



**National Park Service
Everglades National Park
Fire Ecology Annual Report
Calendar Year 2011**

A. Summary

The Everglades fire effects program had a successful year completing the monitoring of all scheduled plots, along with developing protocols for and installing new plots, completing training for personal development and continuing to support the compliance needs of the Fire Management Program at Everglades National Park and Canaveral National Seashore. This year Matt Smith moved on to a job with the Fish and Wildlife in central Georgia, and Ryan Desliu and Bill Graham were hired into the GS-5 positions. Ryan came from the South Florida Water Mangement District in the northern Everglades and Bill had just completed a 4 year Bachelor's degree in biology after more than 20 years with the Navy. Maya Tupaj was out on maternity leave during the beginning of 2011 while Aerin Land and Colleen Holland managed the program during her absence.

The program continued to read FMH plots and refine methodologies in both Everglades National Park and Cape Canaveral National Seashore. In 2011, the crew increased monitoring the exotic climbing fern, *Lygodium microphyllum*, in the Coastal Prairies installing temporary plots to gather more detailed information on lygodium's growth response after fire. The crew also implemented the new lygodium monitoring protocols within the current FMH Coastal Prairie plots. The new FMH plots installed were Long Hydro-period (CLJA) plots located within the new WUI River of Grass burn units and monitor changes in vegetation and fuel loading.

Table 1. Fire Effects Plot Workload (2011) and Total Plots Installed

Park	Monitoring Unit	Type of Plot	Pre-burn	Immed. Post	Postburn (3 mo-10 yrs)	Annual Total Visits (2011)**	Total Plots
Everglades	Pine Rockland	FMH Forest plot	0	0	3	3	27
	Short Hydro-period	FMH grass plot	0	0	4	4	28

	Prairie						
	Long Hydro-period Prairie	FMH grass plot	3	2	1	6	14
	Coastal Prairie	FMH grass plot	1	6	10	17	18
	Butterfly Host plant Monitoring	Host-plant monitoring	N/A	0	48	48	4
	Melaleuca Monitoring*	Fire and exotic monitoring	7	5	5	17	23
	Lygodium Monitoring	Fire and exotic monitoring	6	6	6	18	6
	Phenology Monitoring	Phenology monitoring	N/A	0	0	0	8
	Shrub Monitoring	Tagged individual shrub monitoring plot	0	0	0	0	6
	Insect Monitoring	Insect Monitoring plot	N/A	0	0	0	6
	1970's photo-point relocation plots	Photo Point	N/A	0	0	0	225 (26 relocated)
Canaveral	Slash Pine Flatwoods (<i>Pinus elliottii</i>)	FMH Forest plot	0	8	1	9	10
	Coastal Scrub	Photo Point	0	0	0	0	18
	Scrub Oak*	Photo Point, cover line	0	0	0	0	9
Total			18	11	51	122	161

* Pilot sampling plots

**Number of visits to monitoring plots in 2011 (some plots were visited more than once)

In 2011, the Everglades fire effects completed 30 post burn and immediate post burn visits to 22 FMH plots. Two new plots were added to the monthly Butterfly Host Plant monitoring, bringing the total to 4 plots monitored on a monthly basis and 3 new FMH plots were installed in the park's WUI River of Grass burn unit. In the Coastal Prairies, 6 temporary plots were installed for more detailed monitoring of the exotic climbing fern *Lygodium* and its response after fire. Monitoring was completed in 5 Melaleuca plots that burned during the first prescribed fire in the Melaleuca units. Following a December 2010 prescribed fire in Cape Canaveral National Seashore, all 10 Pine Flatwood plots were visited, but only 9 required monitoring.

Table 2. Fire Ecology Staffing 2010

Ecologist and Monitors	Starting Date	Ending Date	# of Pay Periods	READ	Training and Development
Maya Tupaj	1/1/11	12/31/11	26	No	RT-130, 1st Aid / CPR Cape Sable Seaside Sparrow Symposium,
Aerin Land	1/1/11	12/31/11	26	No	RT-130, D-110, L-280, Operational Leadership, Deputy Planning Section Chief Park Hurricane Team, 1 st Aid / CPR, ATV Refresher, Presented data to the University of Kentucky Entomology Graduate Seminar, Cape Sable Seaside Sparrow Symposium, Imperiled Butterfly Working Group meeting
Colleen Holland	01/01/11	12/31/11	26	No	RT-130, RT-212, S-234, Assisted with teaching L-280, assisted with the PARK Teachers Grant program, worked on EVER fire crews during severity, Cape Sable Seaside Sparrow Symposium, Documentation Unit Leader Park Hurricane Team, Detail to CAHA post Irene, ENOP trainee for West Texas IA, Presented protocols at Caribbean-Florida Fire and Invasives webinar, Regional Wilderness Training, Operational Leadership Training, 1 st Aid / CPR
Matthew Smith	01/01/11	5/7/11	10	No	Attended Florida State Engine Academy, PLDO training, Detail on SE Regional Helicopter,
William Grahm	09/12/11	12/17/11	7	No	ATV operator training, B-3 training, Cape Sable Seaside Sparrow Symposium, 1 st Aid / CPR
Ryan Desliu	09/12/11	12/17/11	7	No	ATV operator training, Regional Wilderness Training, B-3 helicopter

					training, Detail to East Texas for wildfires, Cape Sable Seaside Sparrow Symposium, 1 st Aid / CPR
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The fire effects crew was partially staffed for the 2011 field season, becoming fully staffed in the fall of 2011.

Table 3. Management Objectives and Monitoring Results

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (XX% confidence interval)	Objective Achieved?	Year Last Analysis Completed
Slash Pine Savanna	<u>Canaveral</u> - Limit mortality of <i>Pinus elliottii</i> overstory trees (>15cm BDH) to less than 30% as measured two years post burn.	No new data Overstory pine mortality = 31%	No	2010
	Promote 20% recruitment of seedling and pole sized PIEL >15cm in DBH five years post burn.	Recruitment: 68% Seedlings: 69% Poles: -85% Figure: 1 and 2	Combined: Yes Seedlings: Yes Poles: No	2011
	Increase cover of bare ground/open space to 25% bare ground / 75% litter cover 5 years post burn.	Bare ground = 15% Litter cover = 85% (Bare ground = <50% litter cover Litter cover = >50% litter cover)	No	2011

Slash Pine Savanna	Everglades- To maintain fire frequency return interval 1-5 yrs while maintaining up to 33% of the pinelands in a three year rough condition.	Pineland FMH plots: <1yrFRI – 0% 1yr FRI – 0% 2yr FRI – 0% 3yr FRI – 0% 4yr FRI - 26% 5yr FRI - 11% 6yr FRI – 22% 7yr FRI - 0% 8yr FRI - 41% Pineland acres: <1yrFRI – 3% 1yr FRI – <1% 2yr FRI – 0% 3yr FRI - 2% 4yr FRI - 31% 5yr FRI - 16% 6yr FRI – 19% 7yr FRI - 6% 8yr FRI - 29% Figure 4 and 5	No Fire Frequency maintained at 1-5 yrs for only 37% of pineland FMH plots and ~52% of pineland acres Yes- 2% of pineland acres are in a three year rough condition	2011
Short Hydroperiod Prairie	Topkill >50% of encroaching woody species immediately post-burn	Based on visual analysis of photomonitoring data 99% of shrubs were topkilled immediately post burn	Yes	2010
	Reduce fine fuels >70% immediately post-burn	Did not complete cover transects	No data * Photomonitoring data not analyzed	

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (XX% confidence interval)	Objective Achieved?	Year Last Analysis Completed
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> : 45% exotic plant populations were treated <i>Schinus terebinthifolius</i> : No populations were identified for treatment	Yes	2011
Long Hydroperiod Prairie	Topkill >50% of encroaching woody species immediately post-burn	Based on visual analysis of photomonitoring data 51% of shrubs were topkilled immediately post burn	Yes	2010
	Reduce fine fuels >70% immediately post-burn	Did not complete cover transects	No data * Photomonitoring data not analyzed	

B. Fire ecologist accomplishments and areas of focus

In 2011 the draft Fire Management Plan (FMP) was revised to include federally listed species mitigations resulting from meetings with the US Fish and Wildlife Service. NEPA and Endangered Species compliance work was ongoing for the FMP and annual project specific proposals. Maya Vaidya Tupaj participated in several planning meetings and worked on the Environmental Assessment NEPA analysis and Endangered Species Act consultation with the USFWS. A categorical exclusion for NEPA analysis and consultation with the US Fish and Wildlife Service (USFWS) and the State Historic Presentation Office (SHPO) was completed for the 2011 prescribed fire projects NEPA, section 7 and section 106 compliance for WUI treatments and Hazardous fuel/exotic plant reduction projects.

The fire ecologist continued to serve on several working groups and committees including the Everglades Wilderness Committee, Pine Rockland Working Group, Cape Sable Seaside Sparrow Working Group. A presentation on the effects of fuel loading on fire severity was presented at the 2011 Cape Sable Seaside Sparrow symposium.

The fire ecologist assisted with 1 prescribed fire in the Park as PIO trainee and spent time revising and implementing and inquiry based fire ecology learning program with Everglades Environmental Education and Miami-Dade College.

Table 4. Fire Ecologist Accomplishments/Focus Areas

Category	Percent Time	Accomplishments and/or areas of activities
Planning	40%	Annual NEPA compliance, Sec 7 endangered species consultation, Sec 106 cultural resources consultation, Cape Sable Seaside Sparrow Fire Management Strategy, FMP revision, Multi-Year fuels plan Environmental Assessment research and planning, Fire Management Plan Endangered Species Consultation
Presentations	<5%	Fire effects data summary presentation, Multi-year fuels plan development and methodology presentation
NPS Meetings/ task groups	10%	Work with SFNRC, Pine Rockland Working Group, Wilderness Committee, Cape Sable Seaside Sparrow Working Group
Interagency work	<5%	Work with SFNRC, USFWS
Fire Assignments	<5%	Afternoon Fire PIO trainee
Research	5%	Support and consultation for research in Everglades National Park conducted by USGS, UVM, FIU and UF researchers and students, working with SFNRC to develop exotics monitoring protocols, background research for planning and consultation
Data Management	<5%	Data entry, quality checking and analysis
Outreach, education programs	10%	Conduct fire ecology based inquiry learning project with Environmental education department
Monitoring Field Work	<5%	Assisted crew in monitoring fire effects plots in EVER and butterfly host plant plots in EVER
Supervision/Admin	20%	Supervised fire effects monitors, Hiring: recruited and hired GS 5 fire effects monitor, completed EPAP evaluations for fire effects crew
Training	<5%	RT-130
Miscellaneous	5%	Staffing, assistance with other Fire Management projects, Wilderness committee, burn plan and project proposal reviews

C. Fire effects crew accomplishments and areas of focus

In 2011, the Everglades fire effects crew completed a total of 122 plot reads between Everglades NP and Canaveral NS. This includes FMH plots, exotic plots and host plant monitoring plots. All data was entered into FFI and quality checked shortly after collection. Fire effects monitoring of the butterfly host plant, *Croton linearis*, continued monthly in the pine rocklands,

with the addition of two more plots to strengthen results. The program also installed three new CLJA plots in the new River of Grass burn units, with around 10-12 more plots planned. In Cape Canaveral National Seashore, the Bill's Hill unit was burned in December 2010, with the immediate post reads occurring after the New Year (see appendix A for post burn summary).

Crew members completed scanning of selected FMH photo monitoring slides. Fire effects monitoring data was used to determine unit treatment priorities and to schedule treatment in the WUI and Hazardous fuel reduction units in annual project specific proposals and compliance.

Collaboration efforts:

Everglades fire ecology and fire effects staff continued to assist and collaborate with other departments in ENP, as well as with outside organizations. This year the crew worked closely with the exotic vegetation management staff at Everglades NP to develop a *Lygodium* team. This is a cooperative effort to coordinate resources, monitoring and treatment of the exotic climbing fern *Lygodium microphyllum*. Currently fire is being evaluated as a tool for controlling the spread of *Lygodium*. The fire effects crew assisted with teaching L-280 and with the annual fire refresher. The crew continued to serve on several committees and working groups including the Everglades Wilderness Committee, the Imperiled Butterfly Working Group, the Cape Sable Seaside Sparrow Working Group and the Pine Rockland Working Group. Maya Vaidya Tupaj and Aerin Land are assisting with the planning and organization of the 2012 Pine Rockland Working Group Conference and the Cape Sable Seaside Sparrow Working Group Symposium.

Outreach:

As a follow-up to last year's Bioblitz at Biscayne National Park, Colleen Holland was asked to demonstrate the use of some fire effects field tools at the Biscayne NP "Family-Fun Fest". Aerin presented host plant monitoring data at the University of Kentucky. Colleen assisted Maya with implementation of the PARK teachers grant program, teaching Miami-Dade college students about fire ecology in ENP.

Presentations:

Fire effects crew members gave presentations at various venues in 2011. Colleen conducted a webinar presentation on the monitoring of the effects of fire on exotics within the park for the Caribbean Network Fire and Invasives Learning Workshop. Aerin presented at the Imperiled Butterfly Working Group annual meeting and the University of Kentucky Entomology Seminar.

Mechanical fuels treatments:

The fire effects crew assisted with hazardous fuel/exotic plant fuels reduction and pre-burn prep treatment projects by removing exotic *Melaluca quinquenervia* in the WUI area of East Everglades and prepping a fire break for the Context Road Prescribed burn. Exotic plant treatments in the pine rocklands are ongoing.

Fire Management:

The fire ecology and fire effects staff was involved in diverse wildland fire operational activities in 2011. The staff worked on 6 prescribed fires and 4 wildfires within ENP and went on 5 out of park assignments for prescribed fires, wildfire and hurricane response details. The staff assisted with staffing engines and fire dispatch locally. Aerin served as Deputy Planning Section Chief

and Colleen served as Resource Unit Leader on the Everglades Hurricane Team. Matt Smith, Colleen and Aerin assisted the Everglades Fire program with staffing of dispatch, engines and the helicopter during severity in April and May. Matt completed a detail with the South East Regional Helicopter, Aerin assisted with prescribed fires on Ocala National Forest, Colleen worked as a READ during the Hurricane Irene incident and on an engine for West Texas IA response, Ryan Desliu worked on an engine and as a dozer swamper for East Texas IA response. Matt and Colleen initiated their Engine Operator taskbooks, Ryan initiated his FFT1 and his FEMO taskbooks, Bill Graham initiated his EDRC and RADO taskbooks. Aerin was signed off on her EDRC taskbook.

Table 5. Fire Effects Crew Accomplishments/Focus Areas

Category	Percent Time	Notes
FMH plots	10%	3 PIEL, 4 MUFI, 7 COPR, 4 CLJA, 9 CANA, prep and new plot installs
WUI plots	N/A	
CBI plots	N/A	
Other plot work	20%	Exotic Melaleuca (<i>Melaleuca quinquenervia</i>), Host plant Croton (<i>croton linearis</i>), Exotic Lygodium, prep time
Fire Assignments\Details	5%	Hurricane Irene, West Texas IA, East Texas IA,
Fuels Projects	5%	Assisted the fire/fuels crew with exotics treatment.
Prescribed Fire Projects	<5%	6 Everglades RX assists, Ocala National Forest Assist
Data entry	15%	Plots, EVER, CANA, MEQU, LYMI, Plot folder management, Photo management
Data analysis	<5%	MEQU and LYMI preliminary data, Croton
Supervision/Admin	<5%	Travel, payroll and purchasing, paperwork, etc. - Lead monitor- training new personnel, crediting plan,
Training	5%	Wilderness, S-234, B-3, ATV operator, Refreshers, D-110, Engine Academy
Presentations/Conferences	5%	University of Kentucky, IBWG, Cape Sable Seaside Sparrow, Fire and Invasives Learning Network
Public Outreach	<5%	PARK Teachers grant program, Biscayne National Park mini-BioBlitz
NPS meetings/task groups	5%	ENP Wilderness Meetings, Environmental Assessment Meetings, Prescribed Fire Meeting, ENP Hurricane Incident Management Team Meetings, Lygodium team meetings, Cape Sable Butterfly trip
Interagency Meetings	<5%	Imperiled Butterfly Working Group, Cape Sable Seaside Sparrow Symposium, Fire and Invasive Learning Network meetings, Miami Blue Butterfly, Pine Rockland Working Group,
Miscellaneous	15%	staffing dispatch, fire engines and helitack, hurricane incident management, new protocol/expanded project development, incorporating exotics monitoring, <i>Croton linearis</i> mapping

D. Additional Information

Table 6. Planning - 2011

Park	Does Park have written DFCs? (yes or no)	Date Park-level Monitoring Plan completed (or revised)	Total # of Project- or Community- level Monitoring Plans (not just 2011)	Assisted with how many BAER plans in 2011?
Everglades National Park	no	2007	0	0
Canaveral National Seashore	no	-	0	0

Table 7. Monitoring - 2011

Park	% 2011 Data Entered	% 2011 Data Quality Checked	# Prescribed Fires Monitored*	# Non-fire Fuels Treatments Monitored*	# Wildfires Monitored*	# BAER Treatments Monitored*
Everglades National Park	100%	100%	6	1	0	0
Canaveral National Seashore	100%	100%	1	0	1	0

* Number of treatment units with treatment effects monitoring conducted. Include pre-burn and post-burn monitoring but not burn-day monitoring.

Table 8. Communicating Results - 2011

Park	# of Project Monitoring Reports completed in 2011	# of Annual meeting(s) with Park staff	# of Formal presentations of results	Do you use Minitab?*
Everglades National Park	1	4	3	No

Canaveral National Seashore	2	0	0	No
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* This information will help to assess Minitab multi-user license needs.

Table 9. Research - 2011

Park	Are research needs identified in FMP or Monitoring Plan? (yes or no)	# of Proposals Submitted in 2011	# of Proposals Funded in 2011	# of Research Projects Supported in 2011*	Additional Comments
Everglades National Park	yes	2	0	1	
Canaveral National Seashore	yes	0	0	0	

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

D. 2012 Direction

In 2012 we expect to have a completed Environmental Assessment and approved Fire Management Plan. This will also include a Biological Assessment and Biological Opinion from the USFWS. With an approved FMP the prescribed fire program will begin treatment of many areas of the Park where prescribed fire treatments are currently restricted due to NEPA requirements. The fire effects program plans to be involved in the implementation of prescribed fire treatments as well as post burn monitoring in several areas that have not received fire and are currently in condition class 2 or 3. This includes a majority of the pine rockland ecosystem.

Following Endangered Species compliance, it is expected that the fire effects program will work with the natural resource staff to assess endangered species monitoring needs regarding fire. This effort will continue in regards to exotic invasive plants.

Changes in Wilderness monitoring requirements may be implemented for the Park and the fire effects program will continue to adjust as staffing changes, budget requirements and compliance needs evolve throughout the year.

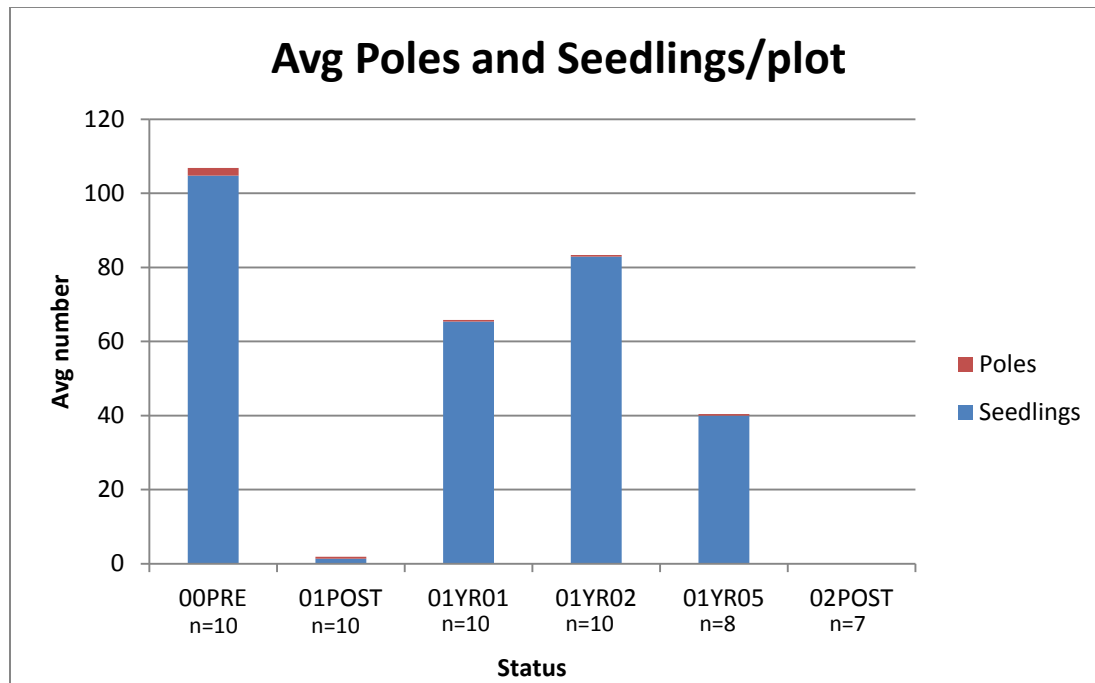


Figure 1: Average *Pinus elliottii* seedling and pole recruitment in the pine flatwoods of Cape Canaveral National Seashore. Since plot installation there has been no pole recruitment, only one has pole graduated to overstory class.

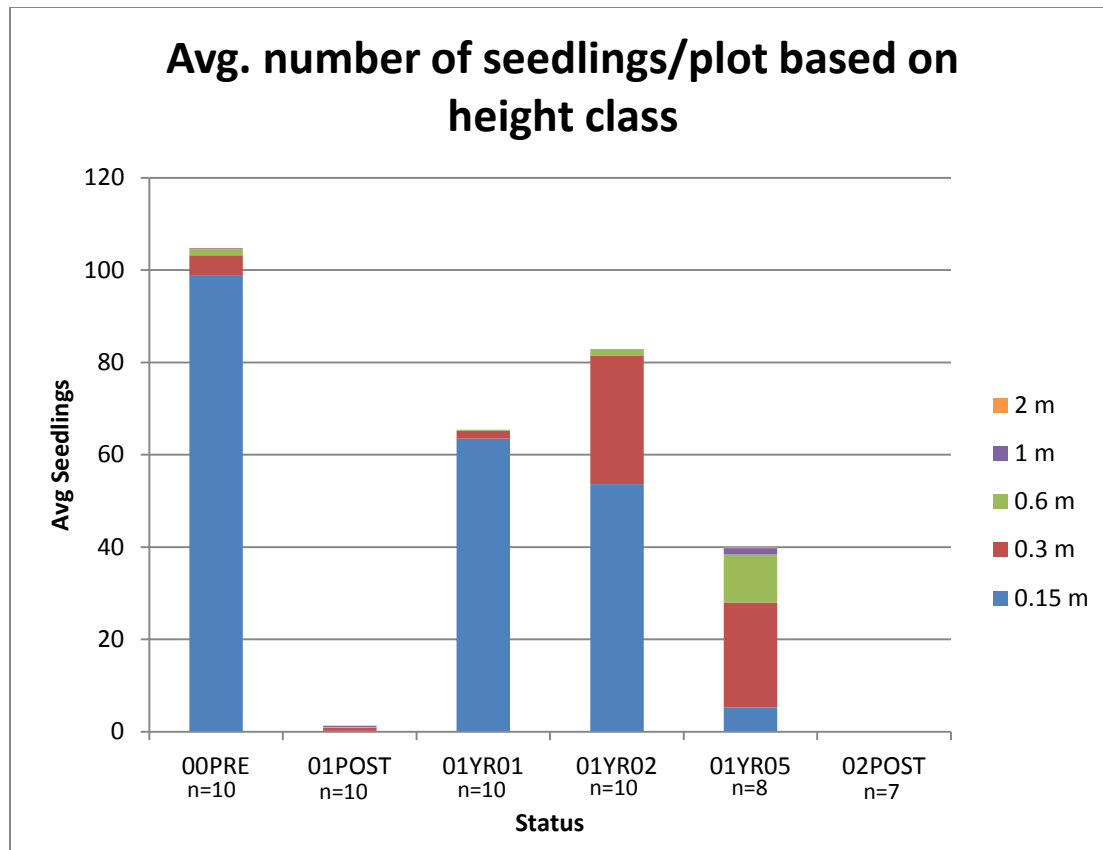


Figure 2: Average *Pinus elliotii* seedlings per plot by height class in the pine flatwoods of Cape Canaveral National Seashore.

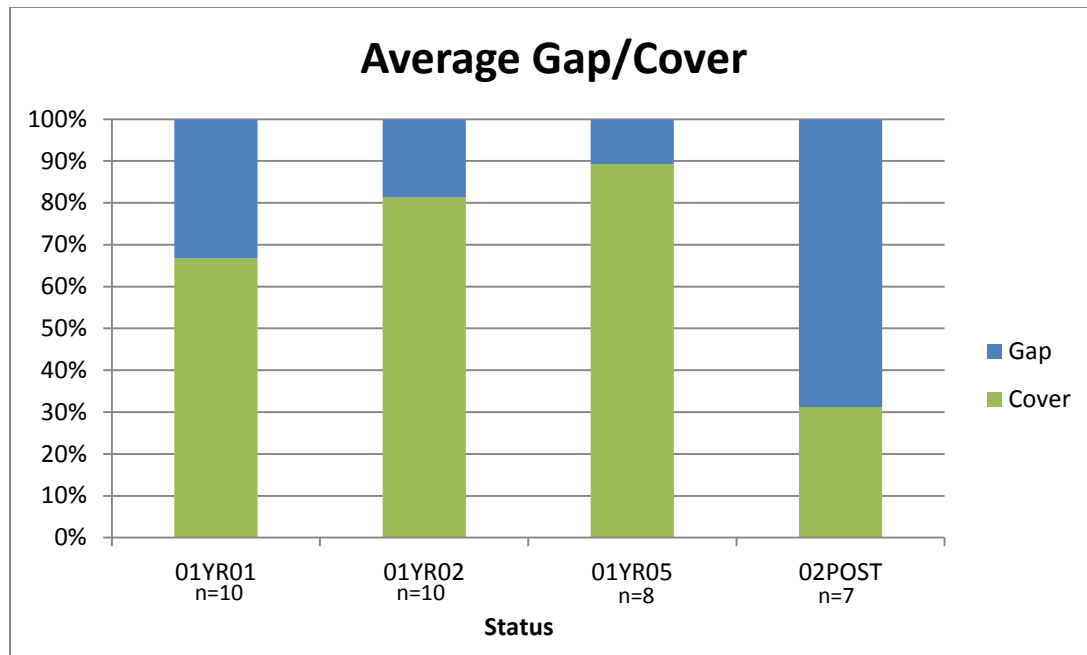


Figure 3: Average understory vegetation cover vs. open space (gap) in the pine flatwoods of Cape Canaveral National Seashore. Open space and litter cover assessed to determine habitat conditions for the gopher tortoise (*Gopherus polyphemus*) and indigo snake (*Drymarchon coraisi couperi*).

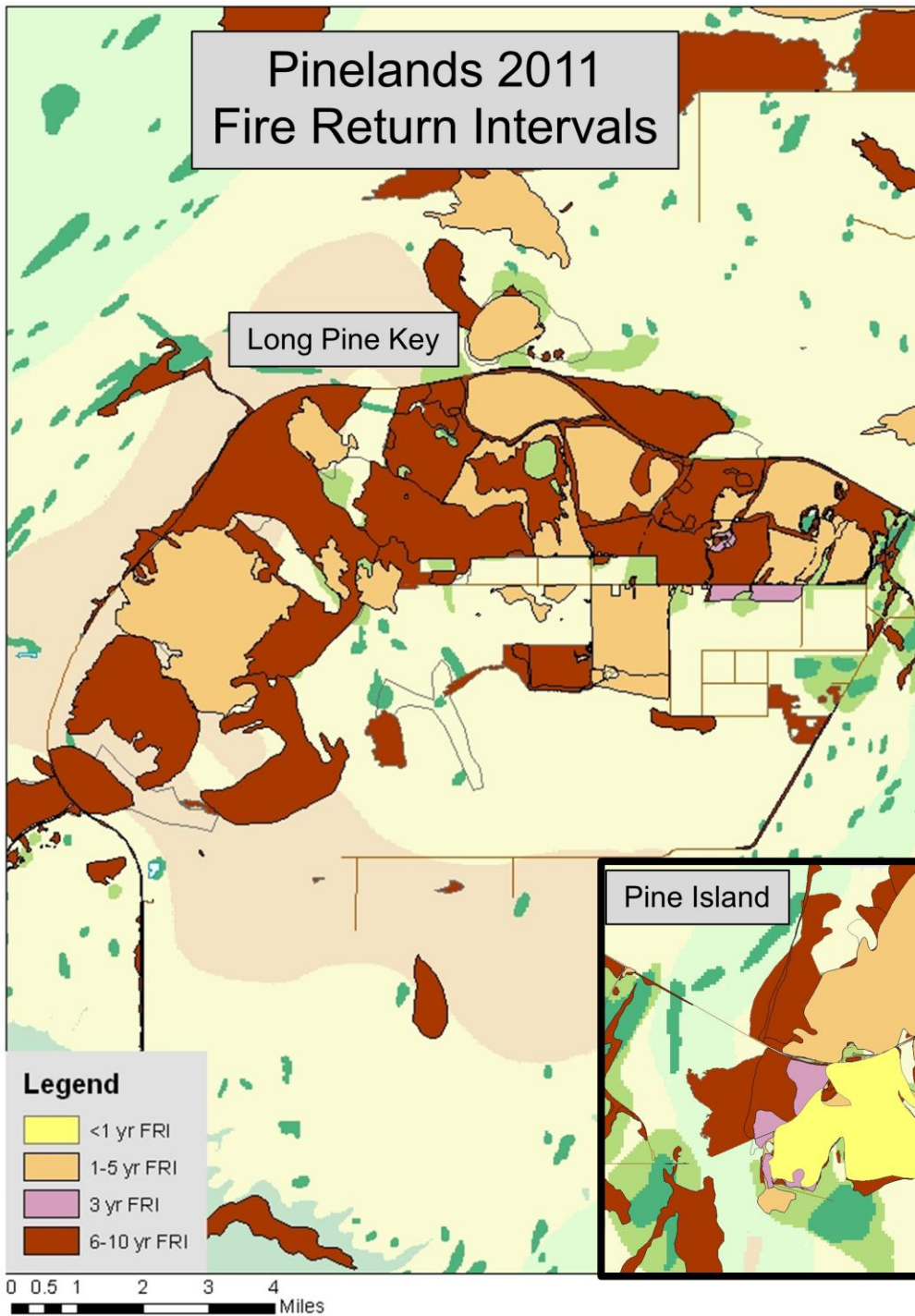


Figure 4: Fire Return Interval of Everglades National Park Pine Rocklands.

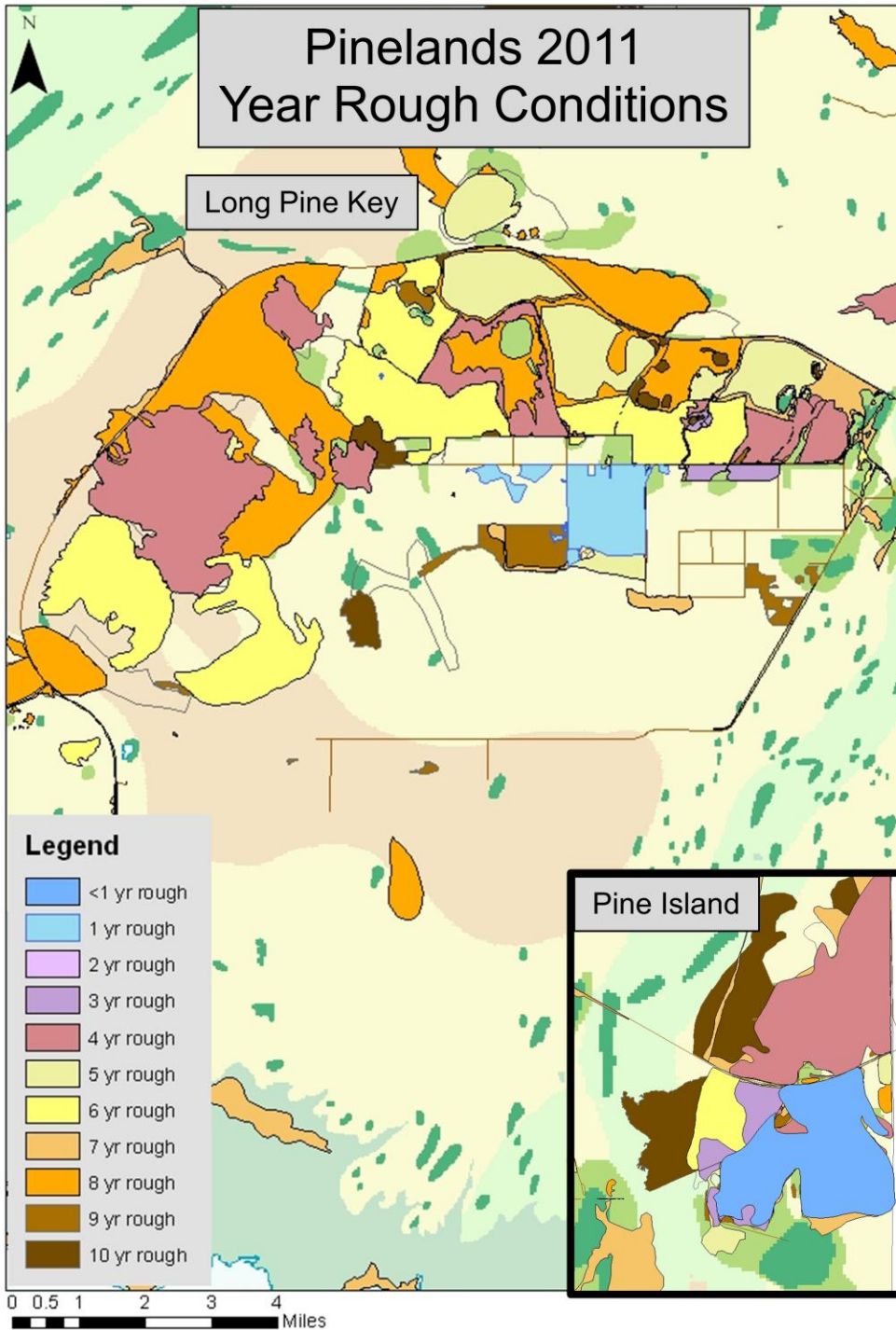
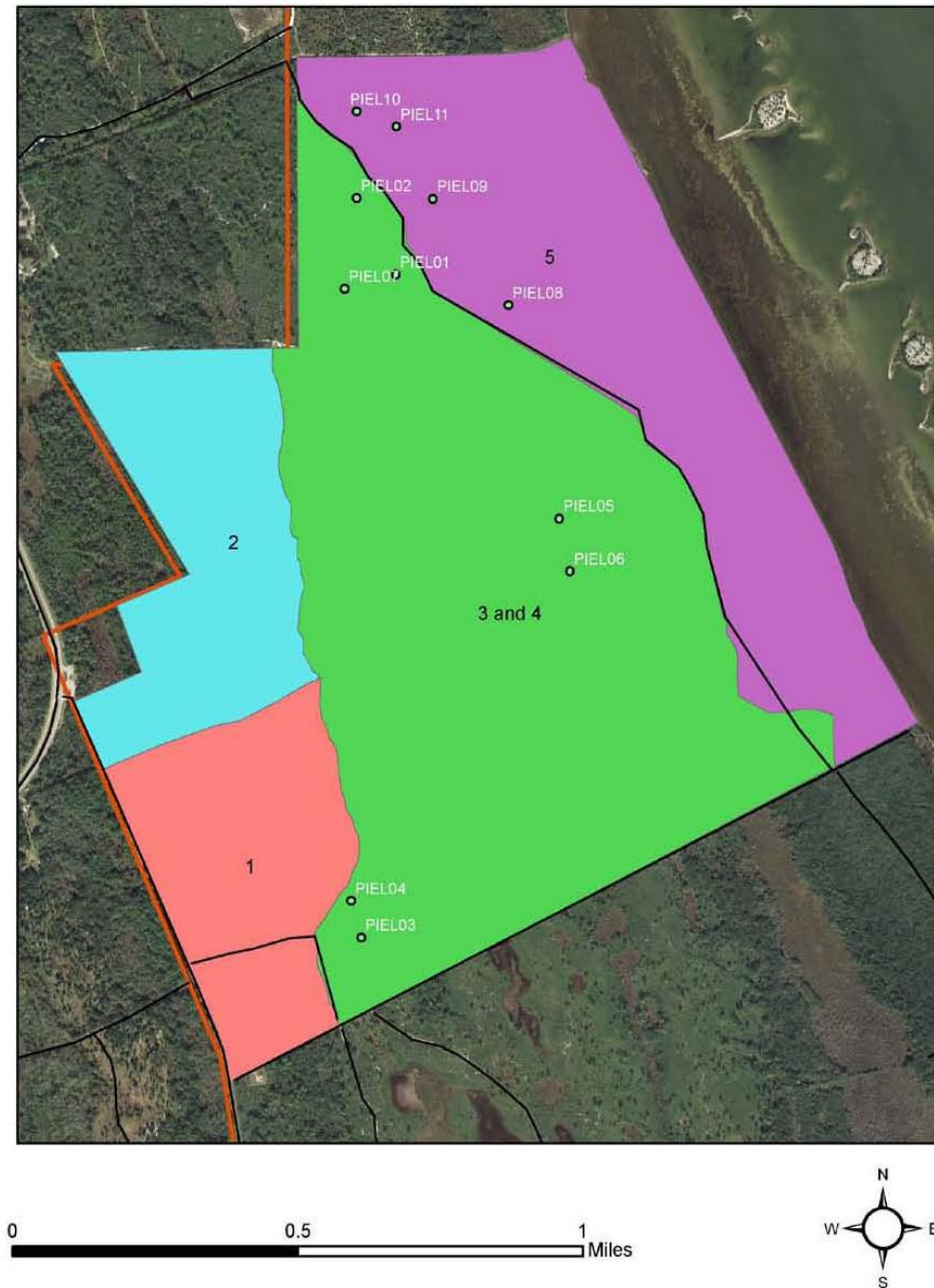


Figure 5: Year rough conditions of Everglades National Park Pine Rocklands.

Appendix A:

The Everglades National Park Fire Effects crew visited all 10 PIEL (*Pinus elliottii*) plots in Bill's Hill (Fig. 1) to perform post-fire assessments on January 6 – 8, 2011. Eight of the ten plots burned during the December 9, 2010 prescribed fire (Table 1) and post-burn severity data was collected along 4 transects within each plot and assigned a number code (Table 2). The preliminary results for the burn severity data are presented for each plot (Fig 2 and 3).

Figure 1: Fire Effects plots in Bill's Hill burn units



Plot	Burned in 2010 RX Fire?	Current Burn Status
PIEL 1	YES	02POST
PIEL 3	YES	03POST*
PIEL 4	NO	01YR06
PIEL 5	YES	02POST
PIEL 6	YES	02POST
PIEL 7	YES	02POST
PIEL 8	NO	01YR05**
PIEL 9	YES	02POST
PIEL 10	YES	02POST
PIEL 11	YES	02POST

Table 1: Current Status of all plots in Bill's Hill burn units

*PIEL 3 burned during the Slim Jim wildfire in July 2010 and again during the December 2010 RX fire.

**An active Bald Eagle Nest was observed in a snag right outside of PIEL 8 (UTM: 3190647.65N, 516710.10E)

	Substrate	Vegetation
5 – Unburned	Did not burn	Did not burn
4 – Scorched	Litter partially blackened; duff nearly unchanged; wood/leaf structures unchanged	Foliage scorched and attached to supporting twigs
3 – Lightly Burned	Litter charred to partially consumed; upper duff layer may be charred but the duff layer is not altered over the entire depth; surface appears black; woody debris is partially burned; logs are scorched or blackened, but not charred; rotten wood is scorched to partially burned	Foliage and smaller twigs partially to completely consumed; branches mostly intact
2 – Moderately Burned	Litter mostly to entirely consumed, leaving coarse, light colored ash; duff deeply charred, but underlying mineral soil is not visibly altered; woody debris is mostly consumed; logs are deeply charred, burned-out stump holes are common	Foliage, twigs and small stems consumed, some branches still present
1 – Heavily Burned	Litter and duff completely consumed, leaving fine white ash; mineral soil visibly altered, often reddish; sound logs are deeply charred and rotten logs are completely consumed.	All plant parts consumed, leaving some or no major stems/trunks; any left are deeply charred
0 – Not Applicable	Inorganic matter preburn	No vegetation present preburn

Table 2: Burn Severity Code Definitions

Figures 2 & 3. Burn Severity Graphs: Data from the December 2010 RX fire presented as the range between the highest and lowest average severity rating collected from the 4 transects in each plot. (Plots PIEL4 and PIEL8 did not burn)

