



**National Park Service
Everglades National Park
Canaveral National Seashore
Fire Ecology Annual Report
Calendar Year 2012**

A. Summary

The Everglades fire effects program had a successful year in which the monitoring of all scheduled plots was completed, along with the development of new protocols for and installation of new plots, training for personal development and continuing to support the compliance needs of the Fire Management Program at Everglades National Park and Canaveral National Seashore. The 2012 field season was completed with a fully staffed crew; however, in November, Ryan Desliu left to take a position as the Lead Fire Effects Monitor with Big Thicket National Preserve after working on that crew during his furlough.

Throughout the year, fire effects staff continued to monitor plots and refine methodologies in both Everglades National Park and Canaveral National Seashore. Monitoring continued in existing FMH, fire and exotic plots and new, temporary pine forest seedling/pole plots were installed to assess the effect of ignition technique and fire behavior on pine mortality. In Everglades NP, six prescribed fires burned 18 fire effects monitoring plots in the coastal prairies, long hydroperiod prairies, short hydroperiod prairies and pine rocklands and 1 wildfire burned 1 fire effects plot in the pine rocklands. At Canaveral National Seashore 1 prescribed fire burned 9 fire effects monitoring plots in scrub oak habitat and 1 wildfire burned 2 plots in the slash pine forest; however both of these plots were destroyed when a dozer used during suppression response plowed a fire control line through them. These plots will be replaced once the units reach a 3 year post burn status.

Table 1. Fire Effects Plot Workload (2012) and Total Plots Installed

Park	Monitoring Unit	Type of Plot	Pre-burn	Immed. Post	Postburn (3 mo-10 yrs)	Annual Total Visits (2012)**	Total Plots
Everglades	Pine Rockland	FMH Forest plot	0	1	7	8	27

	Short Hydro-period Prairie	FMH grass plot	0	3	4	7	28
	Long Hydro-period Prairie	FMH grass plot	5	3	0	8	17
	Coastal Prairie	FMH grass plot	0	7	8	15	18
	Butterfly Host plant Monitoring	Host-plant monitoring	N/A	0	28	28	4
	Melaleuca Monitoring*	Fire and exotic monitoring	7	0	8	15	23
	Lygodium Monitoring	Fire and exotic monitoring	0	0	6	6	6
	Pine Regeneration*	Circular tagged seedling plot	7	7	0	14	7
	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	0	8	8	10
	Coastal Scrub	Photo Point	0	0	0	0	18
	Scrub Oak	Photo Point, cover line	0	9	0	9	9
Total			19	30	69	118	213

* Pilot sampling plots

**Number of visits to monitoring plots in 2012 (some plots were visited more than once)

In 2012, Everglades Fire Effects completed 38 visits to FMH plots, including the installation of three new grass plots in the Long Hydroperiod River of Grass units. Along with the FMH plots monitored, the crew completed 21 visits to the exotics monitoring plots and installed and monitored 7 new seedling/pole pine plots in the Pine Rocklands. Post fire recovery and baseline data on *Croton linearis* was collected in the four host plant fire effects plots. Sufficient baseline data has been collected and monitoring will not resume in these plots until reintroduction of prescribed fire in the pine rocklands occurs, which is expected in 2013 (figures 13-15). At Canaveral National Seashore, 9 pine plots were monitored in the spring, two of which were later lost during a wildfire in July. A dozer was used during the suppression efforts and destroyed significant portions of two pine plots. These will be replaced after the units reach a three year post burn status. In August, the Max Hoeck scrub oak unit had the first prescribed fire and post burn visit since the nine scrub oak plots were installed.

Table 2. Fire Ecology Staffing 2012

Ecologist and Monitors	Starting Date	Ending Date	# of Pay Periods	READ	Training and Development
Maya Tupaj	1/1/12	12/31/12	26	No	RT-130, ATV operator refresher, Cape Sable Seaside Sparrow Symposium, Pine Rockland Working Group meeting, instructed for the PARK teachers grant project, PARK Teachers workshop, attended Resource Protection Leadership Team building workshop, NEPA training, Fire Interpretation Workshop
Aerin Land	1/1/12	12/31/12	26	No	RT-130, ATV operator refresher, Planning Section Chief Park Hurricane Team, worked on EVER fire crews during severity, Cape Sable Seaside Sparrow Symposium, Imperiled Butterfly Working Group meeting, Pine Rockland Working Group meeting, assisted with teaching S-130/190
Colleen Holland	01/01/12	12/31/12	26	No	RT-130, RT-212, ATV operator refresher, assisted with the PARK Teachers Grant program, PARK Teachers workshop, worked on EVER fire crews during severity, Pine Rockland Working Group, Resource Unit Leader- Park Hurricane Team, completed an Introduction to Statistics course, assisted with teaching S-130/190, S-230

William Grahm	01/01/12 - 05/19/12	08/26/12 - 12/31/12	19	No	ATV operator refresher, S-271, S-212, worked on EVER fire crews during severity, Cape Sable Seaside Sparrow Symposium, D-110, S-130/190, Water Ditching
Ryan Desliu	01/01/12 - 05/19/12	09/09/12 - 11/17/12	16	No	ATV operator training, worked on EVER fire crews during severity S-271, S-131/133, assisted with teaching S-130/190, Water Ditching, HECM (t) assignment at Panther NWR

The fire effects crew was fully staffed for the 2012 field season and for most of the fall season.

Table 3. Management Objectives and Monitoring Results

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (XX% confidence interval)	Objective Achieved?	Year Last Analysis Completed (Range of years included in analysis)
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.	Overstory pine mortality = 31% As of 1 year post following the second fire: Overstory pine mortality = 32% Figure: 1	No	2013 (2003-2012)
	Promote 20% recruitment of seedling and pole sized PIEL >15cm in DBH five years post burn.	Recruitment: -70% Seedlings: -68% Poles: -84% As of 1 year post following the second fire: Recruitment: 8% Seedling: 8% Poles: -100%* (1 Pole at Pre, 0 at YR01) Figure: 2 and 3	Combined: No Seedlings: No Poles: No Combined: No Seedlings: No Poles: No	2013 (2003-2010) 2013 (2003-2012)

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (XX% confidence interval)	Objective Achieved?	Year Last Analysis Completed (Range of years included in analysis)
	Increase cover of bare ground/open space to 25% bare ground / 75% vegetation cover 5 years post burn.	Open space = 11% Veg. cover = 89% As of 1 year post following the second fire: Open space = 25% Veg. cover = 75% Figure 4	No At 02YR01 yes, this objective was achieved	2011 (2010) 2013 (2012)
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.	15% of the pinelands are within a 1-5 year FRI 0% of the pinelands are in a 3 year rough condition Figure 12	No	2013 (2003-2012)
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 (2003-2010) No shrubs were found in plots monitored in 2012
	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 (Range of years included in analysis)
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> : 20% exotic plant populations were treated <i>Schinus terebinthifolius</i> : No populations were identified for treatment	Yes	2013 (2012)
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 (2001-2007) No shrubs were found in plots monitored in 2012
	Reduce fine fuels >70% immediately post-burn	73% reduction in fine fuel biomass immediately post burn Figure 8	Yes	2013 (2012)

B. Fire ecologist accomplishments and areas of focus

In 2012 tremendous progress was made regarding the Fire Management Plan Environmental Assessment draft. Chapters 1 and 2 of the EA were completed and provided to the contractor to continue progress on the remaining tasks to complete the NEPA document. NEPA and Endangered Species compliance work was ongoing for annual project specific proposals as well. Maya 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 2012 prescribed fire projects NEPA, section 7 and section 106 compliance for WUI treatments and Hazardous fuel/exotic plant reduction projects.

Maya Tupaj continued to serve on several working groups and committees including the Everglades Wilderness Committee, Pine Rockland Working Group, and Cape Sable Seaside Sparrow Working Group. Maya led the organization and planning of the 2012 Pine Rockland and the SE Region Fire Interpretation Workshops.

Maya Tupaj assisted with 2 prescribed fires in the Park, 1 wildfire as GIS and plans support 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 EA Chapters 1 and 3 revision, Chapter 3 review, Fire Management Plan Endangered Species informal consultation for Fire Management Plan Biological Assessment (preceeding formal consultation), National Historic Preservation Act Fire Management Plan planning and compliance.
Presentations	<5%	Fire effects data summary presentation
NPS Meetings/ task groups	10%	Work with SFNRC, Pine Rockland Working Group, Wilderness Committee, Cape Sable Seaside Sparrow Working Group, Fire Interpretation Workshop
Interagency work	10%	Work with SFNRC, USFWS
Fire Assignments	<5%	Boy Scout Camp and Pine Island prescribed fires and Deer Hammock wildfire.
Research	5%	Support and consultation for research in Everglades National Park conducted by I&M, 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	5%	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, post burn fire effects plots in CANA
Supervision/Admin	20%	Supervised fire effects monitors, Hiring: advertised GS 5 fire effects monitor position, 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 2012, the Everglades fire effects crew completed a total of 118 plot reads between Everglades NP and Canaveral NS. All data was entered into FFI and quality checked shortly after collection. Additional long hydroperiod prairie plots were installed in burn units to assess hazardous fuel reduction in the WUI and new pine forest seedling plots were installed to assess the effect of ignition pattern and fire behavior on pine mortality. At Canaveral NS the Max Hoeck scrub oak unit was burned in an August prescribed fire. Aerin Land participated as FEMO on this prescribed fire and 9 scrub oak plots were monitored post fire. This is the first prescribed burn since the installation of the scrub oak plots in 2009. The two year post read was completed at eight Canaveral NS pine plots, although two were later lost in suppression efforts during a summer wildfire.

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 continued to work closely with the ENP Lygodium Team, consisting of exotic vegetation management and fire management staff at Everglades NP. This is a cooperative effort to coordinate resources, monitor and treat the exotic climbing fern *Lygodium microphyllum*. The fire effects crew assisted with teaching portions of S-130/190 training 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 Tupaj and Aerin Land lead the organization and planning of the 2012 Pine Rockland Working Group Conference, 2012 Imperiled Butterfly Working Group Meeting and the 2012 Cape Sable Seaside Sparrow Symposium. Aerin also participated in efforts to survey ENP for suitable habitat for and presence of the Federally Endangered Miami Blue butterfly. Ryan Desliu and Bill Graham assisted with replanting native species at a remote reconstruction project within the park.

Outreach:

Colleen Holland spoke about wildfire at a yearly AmeriCorps event that brings families from homeless shelters out to the park. She also assisted the engine crew with a career day at a local school. Maya and Colleen continued to work with the PARK Teachers program. The crew also demonstrated monitoring protocols to visitors from National Parks in the Turks and Caicos and Belize.

Presentations:

Colleen presented a poster on photo-monitoring at the Pine Rockland Working Group Conference. Maya presented the Multi-Year Fuels Plan and Butterfly Host Plant Monitoring to the Imperiled Butterfly Working Group and a fire effects summary at the annual prescribed fire meeting.

Mechanical fuels treatments:

The fire effects crew continued to assist with hazardous fuel/exotic plant reduction and pre-burn prep treatment projects by removing exotic *Melaleuca quinquenervia* in the East Everglades burn units.

Fire Management:

The fire ecology and fire effects staff were involved in multiple wildland and prescribed fire activities in 2012. The staff worked on 8 prescribed fires and 1 wildfire within ENP and went on 3 out of park assignments for prescribed fires, wildfire and hurricane response details. The crew assisted with staffing engines and fire dispatch locally. Aerin served as Planning Section Chief and Colleen served as Resource Unit Leader on the Everglades Hurricane Team. The crew also assisted the Everglades Fire program with staffing of dispatch, engines and the helicopter during severity in April and May. In January, Ryan went on an engine assignment to a wildfire at Cumberland Island National Seashore. In February, Bill Graham assisted on a prescribed burn at Ding Darling NWR and, in May, Ryan went on a HECM detail at Panther NWR. Bill opened EDCR and HECM taskbooks. Ryan opened his FEMO and FFT1 taskbooks and completed his HECM taskbook.

Table 5. Fire Effects Crew Accomplishments/Focus Areas

Category	Percent Time	Notes
FMH plots	15%	8 PIEL, 8 MUFI, 16 COPR, 8 CLJA, 8 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, Juvenile pine survival
Fire Assignments\Details	1%	Cumberland Island NS, Ding Darling NWR, Panther NWR assist
Fuels Projects	1%	Assisted the fire/fuels crew with exotics treatment.
Prescribed Fire Projects	<5%	8 Everglades RX assists, 1 CANA RX assist, 2 FWS assists
Data entry	15%	FMH 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, training new personnel
Training	5%	D-110, S-190/130, S-271, S-131/133, S-230,

		Communication training, NEPA, S-212, annual refreshers, Intro to Statistics
Presentations/Conferences	5%	Pine Rockland Working Group, Cape Sable Seaside Sparrow Symposium
Public Outreach	<5%	PARK Teachers grant program, Ameri-Corps Field day, Career Day
NPS meetings/task groups	<5%	ENP Hurricane Incident Management Team Meetings, Lygodium team meetings, Cape Sable Butterfly trip, Fire Program meetings, PARK Teachers Workshop
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, protocols demo with Caribbean and Belizean partners.
Miscellaneous	15%	staffing dispatch, fire engines and helitack, hurricane incident management, new protocol/expanded project development, incorporating exotics monitoring, <i>Croton linearis</i> mapping, Assist with Vice President Biden visit, assist with exotics treatment in park

D. Additional Information

Table 6. Planning - 2012

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 2012)	Assisted with how many BAER plans in 2012?
Everglades National Park	no	2007	0	0
Canaveral National Seashore	no	-	0	0

Table 7. Monitoring - 2012

Park	% 2012 Data Entered	% 2012 Data Quality Checked	# Prescribed Fires Monitored*	# Non-fire Fuels Treatments Monitored*	# Wildfires Monitored*	# BAER Treatments Monitored*
Everglades	100%	100%	6	0	1	0

National Park						
Canaveral National Seashore	100%	100%	1	0	0	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 - 2012

Park	# of Project Monitoring Reports completed in 2012	# of Annual meeting(s) with Park staff	# of Formal presentations of results	Do you use Minitab?*
Everglades National Park	2	3	2	No
Canaveral National Seashore	0	0	0	No

* This information will help to assess Minitab multi-user license needs.

Table 9. Research - 2012

Park	Are research needs identified in FMP or Monitoring Plan? (yes or no)	# of Proposals Submitted in 2012	# of Proposals Funded in 2012	# of Research Projects Supported in 2012*	Additional Comments
Everglades National Park	yes	2	1	2	
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. 2013 Direction

In 2013 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 cultural resource and 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.

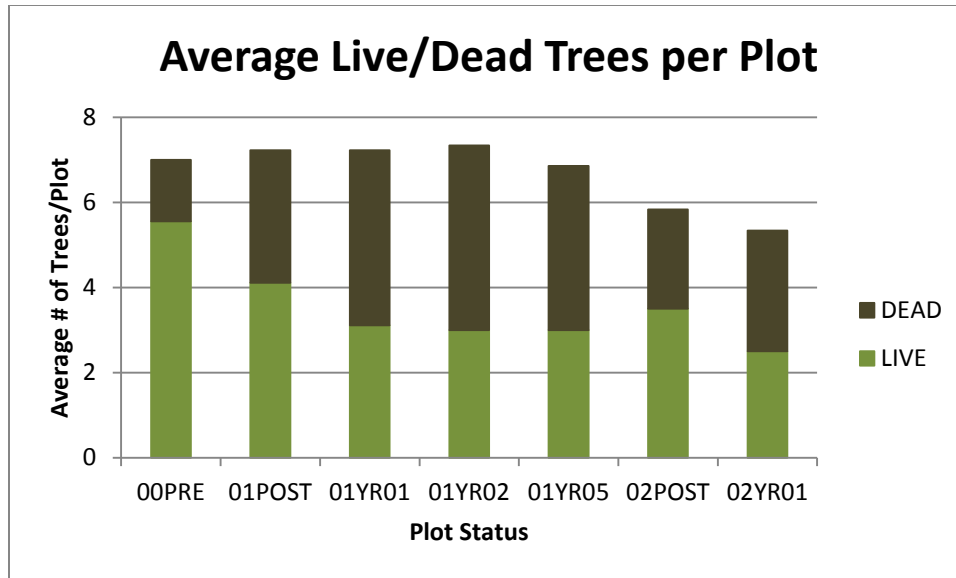


Figure 1: Average *Pinus elliotii* overstory trees per plot in the pine flatwoods of Canaveral National Seashore.

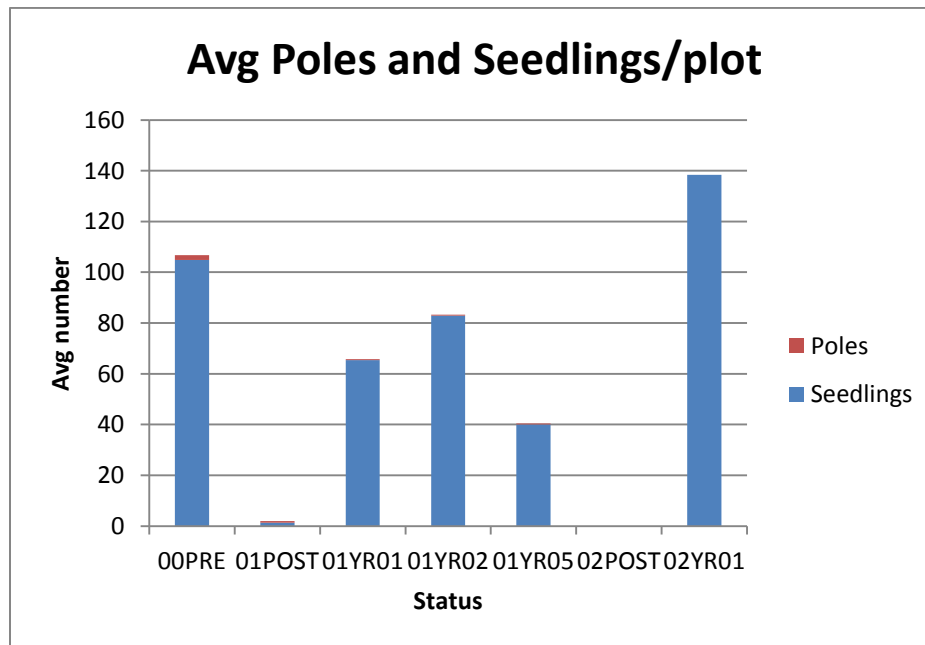


Figure 2: Average *Pinus elliotii* seedling and pole recruitment in the pine flatwoods of Canaveral National Seashore. There was no pole recruitment seen in the 02YR01 post burn reads.

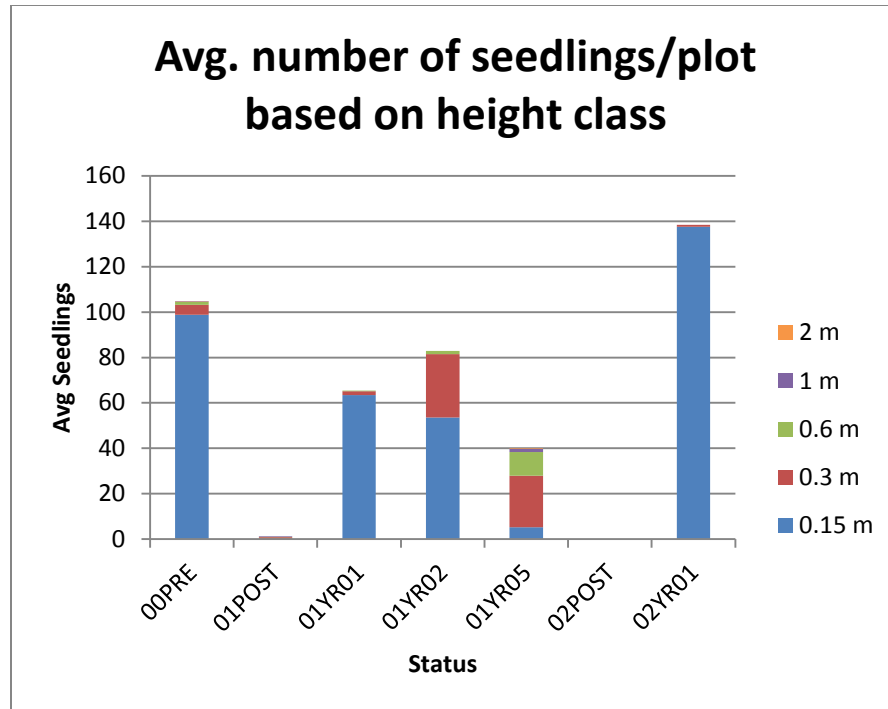


Figure 3: Average *Pinus elliottii* seedlings per plot by height class in the pine flatwoods of Canaveral National Seashore.

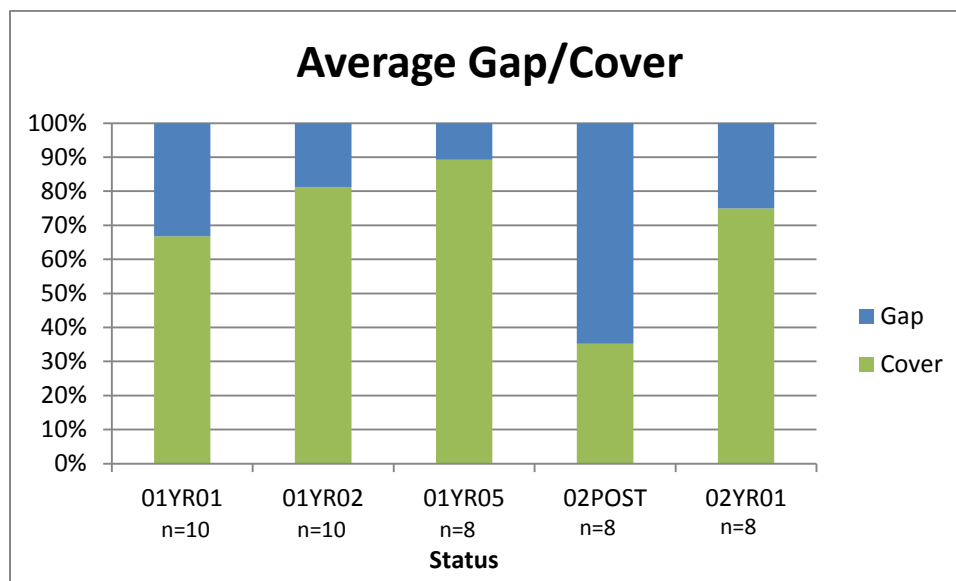


Figure 4: Average understory vegetation cover vs. open space (gap) in the pine flatwoods of Canaveral National Seashore. Open space and litter cover are assessed to monitor habitat conditions for the gopher tortoise (*Gopherus polyphemus*) and indigo snake (*Drymarchon coraisi couperi*).

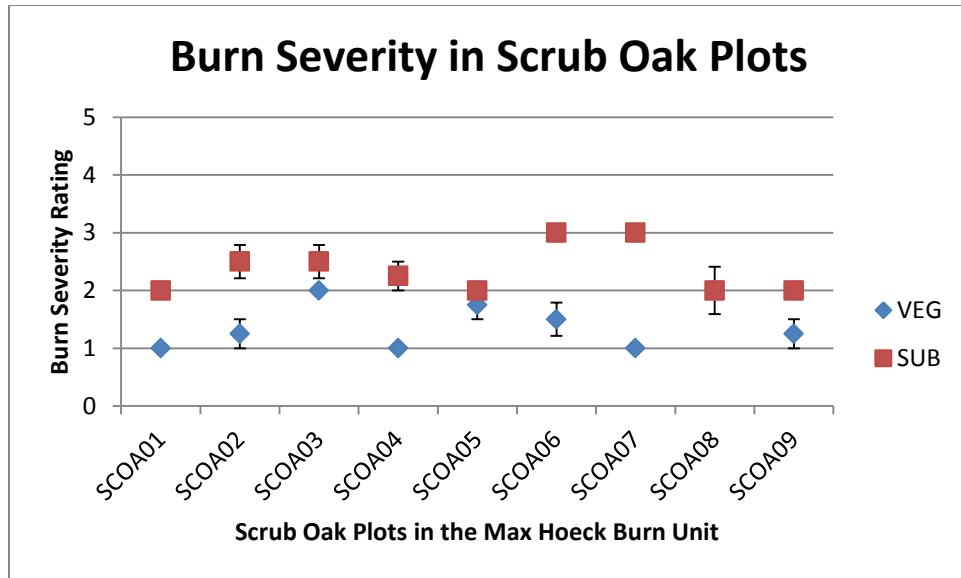
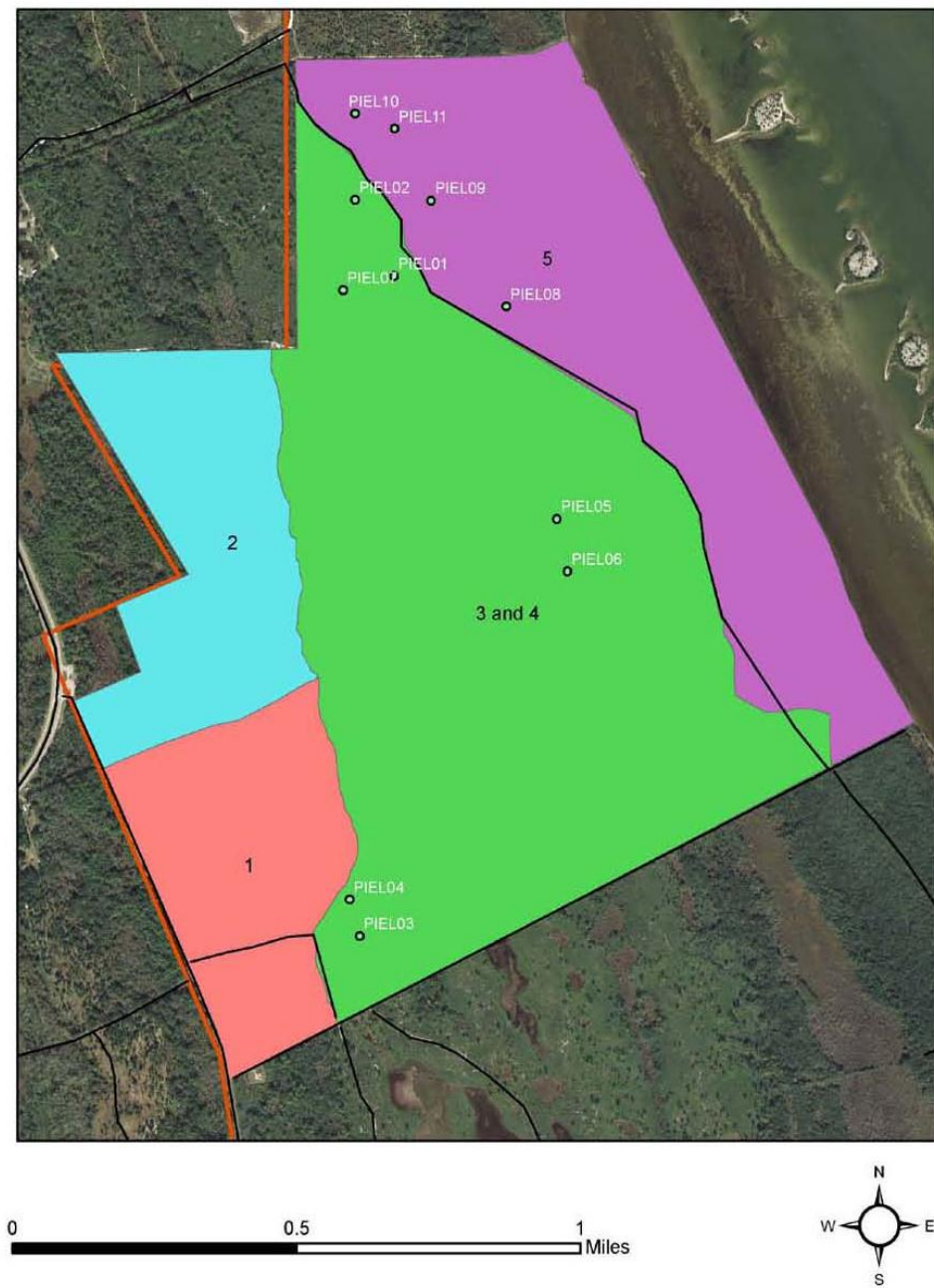


Figure 5: Post burn severity of vegetation and substrate within the Scrub Oak plots in the Max Hoeck Burn unit at Canaveral National Seashore (0 – No organic material preburn, 1 – Heavily burned, 2 – Moderately burned, 3 – Lightly burned, 4 – Scorched, 5 – Unburned).

Figure 6. Pine Flatwoods plots located in the Bill's Hill Burn units. Plots PIEL03 and PIEL04 were destroyed when a bulldozer constructed fire line through the middle of the plots to contain a wildfire in July 2012.



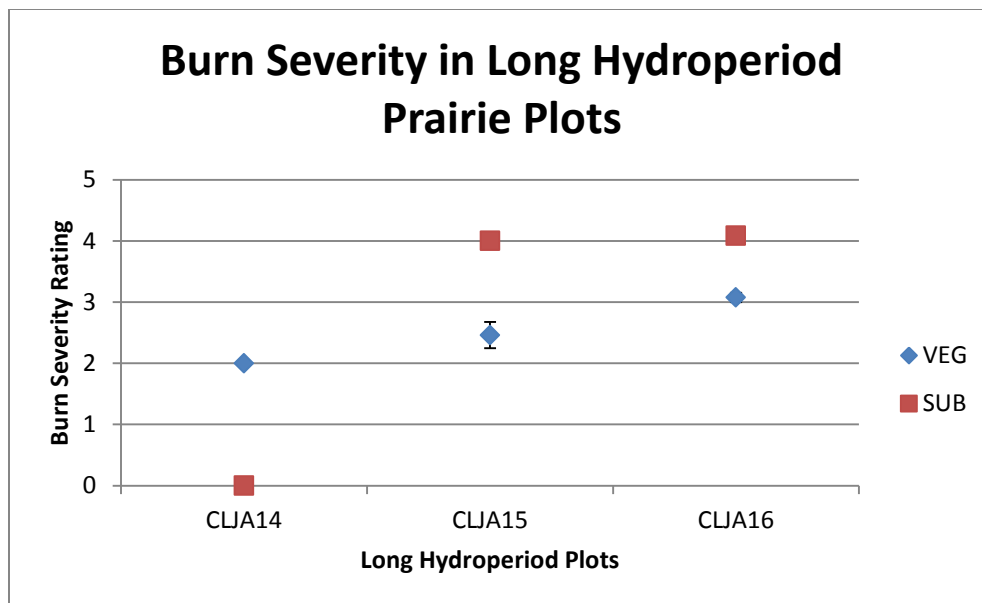


Figure 7: Post burn severity of vegetation and substrate within the Long Hydroperiod plots in the River of Grass NE burn unit at Everglades National Park (0 – No organic material preburn, 1 – Heavily burned, 2 – Moderately burned, 3 – Lightly burned, 4 – Scorched, 5 – Unburned).

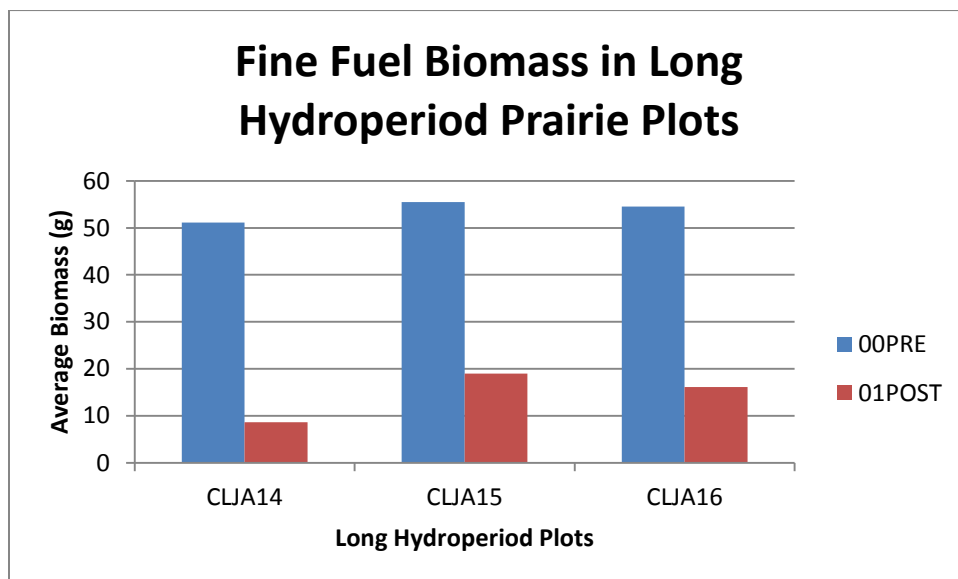


Figure 8: Reduction in fine fuel biomass in the Long Hydroperiod plots located in the River of Grass NE burn unit in Everglades National Park.

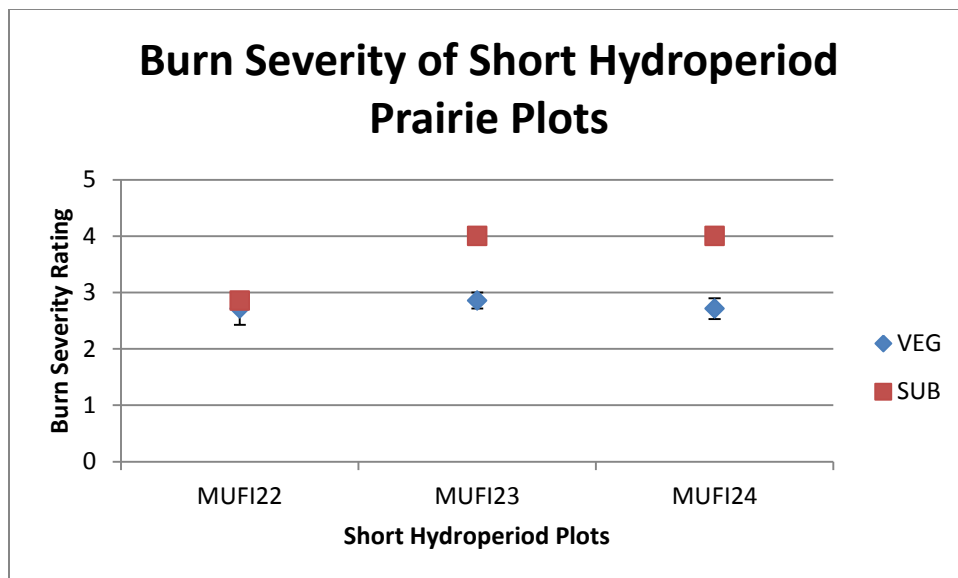


Figure 9: Post burn severity of vegetation and substrate within the Short Hydroperiod plots in the East Everglades 1 burn unit at Everglades National Park (0 – No organic material preburn, 1 – Heavily burned, 2 – Moderately burned, 3 – Lightly burned, 4 – Scorched, 5 – Unburned).

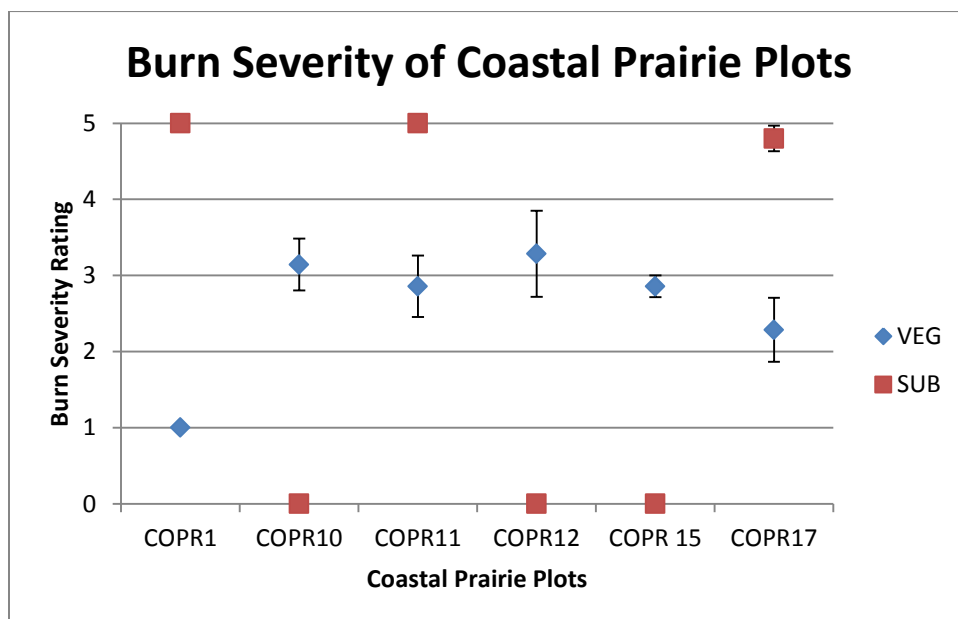


Figure 10: Post burn severity of vegetation and substrate within the Coastal Prairie plots in the Cape Sable and South Broad River burn units at Everglades National Park (0 – No organic material preburn, 1 – Heavily burned, 2 – Moderately burned, 3 – Lightly burned, 4 – Scorched, 5 – Unburned).

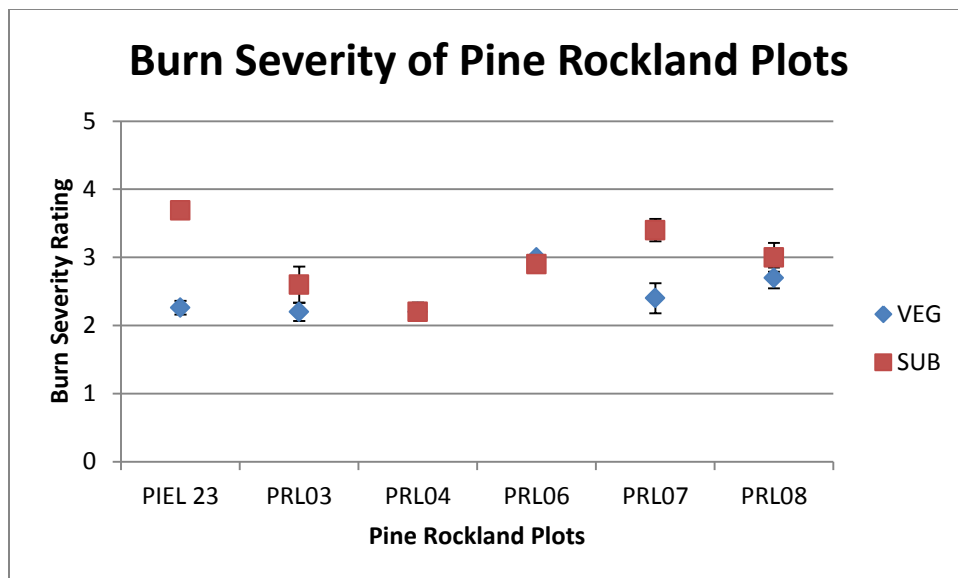


Figure 11: Post burn severity of vegetation and substrate within Pine Rockland plots at Everglades National Park (0 – No organic material preburn, 1 – Heavily burned, 2 – Moderately burned, 3 – Lightly burned, 4 – Scorched, 5 – Unburned).

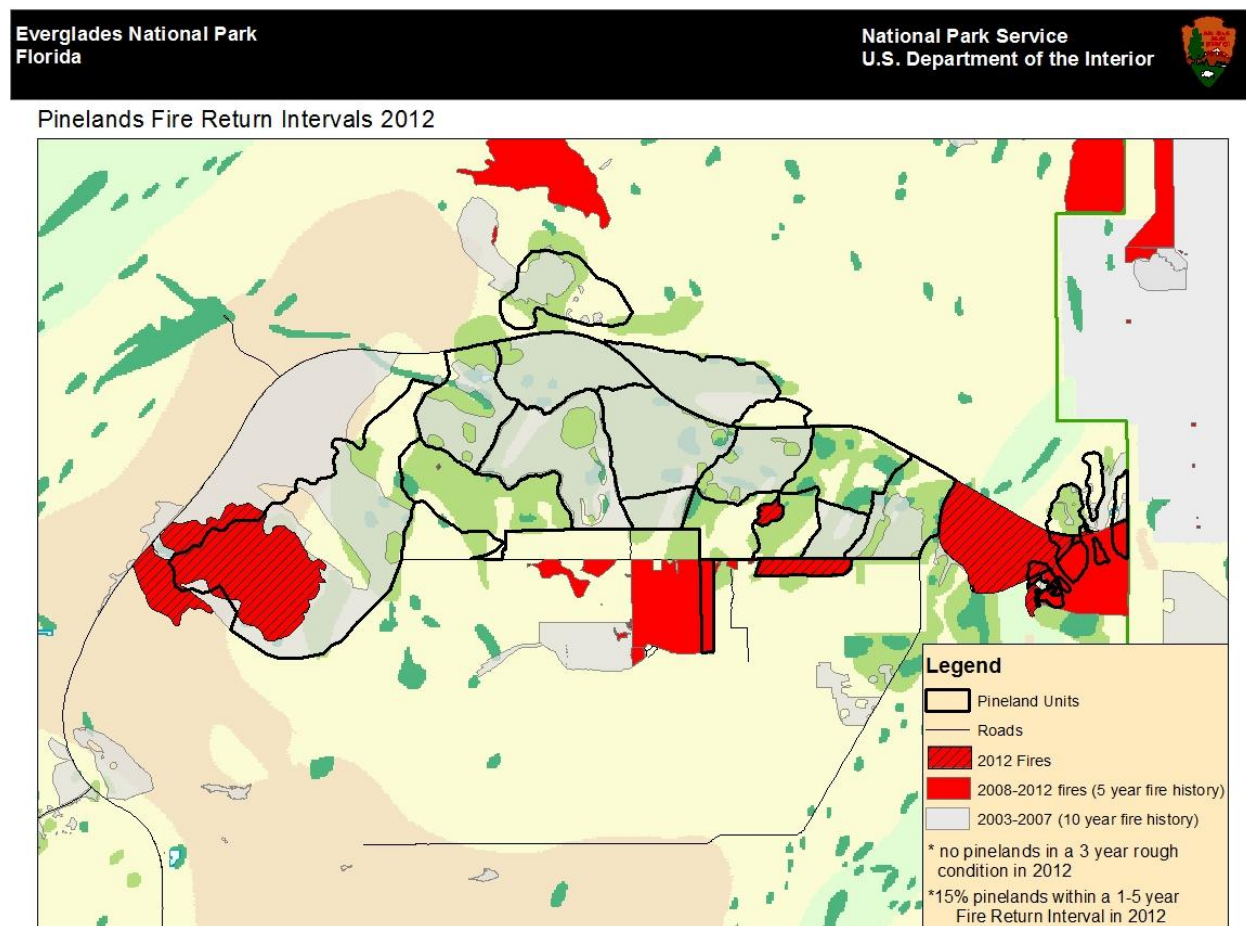


Figure 12: Fire Return Interval of Everglades National Park Pine Rocklands.

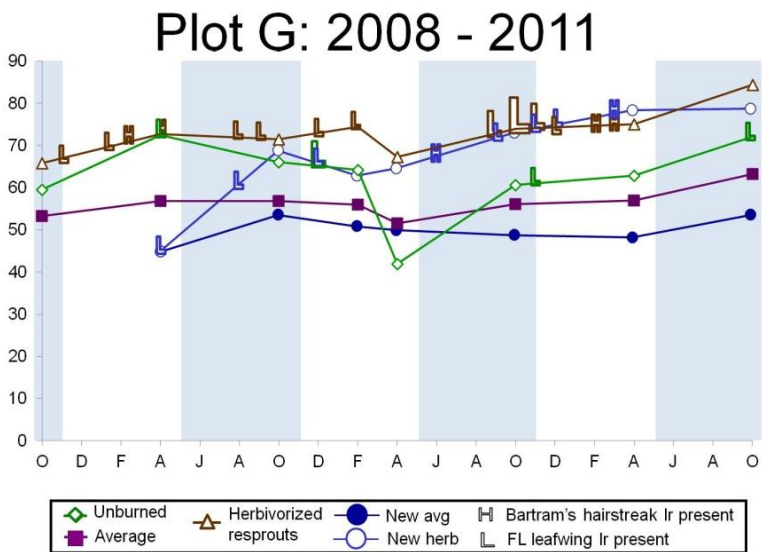
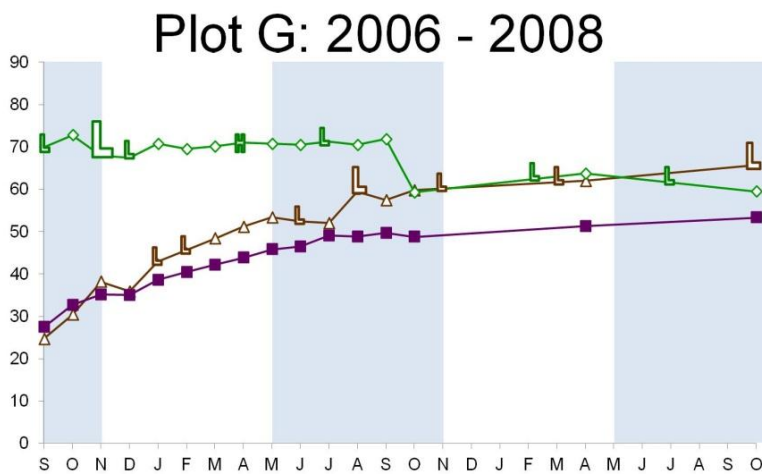
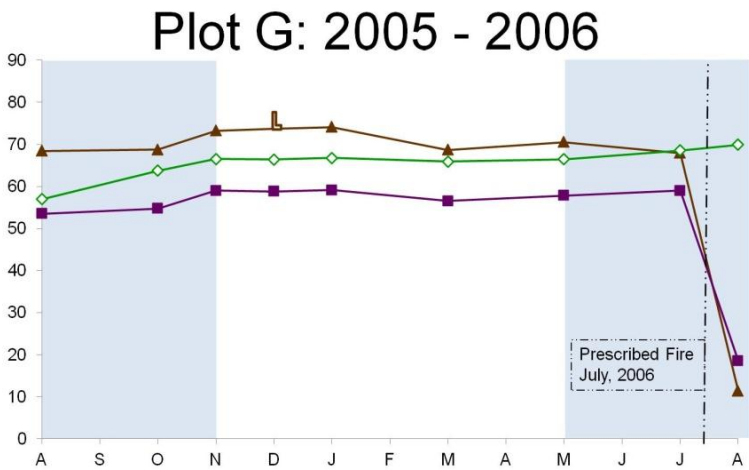


Figure 13: Average height of pineland croton in Plot G from 2005-2011. The letters indicate that larvae were present on that monitoring date and the varying sizes of the letters represent the number of larvae

present. The smallest letter indicates that only one larva was present, while the largest indicates that 3 larvae were present.

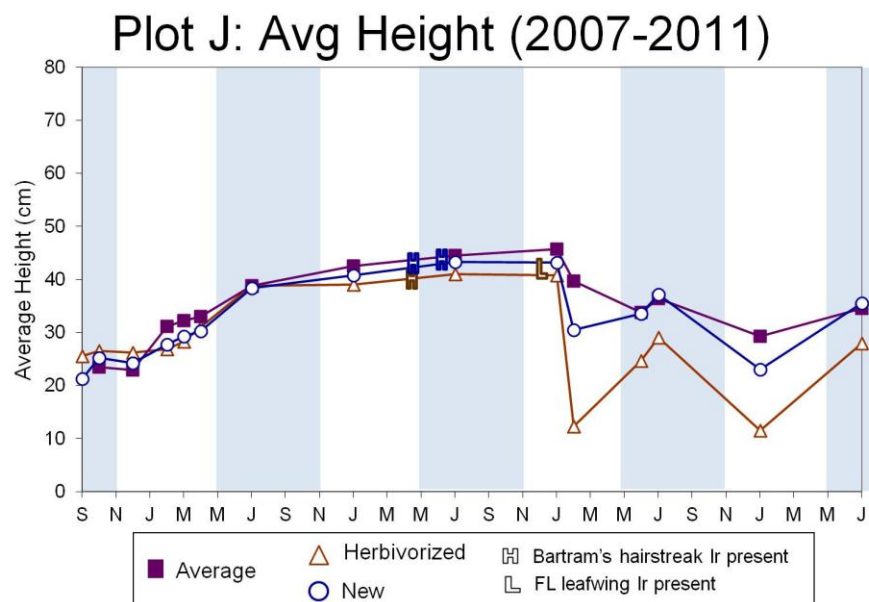
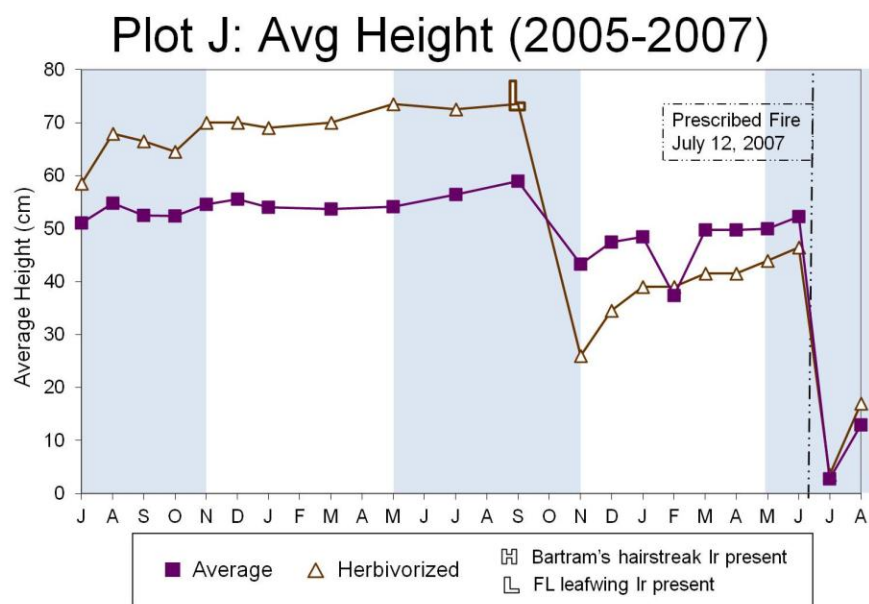


Figure 14: Average height of pineland croton in Plot J from 2005-2011. The letters indicate that larvae were present on that monitoring date and the varying sizes of the letters represent the number of larvae present. The smallest letter indicates that only one larva was present, while the largest indicates that 3 larvae were present.

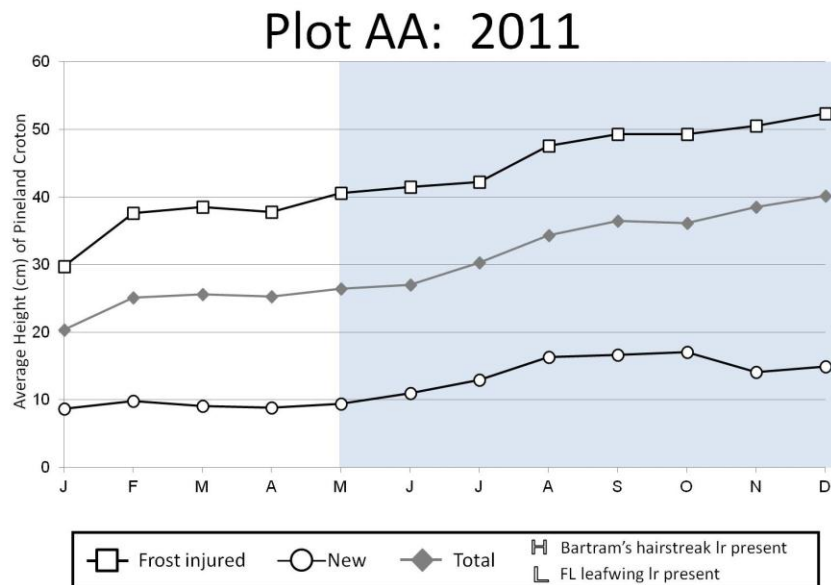
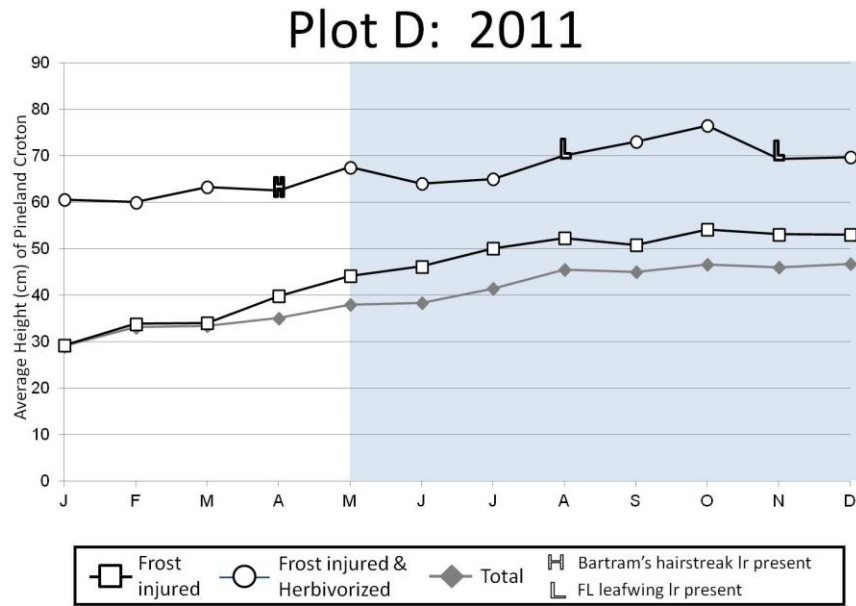


Figure 15: Average height of pineland croton in Plots D and AA in 2011. The letters indicate that larvae were present on that monitoring date.