



**National Park Service
Everglades National Park
Fire Ecology Annual Report
Calendar Year 2008**

Summary

The Everglades fire effects monitoring program was able to successfully transition the fire effects monitoring database from FEAT (Fire Ecology Assessment Tool) to FFI (FEAT Firemon Integrated) in 2008. The crew continued to read plots and refine methodology for fire effects monitoring and data management in both Everglades National Park and Canaveral National Seashore. In the Pine Rocklands, candidate species butterfly host plant and rare herbaceous plant monitoring studies continued.

Everglades fire effects staff continued to assist and collaborate with other organizations. Our fire effects monitors served as advisors to the Pine Rockland Working Group, an international, multi-agency effort which effectively makes recommendations and takes action to protect this imperiled ecosystem. Aerin Land represented Everglades and Biscayne National Parks on the Imperiled Butterfly Working group and was appointed co-chair of the Habitat Assessment and Management sub-committee. In February, 2008, fire effects monitors assisted with organizing and facilitating the biannual 2008 Pine Rockland Conference. In December, 2008, fire effects monitors organized and facilitated the 8th annual 2008 Cape Sable Seaside Sparrow symposium (Fire Management Strategy of Occupied Cape Sable Seaside Sparrow Habitat). The Everglades fire effects team continued to work with the Big Cypress prescribed fire crew. A South Florida Inter-Agency meeting was held at Panther National Wildlife Refuge to share objectives, protocols and foster communication between agencies and researchers conducting fire effects monitoring in South Florida. The Everglades fire ecology / fire effects staff provided input and expertise to National Key Deer Refuge managers in the development of their Fire Management Plan and monitoring program. They also provided input and expertise to the South Florida and Caribbean Inventory and Monitoring staff for the development and selection of Everglades monitoring sites. Maya Vaidya served as a peer reviewer on the panel for Joint Fire Science proposals and Aerin Land provided Everglades monitoring data and input during the development and inaugural meeting of the Imperiled Butterfly Working Group. Maya Vaidya and Aerin Land traveled to eight National Forests in the Southeast Region to serve as facilitators for the National Fuels Assessment project.

Crew members presented fire effects data at various venues, including the Pine Rockland Working Group Conference, the annual Entomological Society of America conference, and the annual Everglades National Park Fire Management After Action Review. Aerin Land and Maya Vaidya represented Everglades National Park at the Pine Rockland conference, Miami FL in February 2008 and the Pine Rockland Working Group workshop in the Andros, Bahamas. Aerin Land also presented at the Entomological Society of America conference, Reno, NV in November 2008. Aerin Land presented current data regarding fire effects on the candidate butterfly species for the federally endangered species list and their host plants and Maya Vaidya presented current data and new methods to assess snag populations in the Pine Rocklands.

The fire effects staff was involved with a number of outreach events in 2008. The Everglades Fire Communication Team (FCT) was created in March, 2008. Katie Budzinski served on the committee as a co-chair and the fire ecology representative. The FCT developed and presented the 50th Anniversary of Prescribed Fire in Everglades National Park. Katie Budzinski, along with other FCT members, presented this information at Everglades National Park, Homestead, FL and the '88 Fires: Yellowstone and Beyond Conference in Jackson Hole, WY. Intern Naomi Kibe worked part time with the Environmental Education staff and created a detailed presentation on the role of fire in the Pine Rocklands. She presented the program multiple times to the public during the spring of 2008. Maya Vaidya was interviewed for a report with local channel 6 news on the after effects of the Mustang Corner Fire. The fire effects staff presented fire ecology information at family and school events. Fire ecology presentations and field trips were conducted for University of Florida students and the Everglades Interpretation staff.

In September 2008, the contract for completing the Everglades Fire Management Plan Environmental Assessment was awarded to Parsons. The fire effects staff assisted in planning and organizing the Environmental Assessment kick off meeting held in October 2008.

The fire effects staff worked on prescribed fires and wildland fires, including the ~49,000ac Mustang Corner Fire, assisted with staffing needs for severity and preparedness, and assisted with three hurricane shut-down and re-opening operations. All scheduled and immediate post reads were completed by June and all data entry was completed by October.

Table 1. Fire Effects Plot Workload 2008

Park	Monitoring Unit	Number of Plots	Type of Plot (FMH, photo point, other)	Pre-burn	Immed. Post	Postburn (1-20 yrs)	Total
Everglades	Pine Rockland	27	FMH Forest plot	0	0	21	21
	Short Hydro-period Prairie	28	FMH grass plot	0	8	16	24
	Long Hydro-period Prairie	11	FMH grass plot	0	0	1	1
	Coastal Prairie	18	FMH grass plot	0	0	2	2

Table 1. Fire Effects Plot Workload 2008, continued

	Butterfly Host plant Monitoring	2	Host-plant monitoring	N/A	0	20	20
	Phenology Monitoring	8	Phenology monitoring	N/A	0	6	6
	Shrub Monitoring	6	Tagged individual shrub monitoring plot	0	0	6	6
	Insect Monitoring	6	Insect Monitoring plot	N/A	0	6	6
	1970's photo-point relocation plots	225 (26 relocated)	Photo Point	N/A	0	0	0
Canaveral	Slash Pine Flatwoods (<i>Pinus elliottii</i>)	11	FMH Forest plot	0	0	3	3
	Coastal Scrub	18	Photo Point	18	17	0	35
Total		161		18	26	80	124

In 2008, the Everglades fire effects team conducted reads of 51 FMH plots, 48 reads in Everglades National Park and 3 reads in Canaveral National Seashore. Other monitoring included 20 butterfly host plant plot reads, 6 insect plots visits, 6 phenology plot reads and 6 shrub (Non-FMH) plot reads in Everglades and 35 photo monitoring plots in Canaveral National Seashore.

Table 2. Fire Ecology Staffing 2008

Ecologist and Monitors	Starting Date	Ending Date	# of Pay Periods	Training and Development
Maya Vaidya	1/1/08	12/31/08	26	Ecology and Restoration of Longleaf Pine Ecosystems on line college course, RT-130, FFI, RX-310, RT-271, ATV Refresher, S-133, S-212, S-390, Defensive Driving, Arthur Carhart Wilderness Act Training, Alternative Consultation Act Training, Pine Rockland Working Group Conference, Cape Sable Seaside Sparrow Symposium, HECM Task Book completed
Aerin Land	1/1/08	12/31/08	26	RT-130, FFI, RX-310, S-133, S-212, S-390, Defensive Driving, Arthur Carhart Wilderness Act Training, Alternative Consultation Act Training, Imperiled Butterfly Working Group Meetings, Entomological Society of America Conference, Pine Rockland Working Group Conference, Cape Sable Seaside Sparrow Symposium, RADO, EDRC task books initiated

Table 2. Fire Ecology Staffing 2008, continued

Katherine Budzinski	1/1/08	12/31/08	26	S-271, RT-130, CPR/1 st Aid, FFI, RX-310, S-133, A-312, S-290, S-212, S-390, Defensive Driving, '88 Fires: Yellowstone & Beyond Conference, Cape Sable Seaside Sparrow Symposium, Pine Rockland Working Group Conference, HECM task book initiated and completed
Colleen Holland	1/1/08	12/31/08	26	RT-130, 1 st Responder, CPR/1 st Aid, FFI, RX-310, RT-271, S-290, ATV Refresher, Defensive Driving, Women in Fire Conference, Pine Rockland Working Group Conference, Cape Sable Seaside Sparrow Symposium, HECM task book completed
Naomi Kibe	1/1/08	6/30/08	14	S-271, Environmental Education Training, Pine Rockland Working Group Conference
Dana Cohen	1/1/08	4/4/08	8	RX-310 Instructor, RX-410, RX 310 Planning Meeting, Pine Rockland Working Group Conference

Changes in the fire ecology and effects staff took place in 2008. Dana Cohen continued as Acting Fire Ecologist until April 2008. Maya Vaidya was promoted to Fire Ecologist in December 2008. Student Conservation Association Intern Naomi Kibe completed her internship in July 2008.

Table 3. Management Objectives and Monitoring Results 2008

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (XX% confidence interval)	Objective Achieved?
Slash Pine Savanna	~~Canaveral-~~ Limit mortality of <i>Pinus elliottii</i> overstory trees to less than 30% as measured two years post burn.	Overstory pine mortality 28% 2 years post fire	Yes
	Induce top-kill of pole size hardwoods by 50-100% immediately post burn.	No longer monitoring hardwoods. (Resource objectives refined Nov. 2004)	N/A
	Promote 20% recruitment of seedling and pole sized PIEL >15cm in DBH five years post burn.	Have not completed 5 year post read.	N/A
	Reduce height of hardwoods and shrubs <6 feet immediately post burn.	No longer monitoring shrubs. (Resource objectives refined Nov. 2004)	N/A
	Increase cover of bare ground/open space to 25% bare ground / 75% litter cover 5 years post burn.	Have not completed 5 year post read. 2 year post : 41% bare ground 59% litter covered ground (Bare ground = <50% litter cover Litter cover = >50% litter cover)	N/A Have not reached 5 years post (not reached at 2 years post)

Table 3. Management Objectives and Monitoring Results 2008, continued

Slash Pine Savanna	<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 - 26% plots are currently at a 3 year rough condition, 37% of plots are less than 3 year rough, 37% of the plots are greater than three year. *FMH plot burn history is not representative of entire pineland fire frequency and habitat rough condition	Yes Fire Frequency maintained at 1-5 yrs Yes- **see * in column to left
Short Hydroperiod Prairie	Topkill >50% of encroaching woody species immediately post-burn	Did not complete belt transects Photomonitoring used to monitor woody species encroachment	No data * Photomonitoring data not analyzed
	Reduce fine fuels >70% immediately post-burn	Did not complete cover transects	No data * Photomonitoring data not analyzed
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	<i>Lygodium microphyllum</i> : 80% exotic plant populations were treated <i>Schinus terebinthifolius</i> : No populations were identified for treatment	Yes
Long Hydroperiod Prairie	Topkill >50% of encroaching woody species immediately post-burn	Did not complete belt transects Photomonitoring used to monitor woody species encroachment	No data * Photomonitoring data not analyzed
	Reduce fine fuels >70% immediately post-burn	Did not complete cover transects	No data * Photomonitoring data not analyzed

Fire Ecologist accomplishments and areas of focus

The Fire Ecologist position was vacant for the majority of 2008. Dana Cohen spent a substantial amount of her time working with other agencies and within Everglades to streamline and coordinate south Florida fire effects monitoring and integrate programs. She developed and strengthened working relationships with Panther National Wildlife Refuge, South Florida and Caribbean Inventory and Monitoring and South Florida Natural Resource Center staff. Dana continued to attend training and taught and served on the rewrite committee for RX-310 in Boise, ID. Dana developed new performance appraisal plans for the fire effects crew and worked with the HR staff to update position descriptions. Maya Vaidya worked as Fire Ecologist for one month in 2008. The majority of her time was spend developing an updated Endangered Cape Sable Seaside Sparrow Fire Management Strategy for Everglades National Park following the

CSSS Symposium and continuing work on the FMP EA that she started as Lead Fire Effects technician.

Table 4. Fire Ecologist Accomplishments/Focus Areas

Category	Percent Time	Accomplishments and/or areas of activities
Planning	25%	CSSS Fire Management Strategy, EA for FMP
Presentations	5%	Teaching RX-310
NPS Meetings/ task groups	25%	Rewrite committee for RX 310, Pine Rockland Working Group Conference, Work with Panther National Wildlife Refuge, SFNRC, I&M
Interagency work	<5%	LANDFIRE – provided research datasets and other requested information for Landfire refresh
Fire Assignments	<5%	FEMO (T) on one prescribed fire
Research	5%	Support and consultation for research in Everglades National Park conducted by UVM, FIU and UNC researchers and students.
Data entry		
Data Conversion		
Data analysis		
Supervision/Admin	15%	Supervised lead monitor, completed evaluations for fire effects crew
Training	5%	RX-410
Miscellaneous	15%	Miscellaneous projects and activities

Fire Effects crew accomplishments and areas of focus

The fire effects crew monitored 51 FMH plots this year, 48 in Everglades National Park and 3 in Cape Canaveral National Seashore. The crew also monitored 2 Butterfly Host Plant plots on a monthly basis, recording phenology of *Croton linearis* (Pineland Croton) and presence of *Strymon acis bartrami* (Bartrams Hairstreak) and *Anaea troglodyta floridalis* (Floridia Leafwing) herbivory or life stages. The insect monitoring was wrapped up this year, with each of the 6 plots being visited a final time. The shrub phenology monitoring continued in the single plot that burned the previous year and final height and crown areas were collected in all 6 of the shrub plots. Crew members worked with the conversion of FEAT to FFI, checking that all data converted correctly, and changing the protocols that did not. All FMH data was entered and double checked in FFI by the Fall of 2008. Crew members and SCA Interns continued to scan and digitally store FMH slides. A new archiving system was created with the use of an external hard drive. Due to serious glitches in the system, DocuShare has been deemed an unreliable archival tool and will no longer be used.

Table 5. Fire Effects Crew Accomplishments/Focus Areas

Category	Percent Time	Notes
FMH plots	13%	Estimated amount of time spent collecting plot data; includes any preparation time.
WUI plots	N/A	
CBI plots	N/A	
Other plot work	8%	Pineland Croton, shrub phenology, insect sampling
Fire Assignments	8%	Mustang Corner Fire
Fuels Project work	0	

Table 5. Fire Effects Crew Accomplishments/Focus Areas, continued

Data entry	20%	Estimated amount of time spent entering data from paper to PC
Data conversion	15%	Estimated amount of time to convert FEAT data to FFI; includes verification of protocols, error checking, etc.
Data analysis	16%	Time spent on data analysis and preparing monitoring protocols for Canaveral
Supervision/Admin	5%	Travel, payroll and purchasing, paperwork, etc. - Lead monitor-training new personnel, crediting plan, hiring a new intern
Training	19%	RT-130, FFI, RX-310, S-133, S-212, S-390, RT-271, CPR/1 st aid, A-312, S-290, ATV Refresher, 1 st Responder, Environmental Education Training Defensive Driving, Arthur Carhart Wilderness Act Training, Alternative Consultation Act Training,
Presentations/Conferences	5%	Entomological Society of America, Pine Rockland Working Group Conference, '88 Fires: Yellowstone and Beyond Conference, Women in Fire Conference
Public Outreach	11%	Fire Effects intern hosted talks for park visitors and participated in Environmental Education events, Miami-Dade County Fair, ENP Staff Family Day, Miami Metro Zoo Family Fun Day, Post Mustang Corner Fire interview with News Channel 6, University of Florida Fire Ecology Tour,
NPS meetings/task groups	11%	Fire Communications team, ENP Wilderness Meetings, Environmental Assessment Meetings, Prescribed Fire Meeting , Fire Management AAR
Interagency Meetings	5%	Imperiled Butterfly Working Group, Panther Refuge/Everglades National Park Fire Monitoring Meeting, Imperiled Butterfly Field Trip, National Key Deer Refuge Fire Management Plan Meeting, Cape Sable Seaside Sparrow Symposium
Miscellaneous	40%	search and rescue, local prescribed and wild fires, work with DocuShare, Fire Ecology presentation for Seasonal Interp Ranger Training, staffing dispatch, fire engines and helitack, hurricane incident management, Raulerson Project

Sampling Design & Field Methods

Everglades National Park:

The FMH monitoring protocols employed in 2007 were continued in 2008. The Butterfly Host Plant monitoring continued for *Croton linearis* (host plant of the Florida leafwing and Bartram's hairstreak - project description in the 2005 Everglades Fire Ecology Annual Report). Results of this study were presented in poster format at the Pine Rockland Conference in Miami, FL and the Entomological Society of America Conference in Reno, NV. The study initiated to monitor effects of fire on individual shrub growth, resprouting, and phenology was concluded after 1 year of monitoring.

Canaveral National Seashore:

Fire effects monitoring in the Slash Pine Flatwoods of Canaveral National Seashore continued. Photo monitoring points were established in the Coastal Scrub Apollo 1 unit.

Monitoring Results

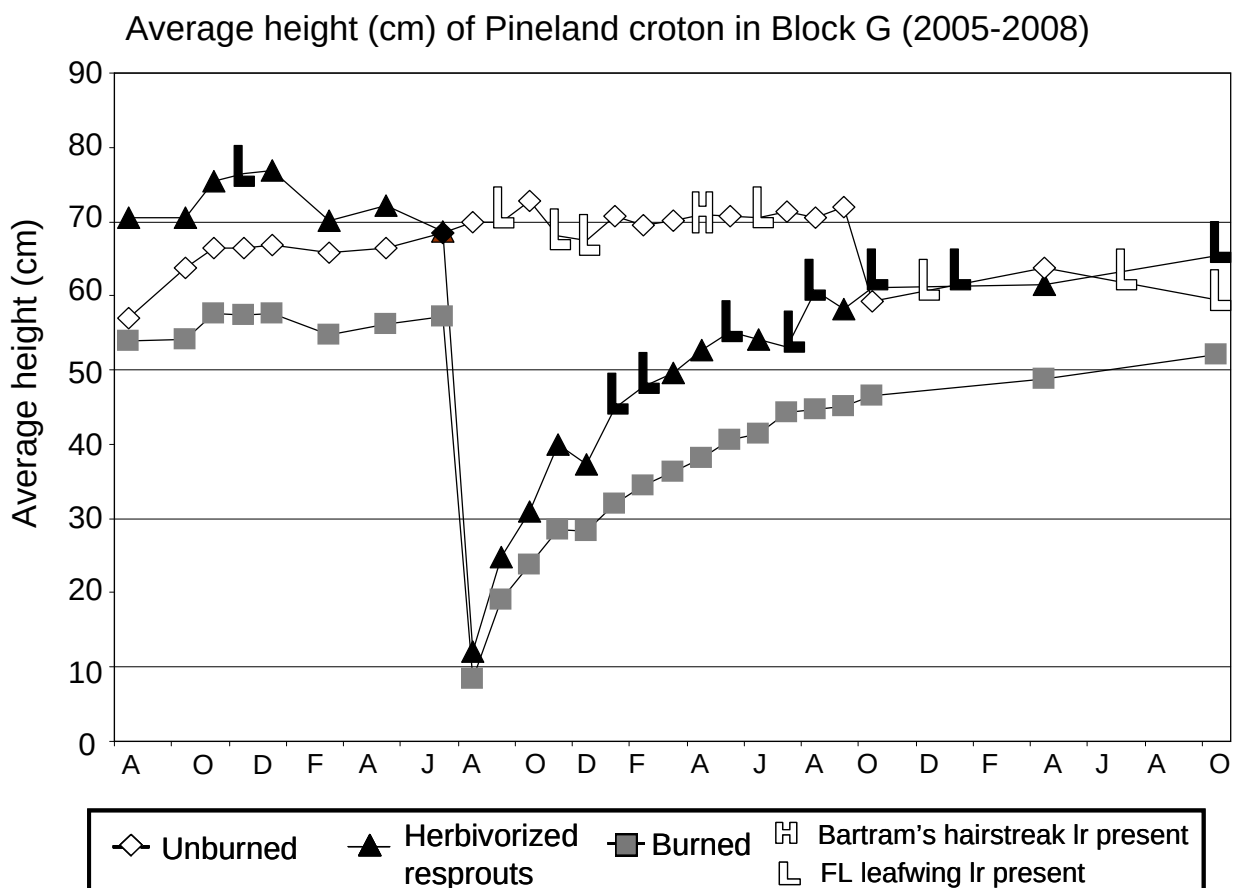
Everglades National Park

FMH Plots:

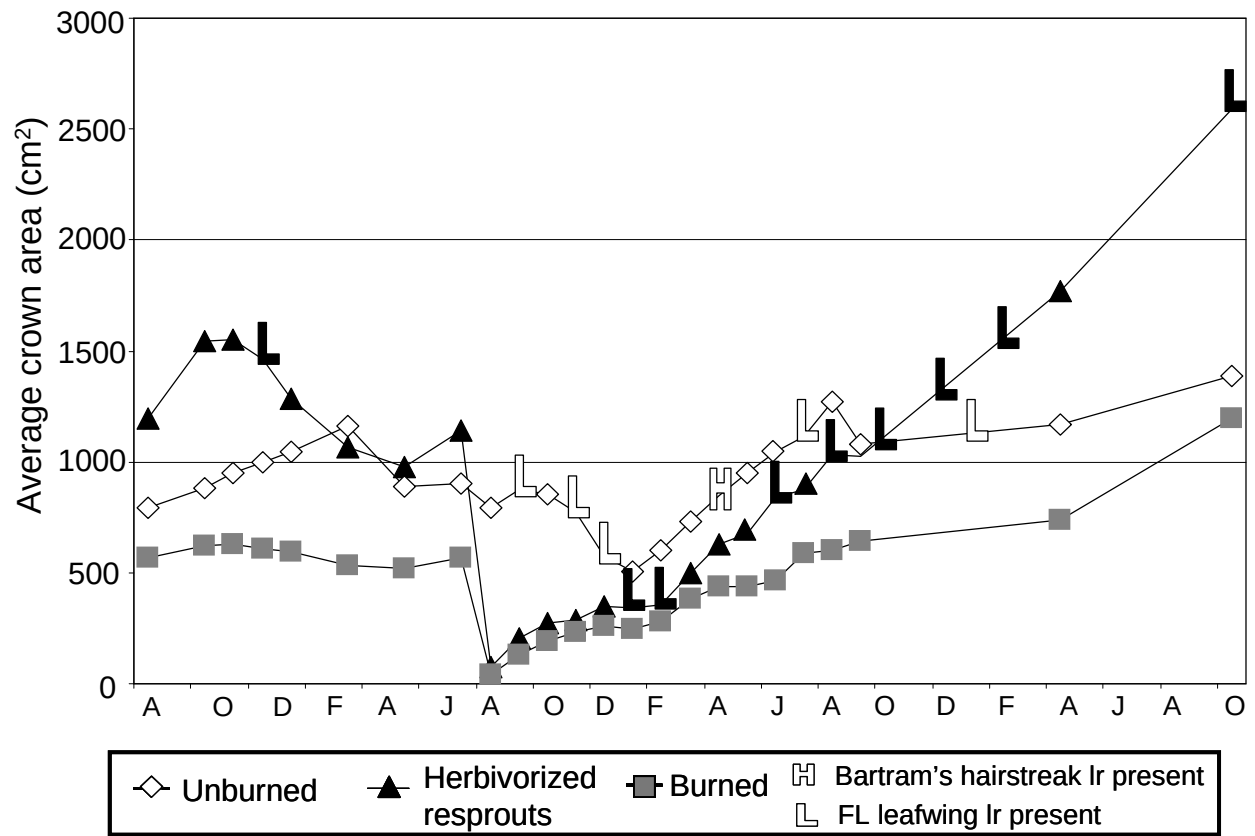
The Everglades fire effects plot data was analyzed in 2006 by Jay Sah of Florida International University. The final analysis report is being complied. A draft report is available and is included in the 2007 Everglades Fire Ecology Annual Report.

Butterfly Host Plant Plot Monitoring:

The average height and crown area of *Croton linearis* approached pre burn values at six months following fire. Leafwing larvae were observed on unburned host plants two months post fire and after six months were observed on burned / resprouting Pineland Croton.

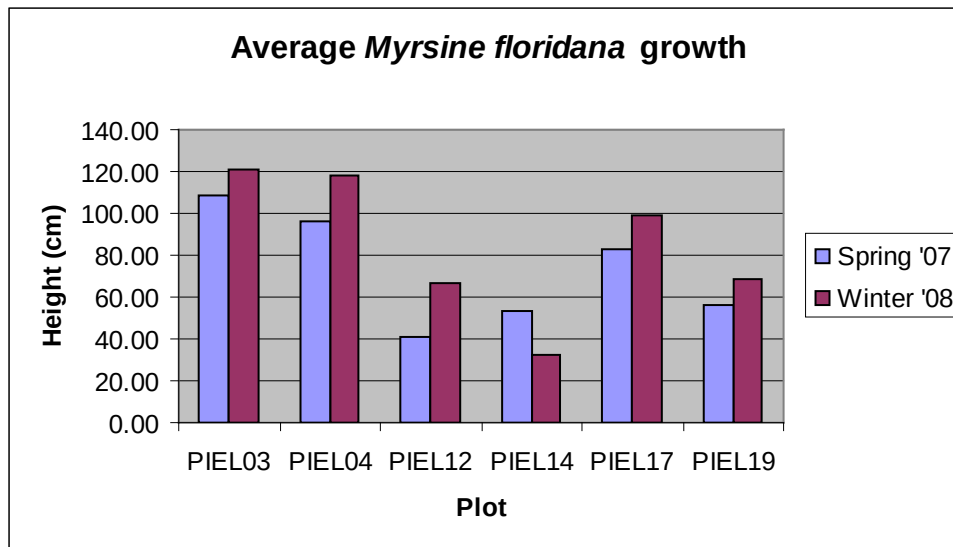


Average crown area (cm²) of Pineland croton in Block G (2005-2008)

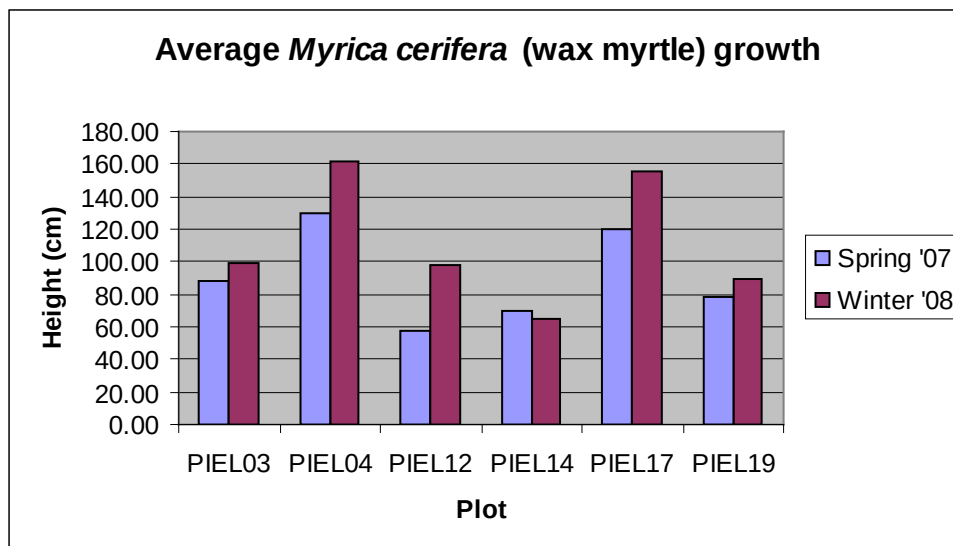


Individual Shrub Monitoring Plots:

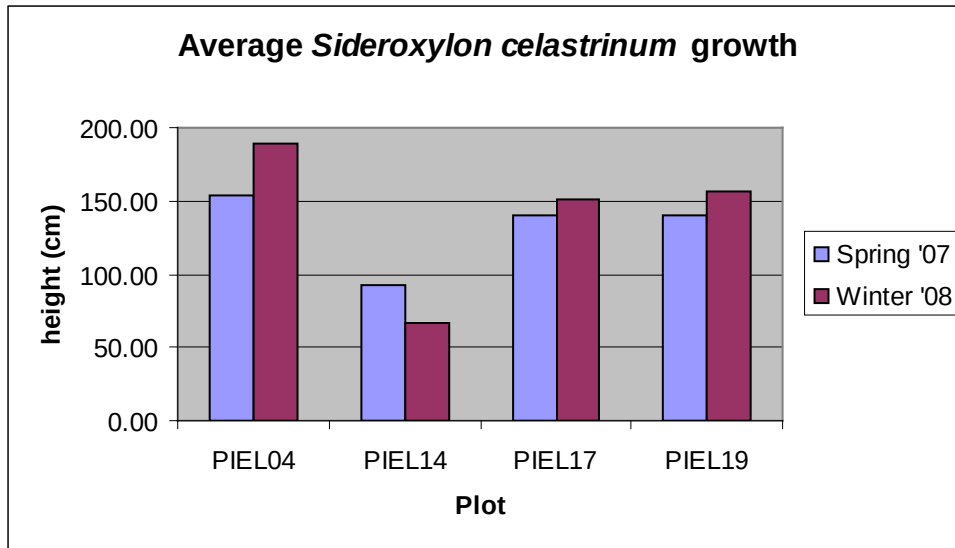
An increase in shrub heights after 1 year was seen in all unburned plots for all species measured. A decrease in shrub heights was seen for all species in the plot that burned in 2007 (PIEL 14).



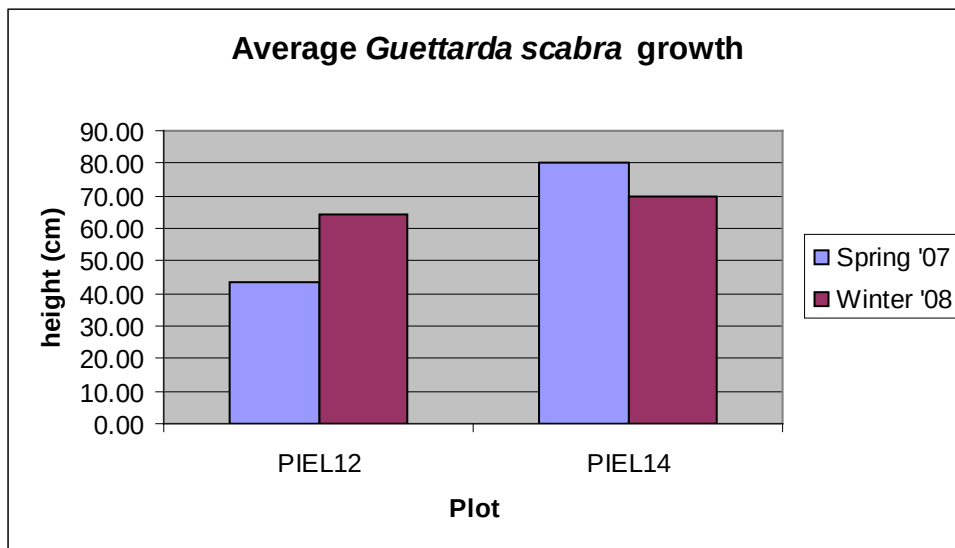
**Plot 14 burned July 2007. All other plots unburned during sampling period



**Plot 14 burned July 2007. All other plots unburned during sampling period



**Plot 14 burned July 2007. All other plots unburned during sampling period

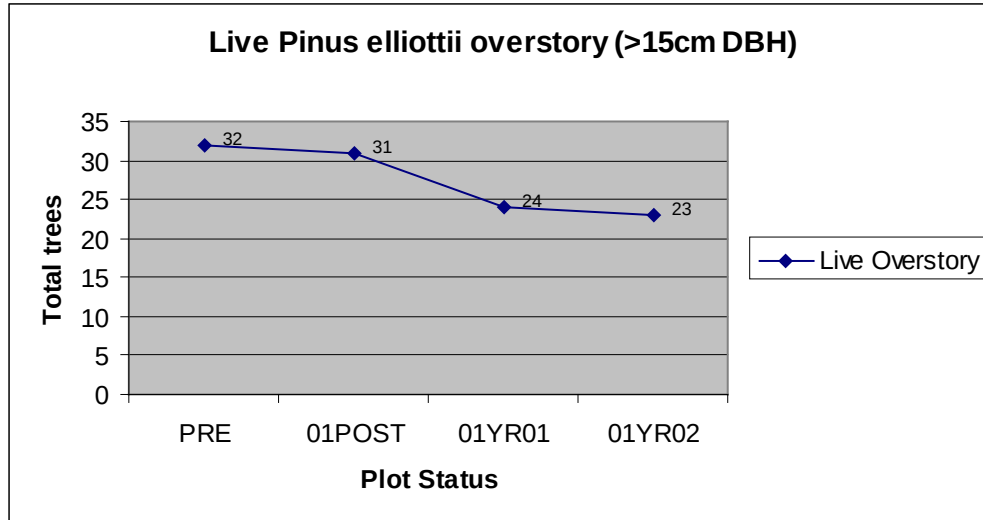


**Plot 14 burned July 2007. All other plots unburned during sampling period

Canaveral National Seashore

FMH Plots:

Overstory mortality was 28% for all plots measured 2 years post fire.



The percent bare ground versus litter covered ground was determined for areas with open space (gap) or aerial cover (vegetation cover over 1m). Bare ground was defined as areas with <50% litter cover, Litter covered ground defined as areas with >50% litter cover.

Percent Bare Ground vs. Percent Litter Covered Ground

Canaveral National Seashore

Plot	Status	Bare Ground (<50% litter cover)	Litter Covered Ground (>50% litter cover)
PIEL01	01YR02	98.57%	1.43%
PIEL03	01YR02	0.00%	100.00%
PIEL04	01YR02	75.54%	24.46%
PIEL05	01YR02	7.86%	92.14%
PIEL06	01YR02	9.55%	90.45%
PIEL07	01YR02	66.67%	33.33%
PIEL08	01YR02	81.80%	18.20%
PIEL09	01YR02	27.66%	72.34%
PIEL10	01YR02	38.90%	61.10%
PIEL11	01YR02	0.00%	100.00%
Average	01YR02	40.56%	59.44%

Research Projects/Collaboration

Collaboration with groups below has continued.

- Pine Rockland Working Group
- Annual Cape Sable Seaside Sparrow Symposium
- University of Vermont study on fire effects in the Pine Rocklands
- Florida International University – fire effects data analysis / prairie vegetation monitoring
- LANDFIRE
- South Florida Natural Resource Center (SFNRC)

New collaboration began with.

- Imperiled Butterfly Working Group
- South Florida Fish and Wildlife Service
- University of North Carolina graduate research – Fire and the Pinerockland/Hammock Ecotone
- Montana State University graduate project – Film Thesis – Fire Management activities in Everglades National Park

Field assistance was provided by the fire effects staff to University of Vermont researchers and a Montana State University graduate student. Consultation, guidance, and proposal review and editing were provided for the University of North Carolina graduate research project. Fire occurrence in areas of Florida International University vegetation study plots was tracked and perimeter data was provided to Florida International University research staff.

Adaptive Management

Programmatically, fire effects data is currently being used to rewrite the FMP as well as prescribed fire goals and objectives.

Annual Report Supplement

1. FFI is being used for all FMH style plots. Excel spreadsheets are used for butterfly host plant monitoring, insect diversity study and individual shrub monitoring data. Data summary graphs are created using exported FFI data in Excel.
2. Annual Meetings - No meetings were held internally where monitoring results were discussed. Results of the butterfly host plant monitoring were presented to members during the development of the Imperiled Butterfly Working Group. Results from FMH plot monitoring were discussed with Inventory and Monitoring staff and researchers to solicit advice regarding ways to refine protocols and generate meaningful data.

Poster Presentations

National Park Service
U.S. Department of the Interior



Monitoring the response of rare lepidoptera to fire management in the pine rocklands of Everglades National Park

Aerin D. Land and Hillary C. Cooley
Everglades National Park

Introduction:

- Habitat loss in south Florida has reduced the Pine Rocklands from 65,450 ha to approximately 11,000 fragmented ha., the largest fragment (8,029 ha) located in Everglades National Park
- Pineland croton (*Croton linearis*) is restricted to Pine Rockland habitats and is the only known host plant of

- Florida leafwing (*Anaea troglodyta floridae*; Fam: Nymphalidae)



- Bartram's hairstreak (*Strymon acis bartrami*; Fam: Lycaenidae)



- Fire is essential to maintain the Pine Rocklands, suppression results in habitat conversion to hardwood hammock
- The relationship between pineland croton, Florida leafwing, Bartram's Hairstreak and fire is not fully understood
- Monitoring is conducted to provide preliminary information on pineland croton and butterfly response to fire for the Everglades National Park adaptive fire management program

Objectives:

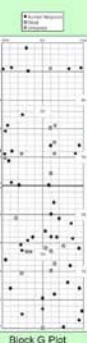
- Monitor survival and growth of pineland croton
- Monitor presence of Florida leafwing and Bartram's hairstreak larvae
- Monitor impacts of prescribed fire on pineland croton, Florida leafwing and Bartram's hairstreak

Methods:

- July 2005, monitoring began in existing fire effects plots in areas with known pineland croton populations and histories of Florida leafwing and Bartram's hairstreak butterfly sightings
- Pineland croton in Blocks G (N = 59) and J (N = 9) were designated for observation
 - Blocks G and J differ in elevation, topography, understory component, and moisture levels
- Plots were visited monthly
 - Height and crown area were recorded
 - Larval presence and evidence of herbivory was noted



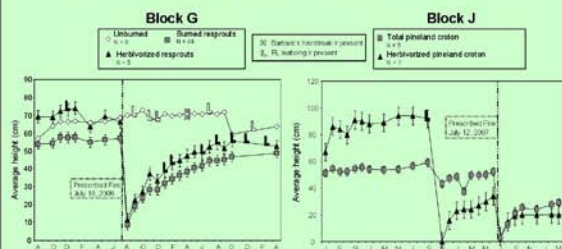
- Wet season prescribed fires burned through the plots in July 2006 (Block G) and July 2007 (Block J)



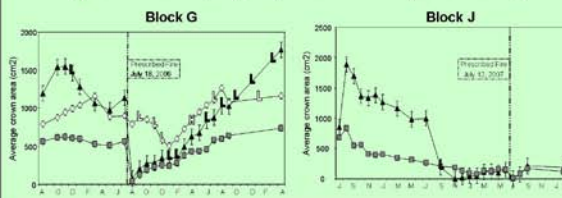
Acknowledgments: Everglades National Park Fire Management, the numerous SCA interns, volunteers and Bio. Techs who provided technical support

Preliminary results:

- Block G**
 - 93% (N = 55) pre-fire survivorship
 - 96% (N = 53) total post-fire survivorship
 - 17% (N = 9) unburned post-fire survivorship
 - 83% (N = 44) burned / resprouting post-fire survivorship
- Block J**
 - 77% (N = 7) pre-fire survivorship
 - 100% (N = 7) burned
 - 85% (N = 6) burned / resprouting post-fire survivorship
- Average height (cm) of pineland croton (2005 – 2008)



- Average crown area (cm²) of pineland croton (2005 – 2008)



Fire Management Implications:

- Herbivory trends in Blocks G and J suggest a preference for taller pineland croton with larger crown areas
- Presence of unburned croton in Block G illustrates the patchy, mosaic burn patterns of summer fires due to elevated water levels and fuel moisture
- In Block G Florida leafwing larvae were found on unburned pineland croton within 2 months and on burned resprouts within 6 months
- Trends suggest unburned refuge may be needed until burned resprouts become suitable host plants
- Burning pineland croton habitat during the wet season may provide unburned refuges

Future Research Needs:

- Continue monitoring pineland croton for long-term post fire effects
- Increase sampling size to determine
 - effects of fire frequency and seasonality
 - size of unburned refuge needed to sustain populations of Florida leafwing and Bartram's hairstreak
- Investigate the physical and physiological characteristics that make individual pineland croton plants suitable hosts for Florida leafwing and Bartram's hairstreak
- Map population size and distribution of pineland croton and look for trends in topography, hydrology, vegetation structure and competition

Poster Presentation by Aerin Land at the 2008 Entomological Society of America Conference
Reno, NV



FIRE EFFECTS MONITORING OF SNAG TREE CHARACTERISTICS IN EVERGLADES NATIONAL PARK PINE ROCKLANDS

Maya Vaidya and Hillary Cooley
Everglades National Park

Introduction

The Pine Rocklands are a globally imperiled ecosystem found only in south Florida, the Bahamas and Cuba. Everglades National Park contains the largest continuous tract of this habitat found in the U.S. Snags are an important component within this system and provide habitat for several extirpated bird species including the reintroduced Brown-headed Nuthatch (*Sitta pusilla*) and the Eastern Bluebird (*Sialia sialis*). Fire is a natural and necessary disturbance of the Pine Rockland ecosystem. Fire has been used as a restoration and management tool in Everglades National Park since the 1950's. In the 1990's fire effects monitoring programs were instituted to monitor the vegetation of fire adapted habitats to better understand how fire shapes the ecosystem and to refine prescription techniques to achieve desired conditions. Traditionally, fire effects protocols required only DBH measurements for snags. In 2007, fire effects monitors measured additional parameters that examine snag characteristics and how fire impacts their suitability for the nuthatch and blue birds.



Eastern Bluebird (*Sialia sialis*)



Brown-headed Nuthatch (*Sitta pusilla*)

Snag Monitoring

Of the 27 FMH plots located in Everglades National Park pine rocklands, 16 were monitored in 2007 in the 1 year 2 year and 5 year post burn conditions. Snags (>8cm DBH) were present in 9 of the 16 plots and monitored for specific snag characteristics.

Snag Characteristics monitored were: Percent bark; Percent sapwood; Cavity presence; Condition Class.



Tree/Snag Monitoring

Condition Class of Snags Monitored

Condition Class	No. of Snags	No. of Snags with Cavities
Class 1	16	0
Class 2	9	1
Class 3	23	0
Class 4	6	2



Prescribed Fire in ENP Pine Rocklands



Tree scorch after fire



Slash Pine (*Pinus elliotii*) Snags

Snag Condition Classes

- 1 = Newly created - bark usually tight.
- 2 = Little to moderate decay - loosening and sloughing bark, sapwood mostly intact and firm.
- 3 = Moderate to severe decay - sapwood is cracked and crumbles easily.
- **Many snags in this condition would be too disintegrated to be used by most cavity nesters
- 4 = Only heartwood (i.e. lighterwood).



Snag Condition Class 1



Snag Condition Class 2



Snag Condition Class 3



Snag Condition Class 4

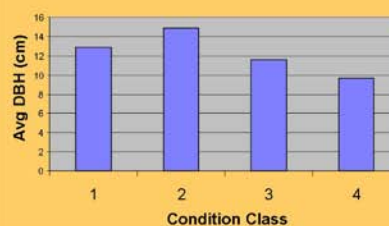


Snag cavity tree



Bird start in snag

Average DBH of Trees by Condition Class



Acknowledgements: Everglades National Park Fire Management, SCA Fire Effects Interns, Gary Slater, South Florida Natural Resource Center

Poster Presentation by Maya Vaidya at the 2008 Pine Rockland Conference Miami, FL

