply vegetation height would be a better measure. Mowing appears to be the most effective method of maintaining a lower shrub density, although it is impossible to say what the density might have been before treatments started. Alternative variables will be explored to evaluate woody encroachment.	No
Reduce woody stem density by 70% to 90%.	In both burned plots the stem density increased after treatment; in both mowed plots it decreased.	Burn - No Mow - Yes
The vegetation is maintained at less than 1 m (3.3 ft) average height.	Current treatment patterns appear to be maintaining the average height of the vegetation well under 1m. Confidence 85% or better.	Yes

Table 4. Fire Ecologist Accomplishments and Area of Focus.

Category	% Time	Accomplishments/Focus Areas
General Planning	11%	EAs, FONSI's, PCFs and other NEPA, non-FEM fire program mgt.
Monitoring Programs	16%	General fire ecology work, such as: data collection and management, monitoring plans, treatment recommendations, literature searches, etc.
Fire Assignments	12%	Prescribed fire - 2%; initial attack & on-park wildfire -10% (to numerous to list).
Supervision & Administration	24%	Hiring, supervision, travel, payroll, etc.
Training & Development	6%	Fire refresher, DO-12 and 106, All-Hazard C&GS Academy (Logistics)
Prescribed Fire	2%	Prescribed fire program development, including burn plans
Miscellaneous	28%	Includes J400 all-hazard assignment - 22%

Table 5. Lead Fire Monitor Accomplishments and Area of Focus.

Category	% Time	Notes
FMH plots	5%	FRSP, RICH and SARA
CBI plots	0%	
Other plot work	< 1%	
Fire Assignments	35%	Too numerous to list. A very busy fire season, both here and out west: prescribed fire - 7%; western assignment - 12%; IA & on-park wildfire - 15%; WFU - 2%.
Data Entry & Mgt	4%	Completed entry of 100% of data collected in 2007; includes some data analysis
Leadership & Administration	20%	Includes travel prep. (but not travel itself), ordering supplies, timekeeping, employee orientation, trip reports, crew leading, errands
Training & Development	17%	Fire refresher, ArcGIS 9.2 training, Designing Monitoring Surveys short-course, READ training at YOSE, AHA CPR, USDA Aspiring Leader Program
FFI Development	10%	
Miscellaneous	8%	Includes wildfire readiness, equipment maintenance, herbarium work, monitoring reports, SARs, non-FEM activities, etc.

Table 6. Fire Effects Crew Accomplishments and Area of Focus.

Category	% Time	Notes
FMH plots	23%	FRSP, RICH and SARA
CBI plots	0%	
Other plot work	40%	Assisted CACO staff with pre-burn, burn-day and post-burn monitoring on research plots; assisted SHEN staff with long-term post-burn monitoring at big Meadows
Fire Assignments	6%	Turk Mtn WF, SHEN: 1 op. period x 1 folk = 1 op. periods Buzzard Rock WF, SHEN: 3 op. periods x 1 folk = 3 op. periods CACO Rx Fire: 2 op. periods x 1 folk = 2 op. periods
Data Entry	9%	Completed approximately 85% of 2007 data entry by the end of the season
Admin. & etc.	2%	
Orientation & Training	10%	Includes PT, Heartsaver First Aid, Search and Rescue, mandatory gov't training, plant ID, fire refresher, etc.
Miscellaneous	10%	Includes time spent assisting other park crews



**National Park Service
Acadia National Park
and
The North Country Area Fire Management Group
Fire Ecology Annual Report
Calendar Year 2007**

Summary

In Spring 2007 Acadia National Park conducted two small prescribed fires on park carriage road vistas. These burns, totaling 0.2 acres, are part of an on-going program to use prescribed fire to maintain several of the 100 plus vistas that were created as part of the park's historic carriage road system and motor road system. Visual surveys indicate that the program is successful in reducing woody stems within the vistas and in keeping them open as vistas.

Details regarding fire effects monitoring at Saratoga NHP may be found in the Mountains to the Sea report (above).



**National Park Service
Fire Ecology Annual Report
Cape Cod National Seashore
Calendar Year 2007**

Summary

The Cape Cod National Seashore and the University of Massachusetts / Amherst under direction of CACO FMO David W. Crary, Jr. and Professor William A. Patterson III successfully completed the twenty-second (22nd) year of annual monitoring on research plots established in 1986 to explore the long-term effects of burning and mowing on coastal oak-pine forests.

The SHEN Fire Monitoring Crew was active with providing assistance for immediate pre- and post-burn monitoring in July. Much thanks to the monitoring crewmembers: Melissa Bruggeman, Teresa Van Diest and Laura Kangas. KellyAnn Gorman was instrumental with providing the assistance of the monitoring crew.

SCA Intern Mr. J.T. Erbaugh provided valuable assistance with pre-, post, and on-going monitoring efforts during June, July and August. Mr. Erbaugh internship was funded via Barb Steward (VA-SHP).

A generalized description of the Lombard Paradise Hollow 22 year Rx burn project may be viewed at:

http://www.umass.edu/nrc/nebarrensfuels/ma_barrens/cape_cod/index.html#brochure

Table 1. Fire Effects Plot Workload Cape Cod National Seashore 2007

Park	Monitoring Unit	Type of Plot (FMH, photo point, other)	Pre-burn	Immed. Post	Postburn (1-20 yrs)	Total Plots
Cape Cod National Seashore	Lombard Paradise Hollow (Truro, MA)	Forest mow/burn research 0.1 acre plots	Yes	Yes	Yes (1 – 20 year)	54

Table 2. Fire Ecology Staffing Cape Cod National Seashore 2007

Monitor	Starting Date	Ending Date	# of Pay Periods	Training and Development
J.T. Erbaugh	May 07	August 07	5.5 pp	SCA funded via Barb Stewart
Fire Techs	2007	August 07	1.5 pp	120 hours by fire techs assisting with sampling, plot corridor maintenance and plot burning/mowing.
UMass staff	2007	August 07	1.0 pp	80 hours of UMass support sampling
CACO Engine Supervisor	2007	n/a	0.5 pp	Supervision
CACO FMO	2007	n/a	1.0 pp	RXB2, project oversight

Table 3. Management Objectives and Monitoring Results 2007

Monitoring Unit	Management Objective	Monitoring Results	Objective Achieved?
Lombard Paradise Hollow	Research, vegetation	Collected data included: live and dead pre- and post-treatment fuel loading by size class and % cover and height class estimations of under- and over- story vegetation.	YES
	Research, burning	Day of burn information collected: RH, foliar moisture content, 1- 100 hr downed woody fuel moisture, wind speed and direction (each minute) and ROS	YES
	Research, Forest Overstory	Tree data (species, condition (live/dead; dominant, co-dominant, intermediate, suppressed) and DBH) were collected on 54 plots (400 sq. meter plots) for the fourth time since 1985	YES



**National Park Service
Delaware Water Gap National Recreation Area
Mid-Atlantic Fire Management Area
Fire Ecology Annual Report
Calendar Year 2007**

Summary

The Delaware Water Gap planned to conduct two prescribed burns this year. The Loch Lomond (27 acres) and Snyder (10 acres) prescribed burns were conducted successfully on 23 April and 24 April 2007 respectively. The 37 acres burned represent a 105% increase over planned prescribed burn acres. Along with employees from DEWA, personnel from GATE, INDE, UPDE, STLI, and the US Fish and Wildlife Service assisted. Both burns were conducted to maintain the native warm season grasses, perpetuate the scenic vistas, and disrupt fuel continuity. The burns also helped the park meet its open space management objectives as directed by the park's General Management Plan. DEWA continued with its hazardous fuel reduction projects clearing 28.5 miles of fire roads (equivalent to 46 acres – a 64% increase above planned fire road acres), 5 acres around park structures, and 39 acres along the park boundary.

Gateway National Recreation Area continued with its hazard fuel reduction projects clearing 14 miles of fire roads (equivalent to 21 acres – a 17% increase above planned fire road acres).

None of the other parks within the Mid-Atlantic Fire Management Area planned to conduct any prescribed burns, monitoring, or fuels treatment.

Fire Ecology Staffing 2007

The park has no fire ecology staff

Fire Ecologist Accomplishments/Focus Area

As the park has no fire ecologist, all accomplishments were completed by the FMO and the Fire Operations/Prescribed Fire and Fuels Technician. The percent time is a percent of time associated with prescribed fire and fuels treatment projects and not of time associated with total workload. Prescribed fire and fuels treatment projects account for 50% of the total workload. Table 1. Management Objectives and Monitoring Results 2007

All results shown are XX% confidence intervals of the mean. Fuel reduction objectives/results are mean percent reduction from preburn to immediate postburn. Stand density objectives/results are for five-year postburn mean stand density. An underlined number of plots indicates that the minimum sample size has been attained for that variable.

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (XX% confidence interval)	Objective Achieved?
Loch Lomond (Units LL-001, LL-002, LL-003)	> 75% reduction 1-hr fuels > 50% reduction 10-hour fuels > 10% overstory mortality for all fuels >1-hour (1-year post burn)	100 % TBD	YES
Snyder (SY-005)	> 75% reduction 1-hr fuels > 50% reduction 10-hour fuels	100%	YES

Category	Percent Time	Accomplishments/Focus Areas
General Planning	89%	Prepared ESF and CatEx for XXX prescribed fires, Dingmans Boundary, Egypt Boundary, and Mt. Minsi Repeater fuel reduction projects,
Monitoring Plans	0%	
Presentations	0%	
NPS Meetings/ Task Groups	0%	
Interagency Work	0%	
Fire Assignments and Fuels Projects	10%	COTR for fuel reduction projects
Research	0%	
Monitoring Field Work	0%	
Data Entry	0%	
Data Management and Conversion	0%	
Data Analysis	0%	
Supervision/Admin	0%	
Training & Professional Development	0%	
Miscellaneous		

Fire Effect Crew Accomplishments

DEWA had two seasonal employees in 2007 – one paid out of suppression funding and the other from hazard fuel reduction funding. The seasonal employees spent about 75% of their working on hazard fuel reduction projects involving clearing defensible space around park structures and clearing fire roads. Throughout the spring and summer, the Fire Management Office had

additional support with hazard fuel projects from park volunteers and other park personnel whose primary duties were other than fire management activities.



**National Park Service
New River Gorge National River
Allegheny Fire Management Area
Fire Ecology Annual Report
Calendar Year 2006**

Summary

In the spring of 2007 the New River Gorge National River conducted a prescribed fire over most of the designated grassland area located at the Sandstone Visitor Center. The prognosis of the burn seems to be positive in the suppression of undesirable species and favoring of native grasses and forbs. The data suggests that a program of prescribed fire will be beneficial as an annual or biannual treatment of this site. The landscape as a whole (after three years of maintenance and prescribed fire) looks better and is healthier than ever before.

