



**National Park Service
Fire Ecology Annual Report
Calendar Year 2014
Everglades National Park
Canaveral National Seashore**

A. Summary

The Everglades fire effects program had a successful year in which the monitoring of nearly all scheduled plots was completed; we were unable to monitor 2 coastal prairie plots and 3 long hydro period prairie plots due to lack of funding for helicopter. Fire effects staff completed training for personal development and continued to support the compliance needs of the Fire Management Program at Everglades National Park and Canaveral National Seashore. The 2014 field season was completed with a partially staffed fire effects crew, as two positions remained vacant during the entire year.

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 plots, as well as fire and exotic plots. The majority of the Everglades pine rockland ecosystem remains well outside the desired fire return interval of 3-7 years, with only 23% of the acreage burned within the last 7 years. This year in Everglades National park 6 prescribed fires and 8 wildfires occurred, in which 7 FMH plots and 11 fire and exotics plots burned.

Fire effects staff worked with ENP Prescribed Fire Specialist to assist researchers with the Missoula Fire Lab, who installed fuel loading research plots within the East Everglades Expansion area of the park. FMH plots (n=3) were installed jointly with the Missoula Fire Lab plots in the long hydroperiod prairie ecosystem. ENP fuels and fire effects staff will continue to assist Missoula Fire Lab with data collection from these plots throughout 2015.

Table 1. Fire Effects Plot Workload (2014) and Total Plots Installed

Park	Monitoring Unit	Plot Type (FMH Forest/Brush/Grass plot, photo point,	Pre-burn 2014	Immed. Post 2014	Postburn (1-20 yrs) 2014	Annual Total (2014)	Total Plots
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		Rapid Assessment, CBI, etc.)					
Everglades	Pine Rockland	FMH Forest plot	0	0	1	1	27
	Short Hydro-period Prairie	FMH grass plot	2	4	4	10	28
	Long Hydro-period Prairie	FMH grass plot	5	0	0	5	20
	Coastal Prairie	FMH grass plot	0	3	0	3	18
	Butterfly Host plant Monitoring	Host-plant monitoring	1	1	8	10	4
	Melaleuca Monitoring	Fire and exotic monitoring	21	11	0	32	23
	Lygodium Monitoring	Fire and exotic monitoring	0	0	0	0	6
Canaveral	Slash Pine Flatwoods (<i>Pinus elliottii</i>)	FMH Forest plot	0	0	0	0	8
	Coastal Scrub	Photo Point	0	0	0	0	18
	Coastal Scrub	Modified FMH Brush Plot	0	0	0	0	4
	Scrub Oak	Modified FMH Brush Plot	0	0	9	9	9
Total			28	18	14	70	165

* Pilot sampling plots

**Number of visits to monitoring plots in 2014 (some plots were visited more than once)

In 2014, Everglades Fire Effects staff completed 28 visits to FMH plots in Everglades National Park and Canaveral National Seashore. In addition to The FMH plots, the staff also completed 10 visits to one Endangered Butterfly Host Plant Monitoring plot, which burned during a prescribed fire and 32 visits to Fire and Exotic Monitoring plots, 11 of which burned during a prescribed fire.

Table 2. Fire Ecology Staffing 2014

Ecologist and Monitors	Starting Date	Ending Date	# of Pay Periods	READ Qualified (Yes or No)	Training and Development
Maya Tupaj	1/1/14	12/31/14	26	No	RT-130, HECM refresher, Imperiled Butterfly Working Group symposium, Pine Rockland Working Group symposium, operational leadership,
Aerin Land	1/1/14	12/31/14	26	No	RT-130, HECM Refresher, L-380, Planning Section Chief

					(ENP Hurricane Team), Imperiled Butterfly Working Group planning meetings and symposium, Pine Rockland Working Group symposium, Assisted NATR and CUIS with FX plot installations
William Graham	01/01/14-- --- 11/16/14	05/17/14 ----- 12/31/14	13	No	ATV refresher, S-212 refresher, RT-130, HECM refresher, HAZWOPER, Engine staffing, Dispatch staffing

Table 3. 2014 Management Objectives and Monitoring Results

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (XX% confidence interval)	Objective Achieved?	Year Analysis Completed (Range of Data [Yrs] Included in Analysis)
Slash Pine Savanna	Canaveral- Limit mortality of <i>Pinus elliottii</i> overstory trees (>15cm BDH) to less than 30% as measured two years post burn.	Overstory pine mortality = 33%	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% 02YR02: Recruitment: -71% Seedling: -71% Poles: -95%	Combined: No Seedlings: No Poles: No Combined: No Seedlings: No Poles: No	2013 (2003-2010) 2013 (2003-2012)
	Increase cover of bare ground/open space to 25% bare ground / 75% vegetation cover 5 years post burn.	01YR05 Open space = 8% Veg. cover = 92% 02YR02: Open space = 11% Veg. cover = 89%	No	2011 (2010) 2013 (2012)
Scrub Oak	Reduce cover of saw palmetto by 50-80% immediately post burn.	Saw palmetto cover reduction =83% Figure 1	No (although only slightly exceeded)	2013 (2010-2012)
	Reduce cover of live oak species by 40-60% immediately post burn.	Live oak cover reduction=82% Figure 1	No	2013 (2010-2012)

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (XX% confidence interval)	Objective Achieved?	Year Analysis Completed (Range of Data [Yrs] Included in Analysis)
	Reduce number of scrub oak trees, taller than 2 meters, by 50-80%, as measured three years from the second application of fire (02YR03).	01YR02: Number of oak trees > 2 m reduced by 86% Figure 2	N/A	2014 (2010-2014)
	Increase relative cover of non-woody species by 50-70%, as measured two years from the second application of fire (02YR03).	01YR02: Relative cover of non-woody species increased by 543% Figure 3	N/A	2014 (2010-2014)
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.	19% of the pinelands are within a 1-5 year FRI 4% of the pinelands are in a 3 year rough condition Figure 5	No	2014 (2010-2014)
Short Hydroperiod Prairie	Topkill >50% of encroaching woody species immediately post-burn	Based on visual analysis of photomonitoring data there were no encroaching woody species pre or post-burn	N/A	2014 (2010-2014) 4 plots were in immediate post burn status
	Reduce fine fuels >70% immediately post-burn	Based on visual analysis of photomonitoring data ~97% reduction in fine fuels immediate post-burn Figure 6	Yes	2014 (2012-2014) 4 plots were in immediate post burn status

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (XX% confidence interval)	Objective Achieved?	Year Analysis Completed (Range of Data [Yrs] 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> : 24% exotic plant populations were treated <i>Schinus terebinthifolius</i> : No populations were identified for treatment	Yes	2014 (2014)
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 plots were in immediate post burn status in 2014
	Reduce fine fuels >70% immediately post-burn	73% reduction in fine fuel biomass immediately post burn	Yes	2013 (2012) No plots were in immediate post burn status in 2014

B. Program Information

Table 4. Planning - 2014

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 2014)	Assisted with how many BAER plans in 2014?
Everglades National Park	no	2007	0	0
Canaveral National Seashore	no	-	0	0

Table 5. Monitoring - 2014

Park	% 2014 Data Entered	% 2014 Data	# Prescribed	# Non-fire Fuels	# Wildfires Monitored*	# BAER Treatments Monitored*
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		Quality Checked	Fires Monitored*	Treatments Monitored*		
Everglades National Park	100%	100%	3	0	1	0
Canaveral National Seashore	100%	100%	0	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 6. Communicating Results - 2014

Park	# of Project Monitoring Reports completed in 2014	# of Annual meeting(s) with Park staff	# of Formal presentations of results	Do you use Minitab?*
Everglades National Park	1	1	2	no
Canaveral National Seashore	1	0	0	no

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

Table 7. Research - 2014

Park	Are research needs identified in FMP or Monitoring Plan? (yes or no)	# of Proposals Submitted in 2014	# of Proposals Funded in 2014	# of Research Projects Supported in 2014*	Additional Comments
Everglades National Park	yes	1	0	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.

Reserve Fund Research: If your park(s) received Reserve Fund Research funding or completed a previously-funded project in the last year, please provide the following:

- Current project status (short description)
- Expected project completion date
- List of deliverables

Also, if a Reserve Fund research project is completed, please remember to submit an article to the Rx Effects newsletter (see <http://www.nps.gov/fire/wildland-fire/what-we-do/science-ecology-and-research/rx-effects-newsletter.cfm> for submission guidelines).

C. Fire ecologist accomplishments and areas of focus

In 2014 progress continued in the development of the Fire Management Plan Environmental Assessment draft. Revisions were made to the multi-year fuels treatment plan, cultural resource assessment strategy and mitigations related to federally listed species. A final draft EA was completed and released for public comment. NEPA and Endangered Species compliance work is ongoing for annual project specific proposals as well.

Maya Tupaj collaborated with Inventory and Monitoring for the Natural Resource Conditions assessment, providing data and reviewing summaries related to fire management within the Park. Support and collaboration continued with Florida International University on the research regarding fire and lygodium and support during an outdoor laboratory burn setting to assess the impacts of fire on lygodium growth and spore production.

Maya Tupaj continued to serve on several working groups and committees including the Pine Rockland Working Group where a field presentation was given during the Pine Rockland Working Group symposium.

Education and outreach activities included revising and implementing an inquiry based fire ecology learning program with Everglades Environmental Education and Miami-Dade College, as well as working with a local elementary teacher with the Teacher Ranger Teacher program, introducing her to fire effects monitoring and fire ecology concepts and hosting fire ecology field trips to two local schools.

Table 8. Fire Ecologist 2014 Accomplishments/Focus Areas

Category	Percent Time	Accomplishments and/or areas of activities
Planning	35%	Annual NEPA compliance, Sec 7 endangered species consultation, Sec 106 cultural resources consultation, Cape Sable Seaside Sparrow Fire Management Strategy, FMP and EA final draft, Fire Management Plan Endangered Species consultation for Fire Management Plan, Biological Assessment and Biological Opinion draft, Cultural resource inventory and assessment strategy for National Historic Preservation Act, Fire Management Plan planning and compliance, Prescribed fire planning, multi-year fuels plan revision and update and burn plan reviews.
Presentations	<5%	Fire effects monitoring field presentation, annual IDT prescribed fire review presentation, superintendent briefing presentation on fire effects program
NPS Meetings/ task groups	5%	Work with SFNRC, Pine Rockland Working Group, Wilderness Committee
Interagency work	5%	Work with SFNRC, USFWS
Wildfire assignments	0%	
Prescribed fire projects	<5%	FFT2 on one prescribed fire
Non-fire fuels projects	0%	

Research	<5%	Review of proposals for NPS Reserve Fund Research Request, support for fuels load model project development, support for fire and exotic plant research
Data collection	10%	Assisted crew in monitoring fire effects plots in EVER and CANA
Data entry	<5%	Data entry and quality checking
Data analysis	<5%	Data summaries
Supervision/Admin	20%	Supervised fire effects monitors, completed EPAP evaluations for fire effects crew, reviewed and authorized travel, purchases and time sheets
Training	<5%	RT-130, HECM refresher
Travel out-of-park for plot or project work	<5%	Travel to Canaveral National Seashore
Miscellaneous	<5%	Development of fire indicator for Everglades Ecosystem restoration success for state of conservation report to World Heritage Committee

D. Fire effects crew accomplishments and areas of focus

In 2014, The Everglades National Park fire effects crew completed a total of 70 plot reads between Everglades National Park and Canaveral National Seashore. All data was entered and quality checked. Three new FMH grass plots were installed in the long hydro period ecosystem to expand our understanding of the “River of Grass” and “East Everglades Expansion” areas of the ENP. Only 1 FMH pine forest plot was visit this year and the majority of the pine rocklands habitat remains outside the desired fire return interval of 3-7 years.

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*. Members of ENP fire effects, fuels, and engine crews assisted an FIU researcher to burn *L. microphyllum* in an outdoor laboratory setting. The fire effects crew worked with the ENP botanist to develop methods to regularly monitor the population distribution of endangered butterflies in ENP. The fire effects crew taught portions of 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; Aerin Land assisted with the organization and planning of the 2014 Imperiled Butterfly Working Group Meeting and the 2014 Pine Rockland Working Group Symposium. Aerin Land and Bill Graham assisted the ENP Prescribed Fire Specialist and scientists from the Missoula Fire Lab to collect and process biomass samples from the long-hydro period prairies. Aerin Land joined fire effects crews from Natchez Trace Parkway and Shenandoah National Park to install new FMH plots in Cumberland Island National Seashore. Aerin and Bill joined

staff from many other divisions within ENP in a project to remove large, abandoned research sites from remote areas of the park to improve the quality of Wilderness.

Outreach:

Maya and Aerin continued to work with the Teacher-Ranger-Teacher Program, introducing local teachers to fire effects monitoring and fire ecology concepts. Maya and Aerin also continued work with the PARK Teachers program to introduce inquiry based learning concepts using fire ecology to local college students. Maya hosted a field trip in the pine rocklands ecosystem with the Public Information Officers for a local elementary school and introduced young students to the concepts of fire ecology. Maya and Aerin hosted a field trip in the pine rocklands ecosystem for a new science-based highschool and introduced young scientists to the concepts of fire ecology.

Presentations:

Aerin presented results from last year's juvenile pine mortality study at the Pine Rockland Working Group symposium.

Mechanical fuels treatments:

Bill assisted with hazardous fuel/exotic plant reduction projects by removing exotic vegetation from the "Hole in the Donut" restoration of ENP with the ENP exotics removal crew.

Fire Management:

The fire ecology and fire effects staff were involved in wildland and prescribed fire activities in 2014. The staff worked on 4 prescribed fires and 1 wildfire within ENP and 1 prescribed fire in Big Cypress National Preserve. The crew assisted with staffing engines, helicopter and fire dispatch locally. Aerin served as Planning Section Chief on the Everglades National Park Type 3 Incident Command Team.

Table 9. Fire Effects Crew 2014 Accomplishments/Focus Areas

Category	Percent Time	Notes
FMH plots	20%	1PIEL, 10 MUFI, 5 CLJA, 3 COPR, 9 CANA, prep and new plot installs
WUI plots	N/A	
CBI plots	N/A	
Other plot work	20%	Exotic <i>Melaleuca</i> (<i>Melaleuca quinquenervia</i>), Exotic <i>Lygodium</i> , Rare Butterfly Host Plant Monitoring
Wildfire assignments	0%	
Prescribed fire projects	1%	4 Everglades RX assists and unit prep
Non-fire fuels projects	5%	Exotic vegetation fuels reduction
Travel out-of-park for plot or project work	1%	Travel to Canaveral National Seashore and Cumberland Island for fire effects monitoring

Data entry	15%	FMH Plots, EVER, CANA, MEQU, Plot folder management, Photo management
Data analysis	5%	CANA, Butterfly Monitoring Project
Supervision/Admin	<5%	Travel, payroll and purchasing, paperwork, training personnel assisting on projects
Training	<5%	ATV, L-380, annual refreshers, water ditching
Miscellaneous	15%	staffing dispatch, fire engines and helitack, ENP incident management, endangered butterfly monitoring project, assist with exotics treatment in park, exotics treatment, soil moisture monitoring, live fuel moisture sampling, historic plot relocations, Missoula Fire Lab biomass sample collection.

E. 2015 Direction

An approved FMP is expected by summer of 2015. We expect to continue operating an annual prescribed fire program under documented categorical exclusions until the FMP is approved. 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. 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.

F. Optional Information

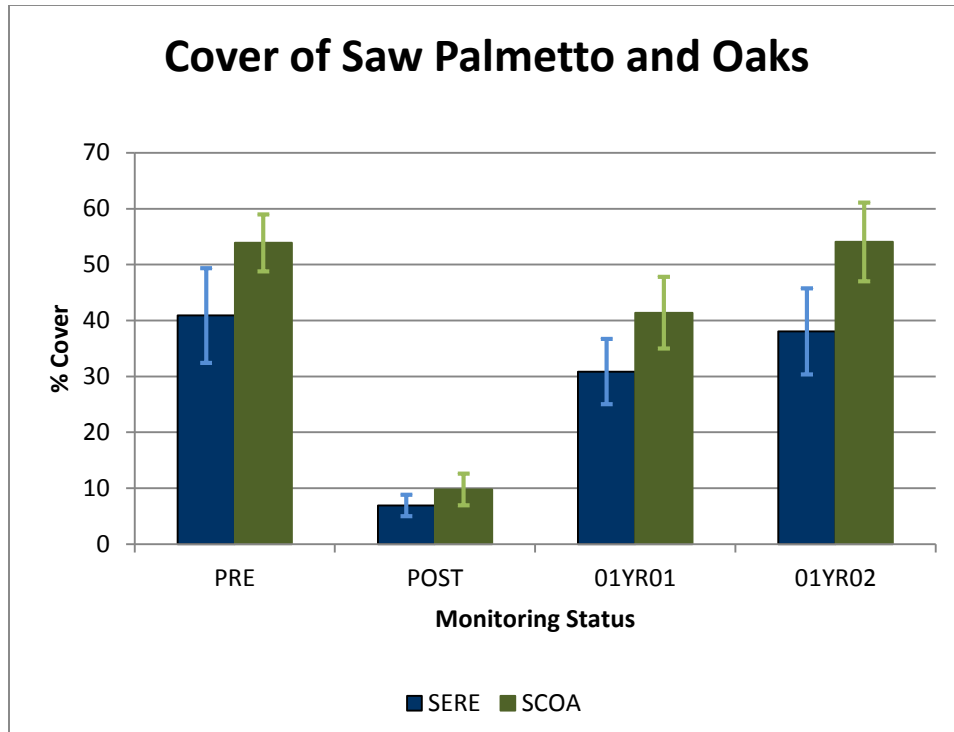


Figure 1: Average cover of saw palmetto (SERE) and oak species (SCOA) in the Max Hoeck scrub oak habitat of Canaveral National Seashore.

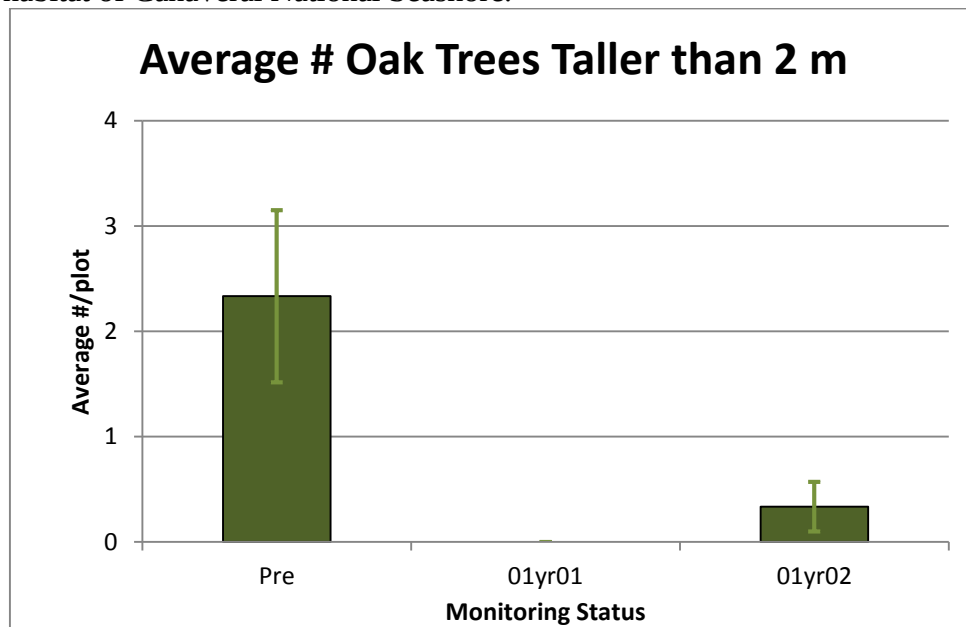


Figure 2: Average number of oak trees taller than 2 m in the Max Hoeck scrub oak habitat of Canaveral National Seashore.

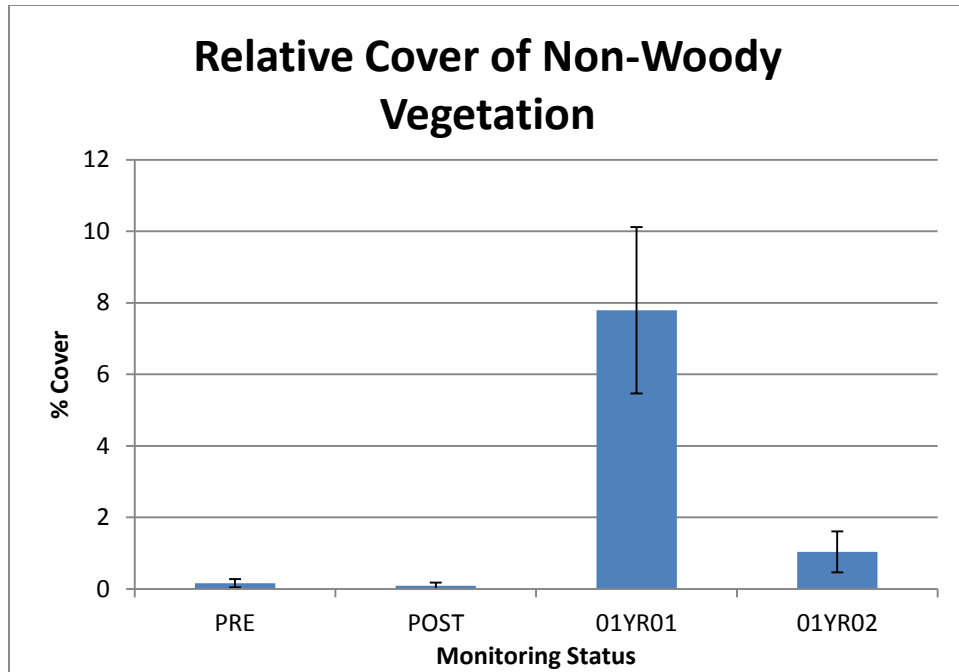


Figure 3: Relative cover of non-woody vegetation in the Max Hoeck scrub oak habitat of Canaveral National Seashore.



Figure 4: Max Hoeck burn unit in Canaveral National Seashore scrub oak habitat contains 9 fire effects monitoring plots.

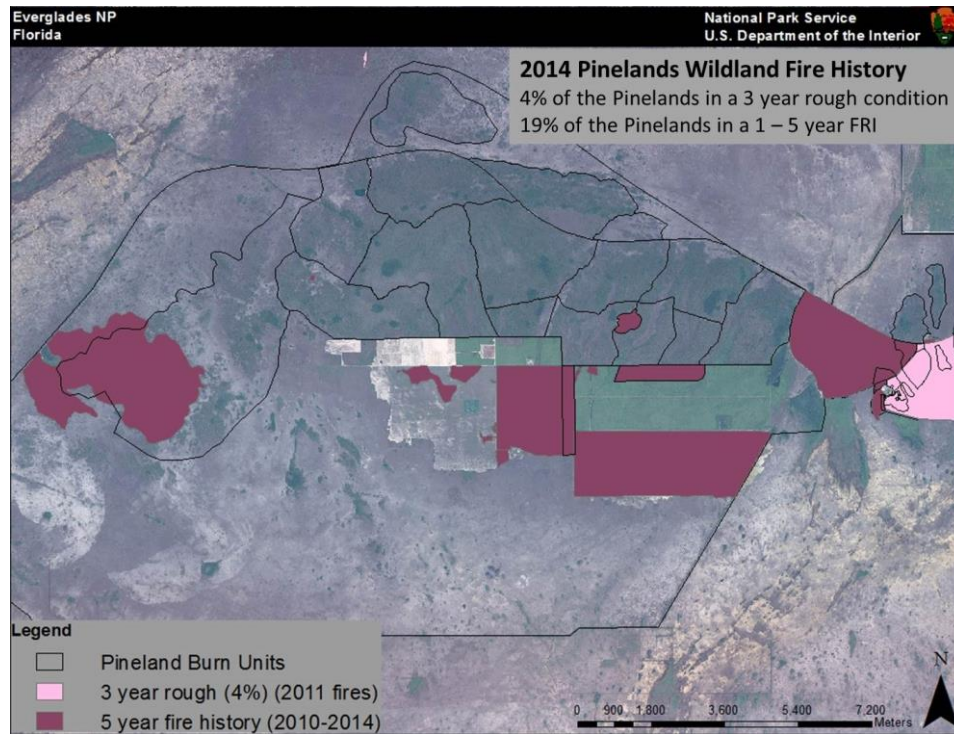


Figure 5: Fire Return Interval of Everglades National Park Pine Rocklands.



Figure 6: Approximately 97% fine fuel reduction immediately post burn in the Short Hydro Period Prairies of Everglades National Park

Appendix A - Effect of fire on *Lygodium microphyllum*

Along the west coast of Everglades National Park, the exotic invasive fern, *Lygodium microphyllum* is invading native habitats, shading out many native species while creating unnatural fuel loading and biomass accumulation in the fire adapted coastal prairies and adjacent fire sensitive habitats.

Anecdotal evidence has supported the idea that prescribed fires within ENP are effective in reducing above ground biomass and FMH plots have been used to assess changes in *Lygodium* presence and cover within burned areas. While this provided useful information on changes in *Lygodium* cover over time, it has been difficult to detect correlations between changes in *Lygodium* cover and prescribed fire applications.

To more accurately assess the impacts of prescribed fire on *Lygodium* cover, spore production and invasion potential, paired burned and unburned plots were installed following a prescribed fire in the Cape Sable region of ENP coastal prairies. After analyzing the results of this 2 year study we have decided to include line intercept cover estimates in FMH monitoring plots as these methods are the most repeatable and provided the most reliable data to assess the impacts of prescribed fire on *Lygodium* in the coastal prairies.

Objectives:

Assess the impact of prescribed fire on *Lygodium* cover, spore production and potential for establishment of new populations in burned areas as compared to unburned areas in close proximity.

- Determine *Lygodium* cover using line intercept and ocular estimate methods of cover estimation.
- Determine percent of *Lygodium* that is reproductive within an 20cm x 20cm x 1.5m sampling area.
- Determine percent of sawgrass tussocks (expected favored habitat for *Lygodium* germination) with *Lygodium* present.

Methods:

Plot design

Plot design was a 15m radius circular plot separated into 4 quarters with a 30m transect through the middle. In 2011, three plots were located within areas recently (<1 month) burned in a prescribed fire and three plots were located in adjacent unburned areas. The plot center and ends of the transects were marked with rebar. Plot locations were determined by scouting the Cape Sable region for unburned sites with *Lygodium* present and burned areas within close proximity and near areas the helicopter could land safely. Plot locations were randomly selected within the limited areas that met this criteria.

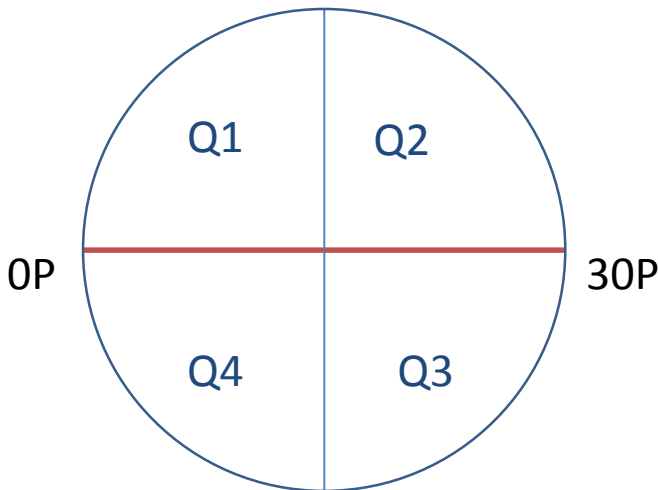


Figure 1: Plot layout. Red line indicates 30m transect.

Two different protocols were used to determine percent *Lygodium* cover within the plot: Line intercept cover estimate was recorded along the 30m center transect and ocular estimate within the 15m radius circular plot.

Line Intercept 30m transect

Lygodium cover along the transect was determined by recording the starting and stopping point for each patch of *Lygodium* intersecting the line. Percent *Lygodium* cover was calculated by summing the length of the line covered by *Lygodium* and dividing by the total length of the line.

Limitations:

The line intercept method offers a way to record cover with more precision and less observer bias, but consists of a small sampling area.

Ocular Estimate 15m radius circular plot

A second tape was laid out perpendicular to the transect, 15m on either side (Figure 1). This second tape was used to designate the extent of the 30m circular plot used for the ocular *Lygodium* percent cover estimate. A percent cover was determined in each quarter for *Lygodium*, other exotic species and native vegetation. After a percent cover was determined it was assigned a cover class (Table 1). The cover class categories help moderate observer bias.

Limitations:

While the ocular estimate provides a quick and easy way to evaluate *Lygodium* cover over a large area, sensitivity to small changes is lost in the large cover classes and observer bias increases when estimating over a large area. Additionally, the percent cover of *lygodium* was higher in burned plots as compared to unburned plots when looking at the ocular estimate data, however the opposite was seen in the line intercept data. We believe this is due to the fact that *lygodium* is easier to observe in the burned areas when the graminoid fuels are reduced.

Table 1: Cover class categories for the 30m ocular estimate protocol.

Coverage Category			
Category	Range	Median	Description
0T	0%	0%	NO LYMI PRESENT
1T	0.1 - 5%	3%	FEW SCATTERED PLANTS OR SMALL CLUMPS
2T	6-25%	16%	SEVERAL SCATTERED PLANTS AND CLUMPS
3T	26-50%	38%	NUMEROUS SCATTERED CLUMPS/FEW LARGE CLUMPS
4T	51-75%	63%	SEVERAL LARGE PATCHES AND NUMEROUS CLUMPS
5T	76-95%	86%	NUMEROUS LARGE PATCHES AND CLUMPS
6T	96-100%	98%	UNIFORMLY PRESENT

Lygodium Fecundity

At three locations within the plot a 20cm grid was placed over a tussock with Lygodium. This square created the outline for a 1.5m tall cube that was used to estimate volume of the Lygodium and native plants within it. After determining the volume of Lygodium, percentage of reproducing leaves was estimated. This percentage was multiplied by the total estimated volume of Lygodium for the sampling point to determine volume of fertile leaves. This method compensates for the varying sizes of Lygodium plants and varying amount of reproduction per plant, but does allow for observer bias. The volume estimate allows for comparison between burned and unburned plots.

Limitations:

The post fire sampling did not occur during the peak spore production season for Lygodium. Additionally, this method allowed for greater observer bias and difficulty in assessing fertile leaves within dense Lygodium bundles. The Lygodium fecundity sampling protocol was discontinued after one year of data collection. These remote plots are only accessible by helicopter and due to limited helicopter availability and budget constraints the decision was made to reduce the data collection to ensure all final plots reads could occur.

Tussock Lygodium presence

From observations in the coastal prairies, Lygodium seems to favor the drier conditions of sawgrass tussocks. To determine the percent of suitable tussock habitat occupied, every tussock that intersects the transect was counted and examined to see if any Lygodium originated from it. The total number of tussocks and the number of those occupied were recorded.

Limitations:

High water levels made it difficult to see all tussocks along the transect and it was difficult to determine if Lygodium presence on tussocks was a result of a new Lygodium germination or delayed resprouting of previously established Lygodium.

Photos

Photos were taken from the center of the transect, towards 0P, 30P and then at 90° on either side of the transect.

Limitations:

Although there is no standard object in the view, such as a range pole used in FMH monitoring, the photos provided a record of changes occurring over time.

Results

Cover

The two different cover estimate methods show a slightly different trend in *Lygodium* cover and growth. Line intercept protocols indicate that *Lygodium* cover is higher in the unburned areas compared with the burned areas. The opposite is seen with the ocular cover estimates. It is believed that there was strong observer bias within the ocular estimate method and that the post burn results are influenced by reduced visibility of *Lygodium* in the dense fuels of unburned plots as compared to recently burned open plots. However, under both methods, the percent cover of *Lygodium* had evened out at 2 years post burn and there was no difference between the burned and unburned areas. This supports the 2 year fire return interval identified for management of *Lygodium* in the fire adapted coastal prairies.

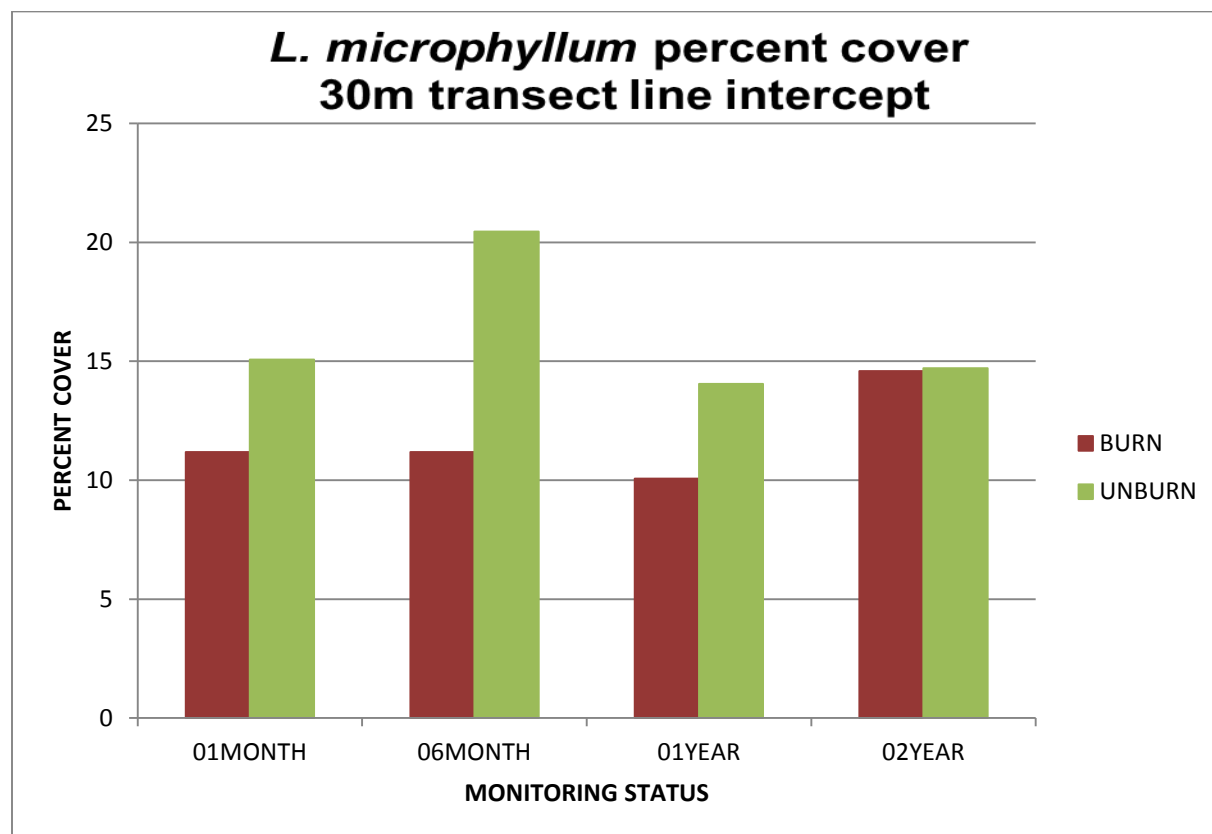


Figure 1: Average percent cover of *L. microphyllum* along 30m line intercept transect.

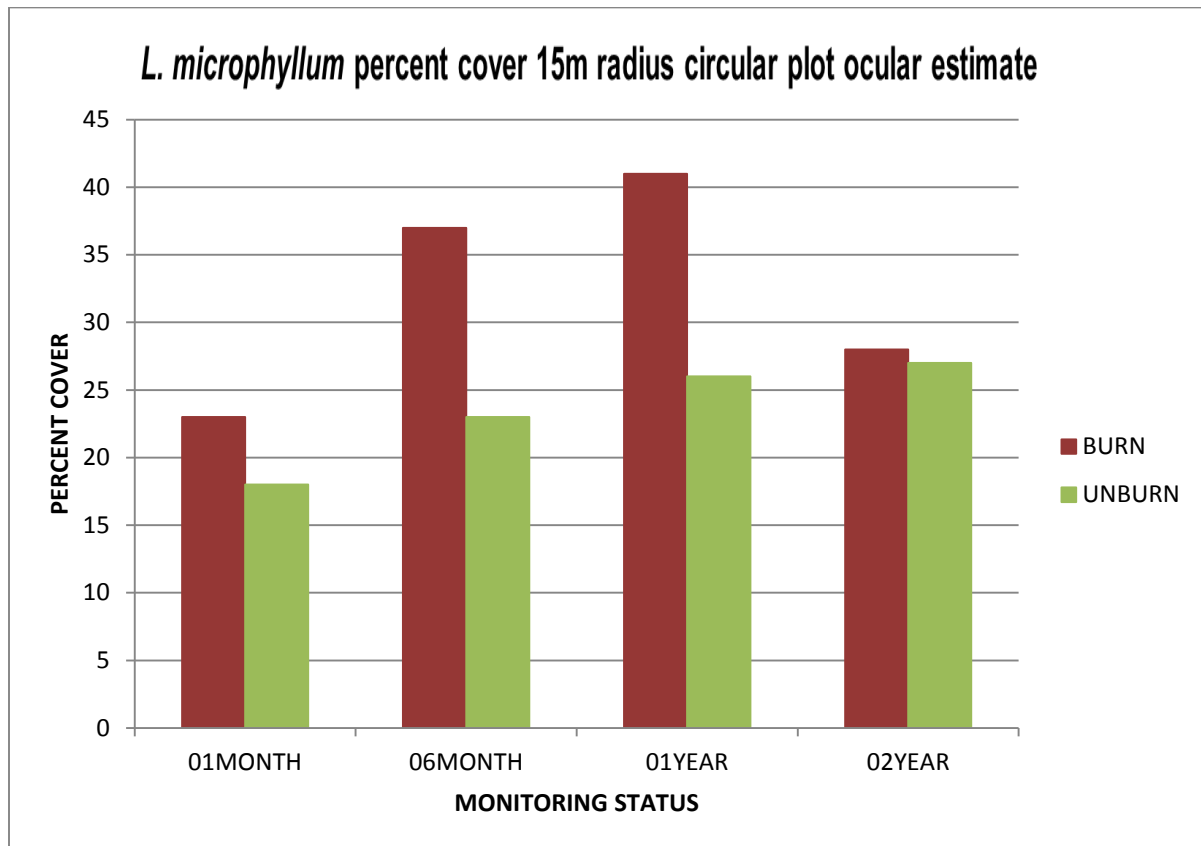


Figure 2: Average percent cover of *L. microphyllum* ocular estimate within 15m radius circular plot.

Fecundity

The percentage of fertile leaves was higher in the burned areas compared to unburned at plot installation (1 month post burn). Both the burned and unburned areas experienced a dramatic increase in volume of fertile leaves at the 6 month read in October, 2011. This coincides with the spore cycle of *Lygodium* which peaks from June to November. Fertile leaf volume decreased at one year post burn for both burned and unburned, with the more dramatic decrease seen in the burned area. Additionally, in the burned areas there was a total decrease over the one year period in the volume of fertile leaves while in the unburned areas volume of fertile leaves increased over the one year period, regardless of the peak season spike in October. This may indicate that over time fire reduces the reproductive capability of *Lygodium*. Further research and monitoring is needed in this area. A laboratory study is currently underway to assess the effects of fire on *Lygodium* spore production as well as heat impacts in spore viability. When this study is completed we may be able to better develop methods and schedules to more accurately assess the effects of fire on spore production in the field.

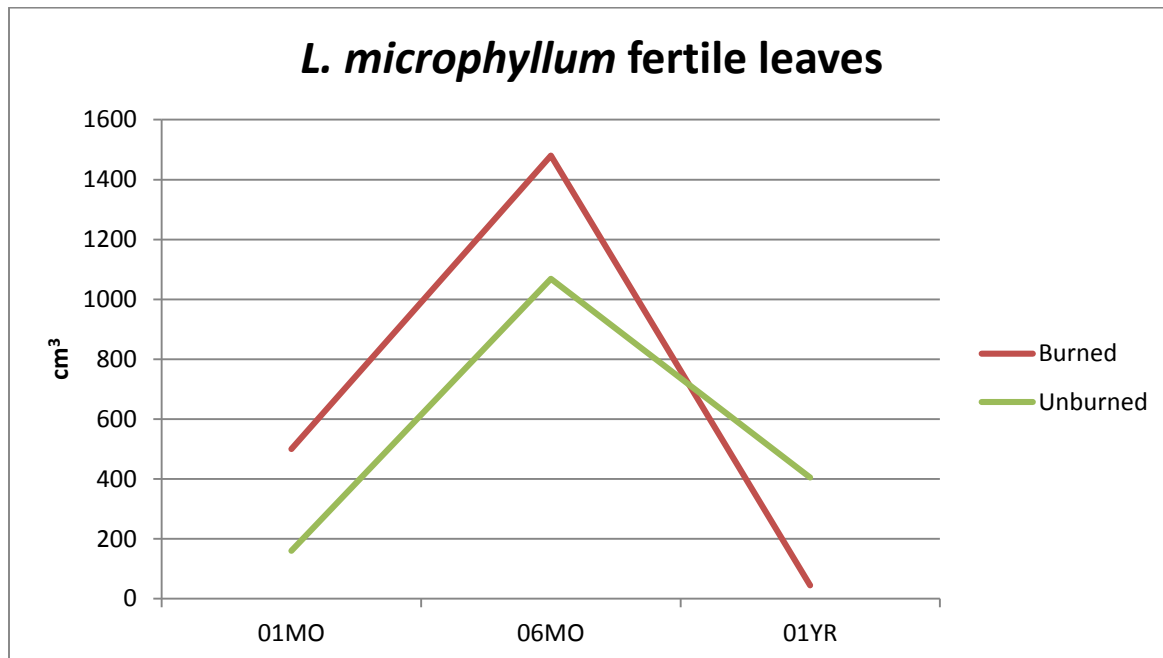


Figure 5: Average volume of *L. microphyllum* fertile leaves.

Tussock *Lygodium* presence

Fire may not impact the formation of sawgrass tussocks but may increase the potential for colonization of new populations of *Lygodium* by removing vegetation competition on existing habitats. The percentage of sawgrass tussocks occupied by *Lygodium* was higher in the unburned sites than the burned sites prior. The unburned sites experienced an increase in percentage of tussocks occupied with *Lygodium* at 6 months, with a subsequent decrease at one and two years post fire. The burned sites followed an opposite trend, with a decrease in percent occupied tussocks at 6 months and a subsequent increase which surpassed the percent occupied tussocks in the unburned at 2 year post fire.

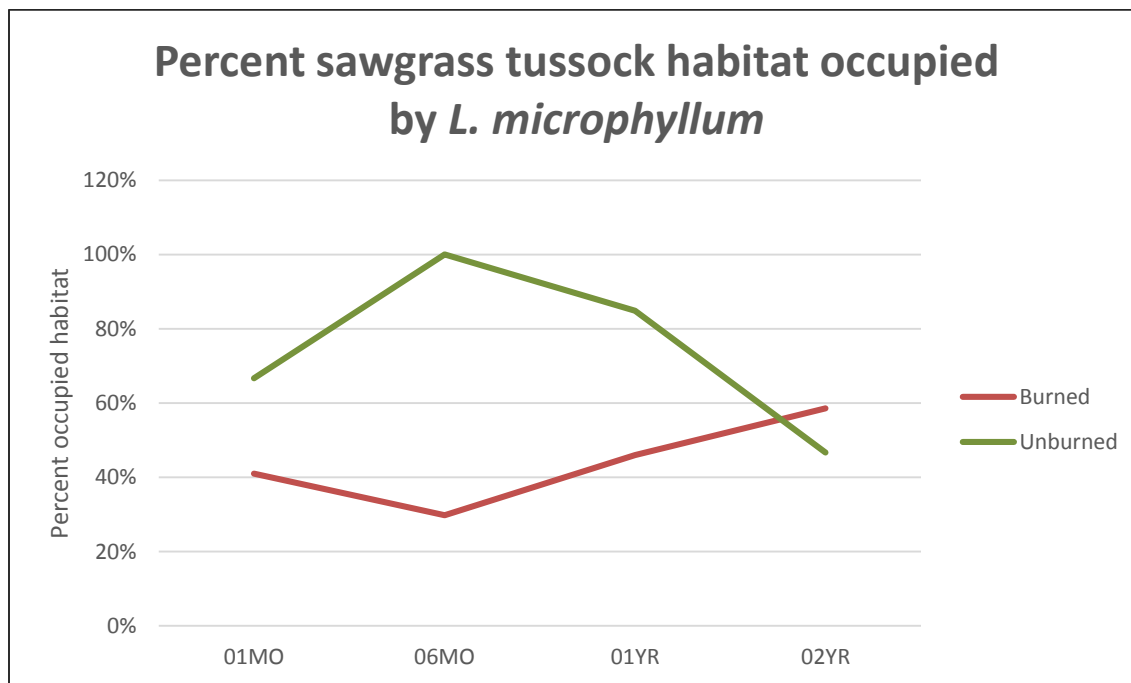


Figure 6: Percent of sawgrass tussock preferred habitat occupied by *L. microphyllum*.

G. Metadata and FFI Database Update on NPS Data Store

As you know, long-term monitoring data are highly valuable! We are glad to have almost all of the NPS FFI databases centrally located on the NPS Data Store. This central data storage option allows us to have an additional secure data location other than those in the parks' or regional offices. It also allows NPS users and others to view the metadata and contact data stewards for access to monitoring data for research or educational purposes. In addition, Landfire staff will be able to download the needed FFI databases directly from the Data Store for Landfire model validation purposes, eliminating the need for NPS staff to respond to another, separate data call.

Once this season's FFI data entry and quality checking are complete, please follow these instructions to update your park(s) metadata ("references") and upload the updated FFI databases to the NPS Data Store.

- 1) Backup the FFI database(s) in FFI (note backup file date for metadata).
- 2) Zip backup file(s) - **this step is critical to reduce file size**, upload time and server storage space utilized. PLEASE use the following naming convention for your zip files: "**FFI_2014_XXXX**", where XXXX is the 4 letter code for the park, or for the lead park in a network if more than one parks' data are included in the database.
- 3) Access the Data Store at: <https://irma.nps.gov/App/Reference/Welcome>
- 4) Select **Manage**, then **Manage My References** and click on the **Search** button (don't need to enter any search criteria to display all references for which you are an owner).
- 5) Select the reference (metadata record) you wish to update from the list displayed to open the Reference Profile where you can make edits to update the reference.
- 6) Expand "Version History", to view and select the **Manage Versions** option. You will then select **Clone this Reference to Create a New Version** to create a new Reference for this year's update while preserving past metadata and databases as archives.
- 7) Once you **Save** the new, cloned reference, you can make any changes necessary to update the reference with this year's information. Most likely, the edits will be to the "Date of Issue/Release", which is the date of the new FFI backup file, and the "Content End Date", if you have collected new data this year that was added to the FFI database. Select **Edit Details** from the menu at the top of the profile to make these changes. If anything else has changed (e.g. new protocols established, old protocols abandoned, etc.), you can make these edits to the text fields (e.g. Abstract) as well. Once changes are complete, you must select the "Save and set to" **Active** button at the bottom of the window.
- 8) Finally, upload the new zipped FFI database backup file by selecting **Add Digital File** from the menu at the top of the reference profile (or Add Holding from the Holdings section). Click on **Select Files** and then browse to your zipped FFI database backup file

to select it, and then select **Upload**. You must also add additional owners here who have permission to edit the holdings if necessary (we recommend at least one person besides yourself; I (MB) am happy to serve as an additional owner to assist with Data Store if you'd like, but not required!). Remember to Save as **Active** once you have completed any changes.

9) Repeat the above steps for each of your FFI databases.

Please feel free to contact MB if you have any questions at all about the process of updating the metadata and FFI databases on the Data Store.

INSTRUCTIONS FOR UPLOADING 2014 ANNUAL REPORT TO DATA STORE

1. Save your report as a PDF file using the following file naming convention "2014 *Park/Network Name* Annual Report.pdf".
2. **NEW THIS YEAR!!!** We will now be uploading our annual reports to the IRMA Data Store instead of the Fire Ecology Sharepoint site. This change will allow us to have all of our Fire Ecology Program information stored in one reliable, accessible location. We are working with the I&M program to transfer all of our past annual reports from Sharepoint to the Data Store. Once this is done, you will be able to use the versioning feature of Data Store to clone the last annual report reference and update it with the current year's report (just as we are doing with the FFI databases). **I will be sending out separate, detailed instructions for uploading the annual reports to the Data Store as soon as they are finalized.**
3. Please e-mail your regional ecologist, MaryBeth Keifer, and Nate Benson to let us know when you get your report uploaded.

Call MaryBeth Keifer (603-795-2333) if you have any questions or problems.