



**National Park Service
Fire Ecology Annual Report
Calendar Year 2006**

Summary

The Everglades National Park fire monitoring program, was able to successfully switch its Fire Effects Monitoring database from the FMH software to FEAT (Fire Ecology Assessment Tool) in 2006. Lisa McInnis and Brad Weissaupt from Natchez Trace Parkway visited in January of 2006 to assist with the database conversion. Efforts were continued to read plots, refine methodology and archive several thousand photo-monitoring slides. Monitoring of the host plants for rare butterflies continued in the Pine Rocklands. Our fire effects monitors continued to serve as advisors to the Pine Rockland Working Group, an international, multi-agency effort which has been effective at making recommendations and taking action to protect this imperiled ecosystem. In December, Fire Effects monitors organized and moderate the 2006 Cape Sable Seaside Sparrow symposium (Fire Management Strategy of Occupied Cape Sable Seaside Sparrow Habitat).

Fire Effects staff served on prescribed fires, wildland fires and assisted with two hurricane shut-downs and re-openings. Collaboration between the Everglades Fire Effects team continued with the prescribed fire crew at Big Cypress. Fire Effects staff coordinated with exotic control efforts to treat *Lygodium microphyllum* (Old World climbing fern) in the costal Prairie. Fire effects staff were involved with the reconnaissance of infested *Lygodium* areas pre-treatment.

The Lead Fire Effects Monitor represented Everglades National Park and south Florida at the LANDFIRE Modeling Workshop for mapzone 56, held in Kissimmee, FL, July 18-19, 2006. After attending the workshop the Lead Fire Effects Monitor was tasked with building upon the existing Rapid Assessment models for 6 of the monitoring types found within Everglades National Park. These include Pine Rockland, Short-hydroperiod Prairie, Long-hydroperiod Prairie. Additionally, an effort was made to separate

Mangroves and Coastal Prairie (Coastal Marsh) into two separate Biophysical Settings because they were lumped together in the Rapid Assessment.

Changes in the staff also took place in 2006, Shanna Ramsey left the program and two new Fire Effects monitors (Maya Vaidya and Aerin Land) were hired in the fall. A total of four Student Conservation Association Interns worked with us in 2006 (Jennifer Mellein, Elizabeth Adair, Madeline Andrews, and Kelly McKean).

Table 1. Fire Effects Plot Workload 2006

Park	Monitoring Unit	Total plots installed to Date	Type of Plot (FMH, photo point, other)	Pre-burn	Immed. Post	Postburn (1-20 yrs)	Total Plots
Canaveral National Seashore	Pinus elliottii (Slash Pine Flatwoods)	10	FMH Forest plot	1	3	7	11
Everglades National Park	Pine Rockland	27	FMH Forest plot	0	3	10	13
	Short-hydroperiod Prairie	28	FMH Brush plot	0	4	7	11
	Long-hydroperiod Prairie	11	FMH Brush plot	0	0	2	2
	Coastal Prairie (Coastal Marsh)	18	FMH Brush plot	0	3	3	6
	1970's photo point relocation	225 (relocated 26)	Photo point	N/A	N/A	N/A	26
	Butterfly host plant	4	Host-plant monitoring	N/A	N/A	N/A	22 visits to 4 different plots
Total		94		1	10	29	90

In 2006, the Everglades Fire Effects team conducted reads of 43 FMH plots, 32 reads in Everglades National Park and 11 reads in Canaveral National Seashore, including one new plot installation in Canaveral National Seashore.

Table 2. Fire Ecology Staffing 2006

Monitor	Starting Date	Ending Date	# of Pay Periods	Training and Development
Rick Anderson	1/1/2006	12/31/2006	26	Assistance Agreements for Assistance Representatives, 581-Fire Program Management
Hillary Cooley	1/1/2006	12/31/2006	26	Assistance Agreements for Assistance Representatives, ISC-100, Endangered Species Act (Section 7-interagency Cooperation), S-290-Intermediate Wildland Fire Behavior, Fundamental II.
Shana Ramsey	1/9/2006	8/5/2006	15	
Maya Vaidya	10/1/2006	12/31/2006	6	ATV Operator, I-300
Aerin Land	11/12/2006	12/31/2006	3	
SCA Interns			# of months	
Jennifer Mellein	1/1/2006	2/28/2006	2 months	B-3, S-130/S-190
Elizabeth Adair	5/15/2006	8/7/2006	3 months	B-3
Madeline Andrews	6/20/2006	9/11/2006	3 months	B-3, S-130/S-190
Kelly McKean	9/12/2006	12/31/2006	3.5 months	B-3, I-Suite, ATV-operator, I-100/L-180/ S-130/S-190

The fire ecologist position was fully staffed this year by Rick Anderson. The Lead Fire Effects Monitor position was fully staffed in 2006 by Hillary Cooley. Shanna Ramsey worked for 15 pay periods and resigned her position this year. Mayavati Vaidya and Aerin Land were hired into the G-S 5 subject-to-furlough Biological Science Technician in 2006. The GS-6 Assistant Lead Fire Effects Monitor was vacant in 2006. Student Conservation Association (SCA) interns Jennifer Mellein, Elizabeth Adair, Madeline Andrews and Kelly McKean assisted with plots reads in 2006.

Table 3. Management Objectives and Monitoring Results 2006

An underlined number of plots indicates that the minimum sample size has been attained for that variable.

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (% confidence interval)	Objective Achieved?
Slash Pine Savanna	<u>Canaveral-</u> Limit mortality of <i>Pinus elliottii</i> overstory trees to less than 30% as measured two years post burn.	Have not completed 2 year read. Will complete in 2007.	Will look at after 2007 data collected.
	Induce top-kill of pole size hardwoods by 50-100% immediately post burn.	No longer monitoring hardwoods.	N/A
	Promote 20% recruitment of seedling and pole sized PIEL >15cm in height five years post burn.	Have not completed 5 year post read.	
	Reduce height of hardwoods and shrubs <6 feet immediately post burn.	No longer monitoring shrubs.	N/A
	Increase cover of bare ground/open space to 25% bare ground / 75% litter cover 5 years post burn.	First year of using Brown's transects to monitor for Open Space.	Too soon to tell, will need to monitor additional years.
	<u>Everglades-</u> To maintain fire frequency return interval 1-5 yrs while maintaining up to 33% of the pinelands in a three year rough condition.	All Fire Effects plots have been treated with fire within the last 0-5 years. 56% of plots are at a 3 year rough, 41% of plots are less than 3 year rough, 4% of the plots are greater than three year.	Yes, to the first part all Fire Effects plots are maintained with a fire frequency of 1-5 years. No-56% of the plots are at 3 year rough, this is greater than 33%. If following the 2007 prescribed fire schedule for 2007 0% of the plots will be at a 3 year rough.
Short Hydroperiod Prairie	Topkill >50% of encroaching woody species immediately post-burn	Did not complete belt transects	?-Did not monitor

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (% confidence interval)	Objective Achieved?
	Reduce fine fuels >70% immediately post-burn	Did not complete Brown's transects	?-Did not monitor
Coastal Prairie	Treat up to 100% of Old World climbing fern (<i>Lygodium microphyllum</i>) and/or Brazilian pepper (<i>Schinus terebinthifolius</i>) populations that have been identified by the Exotic Plant Management staff for fire treatment annually	3 Fire Effects plots out of 18 plots or 17% were treated with fire.	Yes- Areas targeted for herbicide treated because of <i>Lygodium</i> were also treated with fire.
Long Hydroperiod Prairie	Topkill >50% of encroaching woody species immediately post-burn	Did not complete belt transects	?-Did not monitor this objective
	Reduce fine fuels >70% immediately post-burn	Did not complete Brown's transects	?-Did not monitor

Ecologist Accomplishments

February Rick taught a unit of RX-510 in Tucson, Arizona. He has continued a working relationship with Big Cypress fire effects staff as well as the Resource Management Specialist at Canaveral National Seashore. At Canaveral Seashore refinements were made to prescribed fire objectives and monitoring protocols.

Category	Percent Time	Accomplishments and/or areas of activities
Planning	0%	FMP, EA, EIS, CE, section 7 consultation, monitoring plan, etc
Presentations	0%	Scientific meetings, park staff, public, etc
NPS Meetings/ task groups	30%	Park, regional or national – FEAT, conversion, others
Interagency work	0%	LANDFIRE, FPA, FLN, etc.
Fire Assignments	5%	Identify types of assignments/Type I DIVS
Research	20%	JFSP, other (Slocum, Beckage, Wendelberger
Data entry	0%	Estimated amount of time spent entering data from paper to PC
Data Conversion	0%	Estimated amount of time to convert FMH data to FEAT; includes preparing species lists, error checking, learning conversion program, etc
Data analysis	0%	This is expected to be very low number or zero for fire effect crew/lead monitor
Supervision/Admin	30%	Hiring, supervision, travel, payroll, ect
Training	10%	
Miscellaneous	5%	Things that don't fit in other categories – presentations, FMP, ect

Fire effects crew accomplishments and area of focus.

In addition to monitoring 43 FMH plots this year. Fire Effects Crew members monitored Butterfly Host plant plots on a monthly and relocated 26 of the 1970's photo points. Crew members and SCA interns scanned approximately 1,000 FMH slides and entered approximately 1,000 images in to digital storage of DocuShare. This year Fire Effects Crew members organized and moderated the 2006 Cape Sable Seaside Sparrow symposium-Fire management Strategy of occupied Cape Sable Seaside Sparrow Habitat.

Fire Effect Crew Accomplishments/Focus Areas

Category	Percent Time	Notes
FMH plots	14%	Estimated amount of time spent collecting plot data; includes any preparation time.
WUI plots	N/A	NONE
CBI plots	N/A	NONE
Other plot work	15%	Butterfly host plant monitoring and relocation of 1970's photo points
Presentations	2%	Poster and talk for Pine Rockland working group
NPS Meetings/ task groups	4%	Annual Prescribed fire meeting, Annual AAR review, meetings with exotics control manager, daily briefings
Interagency work	15%	LANDFIRE, Cape Sable Seaside Sparrow meeting, Pine Rockland Working Group, Meetings with cooperators at Florida International University and Louisiana State University
Fire Assignments	0%	NONE
Fuels Project work	N/A	NONE
Data entry	9%	Estimated amount of time spent entering data from paper to PC and filing field data sheets.
Data conversion	2%	Estimated amount of time to convert FMH data to FEAT; includes preparing species lists, error checking, learning conversion program, etc
Data analysis	9%	Time spent analysis data and developing sampling protocols for Canaveral and Everglades
Supervision/Admin	12%	Travel, payroll and purchasing, paperwork, etc. - Lead monitor-training new personnel, crediting plan, assisted Fire Ecologist in hiring of new crew members.
Training	9%	FEAT training, Fire Fighter refresher, Assistance Agreements for Assistance Representatives, ISC-100, Endangered Species Act (Section 7-interagency Cooperation), S-290-Intermediate Wildland Fire Behavior, Fundamental II.
Miscellaneous	9%	Hurricane preparations, local work on prescribed and wildland fires, Greater Everglades Restoration Conference. Crew members and SCAs scanned FMH slides and stored digital photo monitoring images in DocuShare.

Sampling Design & Field Methods

Canaveral National Seashore:

Status of Planning Documents

Analyze of Canaveral open space attached in appendix A.

Monitoring Results

Everglades National Park: The Everglades Fire Effects data was analyzed in 2006 by Jay Sah of Florida International University. Jay will give a talk at the Pine Rockland Working Group meeting on January 31, 2007 called “Fire Effects Monitoring in Long Pine Key, Everglades National Park”. Jay will give preliminary results of his data analysis at that time, and the final report is expected to be delivered in late February of 2007. The information in this report will explore alternative statistical measures of how well ENP fire objectives are being achieved.

Research Projects/Collaboration

Collaboration has with groups below has continued.

- Pine Rockland Working Group
- Annual Cape Sable Seaside Sparrow Symposium
- Cavity nesting avian species Reintroduction by Gary Slater of the Eco Institute.
- Brian Beckage from University of Vermont on spatial extent of fire history within the Everglades landscape.
- Southern Everglades Restoration Project to develop fire-hydrology related performance measures for tree islands.
- Landscape Level Climate and Fire Interaction, Matt Slocum LSU
- Fire Effects data analysis with Florida International University

New collaboration began with.

- LANDFIRE
- Florida International University to Develop a data-driven classification of south Florida plant communities.

Adaptive Management

The Florida International University Sah report will be used to evaluated if the current (2005-present) monitoring protocols are meeting the Fire Management objectives.

appendix A

Open space in Canaveral National Seashore
March, 2006
Updated January 2007
By: Hillary C. Cooley
Biological Technician
Everglades National Park

Background- Fire Effects monitoring plots following FMH protocols were established in Canaveral National Seashore beginning in 2001. These plots are 20x50 meters and have a centerline at the 10 meter width running the length of the 50 meter plot. Transects know as Brown's (Fuel load) transects extend in random directions originating from the centerline at 10, 20, 30 and 40 meters. The Brown's transects are 50 ft (15.24 m) in length.

Objectives-One of the monitoring objectives for Canaveral National Seashore is to increase cover of bare ground/open space to 25% bare ground/ 75% litter cover 5 years post burn.

Experiment- In January 2006 the Everglades Fire Monitoring Crew of Cooley, Ramsey and Mellein experimented to try and better determine an estimate of open space. We used the already established 50 ft Brown's transects as line intercept transects by noting along the tape where cover began and ended and where open space began and ended. The percent open space could then be determined by summing all the open space together and dividing by the total length of the transect line and multiplying by 100. Since we used our 50 ft. Brown's transects the total length of the transect line was converted into 600 inches. The total number of open inches was summed and divided by 600 to determine percent open. Methods were adapted from Elzinga, Salzer, and Willoughby 1998.

Results

Table1: Percent open for plots in Canaveral National Seashore. Plots read in January 2006.		
Plot	% Open	Time of last fire
PIEL01	32	March/2005
PIEL03	55	March/2005
PIEL04	45	March/2005
PIEL05	38	March/2005
PIEL06	21	Maerch/2005
PIEL07	17	March/2005
PIEL09	25	March/2005

Problems: Defining open space. Hawks and Menges 1996 defined open space as “ the presence of bare soil.” We did not have a clear definition of open space at the time we sampled the lines. Specifically we were inconstant in what we defined the area under a *Serenoa repens* leaf as.

I would define open space as bare ground (sand or soil) that also includes litter covering soil or sand with no rooted vegetation or canopy cover. The percent of litter cover will be estimated visually in gaps (open areas) of greater than 0.05 meters using a 0.5m² frame.

Table 2: Cover classes to be used for litter found in open areas.	
Cover Class (litter)	Percent
1	<1%
2	>1-5%
3	6-25%
4	26-50%
5	51-75%
6	76-98%
7	>98%

The observer should consider cover to be closed until there is a gap of greater than 2 inches (~5cm) in the canopy cover. The same goes for open space the area is considered open until there is an interruption of the open area greater than 2 inches (5cm).

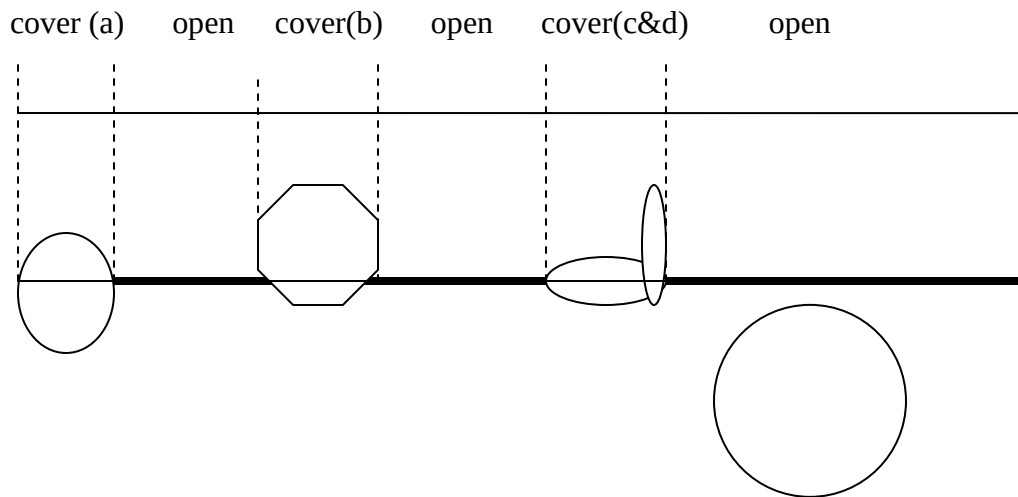


Figure: 1 Line Intercept method of measuring bare ground (open space) vs. cover.
 $\% \text{ Cover} = \frac{\text{Distance } a+b+c+d}{\text{total transect length}}$. (Elzinga, Salzer, and Willoughby 1998)

Second Trip in April 2006

Trip in April 2006 to CANA- Update to cover estimate efforts.

After analyzing the January 2006 data from CANA changes were made to the monitoring protocols for open space as follows.

- 1.) Measured line intercept using meters not feet. Now use 15.25 meters instead of 50 feet.
- 2.) The minimum length of cover or open space considered is 5 cm. We will ignore bits of vegetation, or gaps that are less than 5 cm.
- 3.) We have three different categories:
Gap(open)-bare ground (sand or soil) that may also include sparse discontinuous litter covering sand or soil with no rooted vegetation or canopy cover. This could include ground, soil, sand or litter. *For this category give a litter cover class (Table:2).
Cover>1m- open space as defined above that includes overhanging vegetation greater than 1meter in height. *Also give a litter cover class (Table:2).
Cover<1m- any vegetation that intercepts the transect that is less than 1 meter in height.

Table 3: Comparative results of January 2005 and April 2005.							
Plot	Status in Jan.	% open in Jan open	Status in April	% Gap in April	% >1m in April	% Combined gap and >1m	% difference between Jan. and April
PIEL01	01YR01	32	01YR01	24	15	39	7
PIEL03	01YR01	55	Not sampled	*	*	*	
PIEL04	01YR01	45	01YR01	25	9	34	11
PIEL05	01YR01	38	01YR01	*	*	*	
PIEL06	01YR01	21	01YR01	*	*	*	
PIEL07	01YR01	17	01YR01	10	0	10	7
PIEL09	01YR01	25	01YR01	*	*	*	
PIEL08	N/A	*	01POST	60	36	96	
PIEL10	N/A	*	01POST	40	31	71	
PIEL11	N/A	*	01POST	26	57	83	
* Data not collected.							

Literature Cited

Hawkes, C.V. and E.S. Menges. 1996. The Relationship between Open Space and Fire for Species in a Xeric Florida Shrubland. *Bulletin of the Torrey Botanical Club* 123(2):81-92.

Elzinga, C., Salzer, D. and Willoughby, J. 1998. Measuring and Monitoring Plant Populations. BLM Technical Reference 1730-1.

Other Literature related to topic

Bowman, R and G.E. Woolfenden. 2002. Nest Site Selection by Florida Scrub_Jays in Natural and Human-Modified Habitats. *Wilson Bulletin* 114(1):128-135.

Breining, D.R. and P.A. Schmalzer. 1990. Effects of Fire and Disturbance on Plant and Birds in a Florida Oak/Palmetto Scrub Community. *American Midland Naturalist* 123(1):64-74.

Breinger, D.R., M.A. Burgman, B.M. Stith.. 1999. influence of habitat quality, catastrophes, and population size on extinction risk of the Florida scrub-jay. *Wildlife Society Bulletin* 27(3):810-822.