



Big Cypress National Preserve

National Park Service Fire Ecology Annual Report Calendar Year 2012

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A. Summary

The Fuels/Fire effects crew at Big Cypress National Preserve had a busy year. In CY 2012 we completed 20 prescribed fire projects and 23 Wildfires for a total 53,000 acres treated. When not burning or doing burn prep a vast amount of time was spent writing 2 new burn plans, 1 mechanical fuels treatment plan. 100% of the Preserve now falls under a burn plan. 106 pre and post burn plots were visited.

The lack of staff has forced the employees in the Fuels/Fire effects crew to come up with innovative and time saving solutions that allowed us to do all the work needed without sacrificing quality. Here is a brief list of some of those accomplishments.

- In 2012 two employees in the Fuels/Fire effects crew have participated in Technical Fire Management. One person completed TFM, One person is finishing TFM. Final projects from these endeavors have rewarded BICY with creative, time saving, ecologically friendly, and cost efficient ways of implementing prescribed fire and preparing for wildfire.
- Updated comprehensive database for an easy way to compare data collected at many different photopoints.
- Evaluated an additional 49 plots evaluating stems per acre of wax myrtle following or preceding a fire event.
- Collected 360° panoramic photos, in addition to typical N, S, E, and W views, and we are in the process of linking them to GIS so when the photopoint is clicked a 360° view is available for the user.
- A new TFM project statistically tests the hypothesis ($\alpha = .05$) using a linear regression model that the average stems-per-acre and average stem height per plot has a statistically significant relationship to elevation, FRI, fire weather conditions, hydrology, and NFDRS indices.

We also maintain 4 weather stations that we perform all annual maintenance on. We have several sites around the preserve that we collect weekly fuel moistures from. We maintained all the fire reports.

We have started using the hydrology levels at 9 stations on the preserve and we have created a database for those hydrology levels that allow us to track seasonal severity.

All the firefighters at Big Cypress National Preserve are suppression firefighters and prescribed firefighters regardless of their official title. We depend on each other for many things from monitoring to welding to digging handline.

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

Park	Monitoring Unit	Type of Plot (FMH, photo point, other)	Pre-burn 2012	Immed. Post 2012	Postburn (1-20 yrs) 2012	Annual Total (2012)	Total Plots
Big Cypress	Pine	Photo point	10	4	16	30	34
Big Cypress	Pine	FMH	0	0	0	0	3
Big Cypress	Prairie	Photo point	7	2	12	21	29
Big Cypress	Prairie	FMH	0	0	0	0	5
Big Cypress	Cypress Savannah	Photo point	5	1	5	6	12
Big Cypress	Cypress Savannah	FMH	0	0	0	0	1
Big Cypress	Hammock	Photo point	0	0	0	0	1
Big Cypress	Mechanical	Photo point	0	0	0	0	2
Big Cypress	Disturbed	Photo point	0	0	0	0	1
Big Cypress	Pine	*TFM 26 PLOTS (Due again in 2016)	33	0	0	0	33
Big Cypress	Pine/Prairie	*TFM 27 PLOTS	49			49	49
Total			104	7	33	106	170

* Pilot sampling plots

Table 2. Fire Ecology Staffing 2012

Every firefighter at BICY, regardless of their position, contributed to monitoring, data collection and entry, suppression, and prescribed fire preparations. We had suppression folks; ENGB's, FFT1's, TFLD's, and HMGB's going out in the field to help do plots and monitoring. The people listed below work in Fuels or Fire Effects.

Ecologist and Monitors	Starting Date	Ending Date	# of Pay Periods	READ Qualified (Yes or No)	Training and Development
Jill Waisley	1/1/2012	12/31/2012	26	No	TFM 27, FEMO, GISS, ICT5
Mindy Wright	1/1/2012	12/31/2012	26	No	FIRB, ICT5 (T), GISS
J Thatcher	7/20/2012	12/31/2012	9	No	DIVS(T), TFLD, HMGB RXB2
Justin Turnbo	1/1/2012	12/31/2012	26	No	DIVS completed, RXB2, HMGB, TFLD, ICT3(T)

Table 3. Management Objectives and Monitoring Results

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (XX% confidence interval)	Objective Achieved?	Year Last Analysis Completed
Pine	Consumed 75% of pine litter and palmetto thatch	Total fuel reduction >75% (n= 6 plots visited, 4 fires in pine plots)	YES	2012
	Reduce existing shrub height >50% 1-yr post burn	Ocular Estimation at photopoint site: >50% reduction 1 yr post (n=8 plots, 4 fires in pine plots)	YES	2012
Prairie/Cypress Savannah	Reduce existing shrub height in prairies >50% 1-yr post burn	Ocular Estimation at photopoint site: Total woody vegetation reduction >50% (n=2 plots, 3 fires in Prairie/Cypress plots)	YES	2012
All Units	Treat 75% of burnable veg during each treatment every 3-5yrs	total fuel reduction = 75%-100% (n= 50 plots visited, 7 fires in all plots this year)	YES	2012

B. Fire ecologist accomplishments and areas of focus

We do not have an Ecologist here at BICY. We do collaborate with the Regional Ecologist.

Table 4. Fire Ecologist Accomplishments/Focus Areas

(Please see B. above)

C. Fire effects crew accomplishments and areas of focus

Table 5. Fire Effects Crew 2012 Accomplishments/Focus Areas

Category	Percent Time	Notes
FMH plots	2%	FMH plots that reached completion of 3 yr rotation were converted to photo point plot, of 32 original FMH plots almost all have been converted in last 2 years
WUI plots	25%	Big Cypress 2010 FMP defines WUI as an “Area where an ignition can impact any structure or roadway within one burn period.” So all photopoints have been included in this estimate
CBI plots		Beginning of 2012 fiscal year all immediate post burn site visits include CBI data collection.
Wildfire assignments	15%	23 Wildfires on Preserve. 8 off unit assignments either Wildfire or Hurricane Sandy related
Prescribed fire projects	25%	20 prescribed fire projects.
Non-fire fuels projects	0	Estimated amount of time spent assisting with non-fire fuels projects; include READ activities
Data entry	15%	Estimated amount of time spent entering data from paper to PC
Data analysis	5%	This is expected to be very low number or zero for fire effects crew/lead monitor
Supervision/Admin	1%	Payroll, travel authorization/voucher, etc.
Training	2%	TFM, L-280, RX-410, WFDSS, IQCS, S-339, M-581, S-490 Annual Refreshers.
Miscellaneous	10%	Composed 2 Burn Plans Reviewed 2 Burn Plans Implemented Mechanical Treatment in the Sanctuary Unit.

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?
Big Cypress National Preserve	yes	Completed 2012	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*
Big Cypress National Preserve	100%		9	0	5	

* 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?*
Big Cypress National Preserve	2	1	4	Yes but it is limited as it is the trial version.

* 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
Big Cypress National Preserve	yes	0	0	5	Raccoon Point Research Study/ Cypress Dome Burn Severity Study/ RCW, Fox Squirrel, and Panther research

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

E. 2012 Direction

1. We have continued to revamped the way in which we prioritize our burn treatments by assigning weights to the different variables listed below

- Vegetation type.
- Departure from desired fire return interval.
- Distance to roads and structures.
- Departure from desired condition class.

Utilizing GIS we are able to pin point areas that are in need of treatment and the weighted values allow us to prioritize our treatments.

This system is repeated on a yearly basis. By combining resource objectives with wildland urban interface objectives we have been able to maximize our time and budget to provide the most benefit to Big Cypress National Preserve.

This story was published at the link below and a copy of the story is attached.

<http://www.nps.gov/fire/wildland-fire/connect/fire-stories/2012-parks/big-cypress-national-preserve.cfm>

Big Cypress Firefighters Develop Successful Plan for Prioritizing and Treating Hazardous Fuels

Big Cypress National Preserve, Florida Cohesive Strategy—Maintain and Restore Landscapes*

For the 2011-2012 prescribed fire season, National Park Service wildland firefighters at Big Cypress National Preserve (BICY) developed a new plan to prioritize hazardous fuel reduction treatments through the application of prescribed fire.

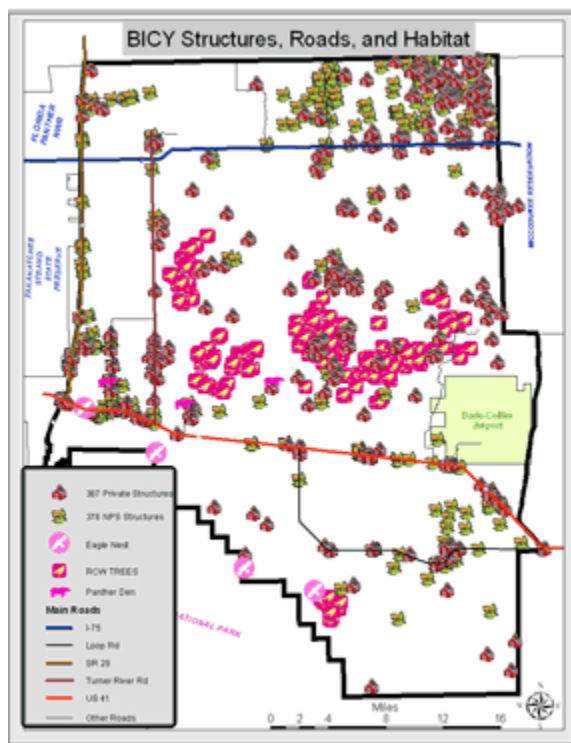


Figure 1 – Habitat and Wildland Urban Interface. Click map for larger version.

In line with National Park Service Director's Order 18, the Big Cypress Fire and Aviation Management policy specifically based a high priority for fuels treatments on two of the National Park Service's wildland fire management mission goals: Protection of Values through Effective Risk Management and Restore and Maintain Fire-Adapted Ecosystems.

Prioritizing fuels treatments that provide the most benefit to the park as well as the community, sometimes causes a conflict as these two mission goals often overlap across the landscape at Big Cypress National Preserve. How can fire managers simultaneously protect life and property while

maintaining and protecting the Preserve's diverse ecosystem and habitat? What is the best way to prioritize fuels treatments to accomplish these goals?

In an effort to solve this dilemma, BICY firefighters created a process that would help them visualize and prioritize fuels treatment objectives that would protect and sustain infrastructure, private and government property, and ecosystems, including threatened and endangered species habitat.

Using three main weighted criteria of fire return interval, fuel type, and distance that roads and structures are from the other two criteria, firefighters created a prioritization map (**Figure 2**).

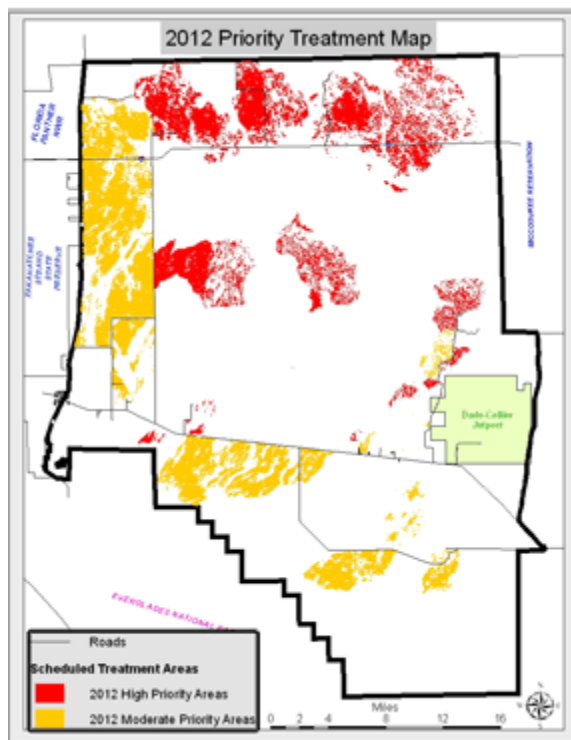


Figure 2 – The red areas indicate that the criteria has been met for an area that has not burned in five or more years, and contain pine or prairie fuels that lie adjacent to a value at risk (roadways, structures, etc.) located within a half of a mile to its location. The orange areas indicate a moderate or lower priority area for 2012. Click map for larger version.

Fire return interval is the time in years between fire events. Fire return interval is important because the longer the departure from natural cycles of fire, which are typically 3-5 years, the more severe the wildfires and fire behavior will be. Threatened and endangered species habitats such as the Florida panther and red-cockaded woodpecker require shorter fire return intervals to maintain viable habitat. Under this interval of fire occurrence in these ecosystems, fires will burn with less intensity, thus increasing sustainability rates and survivability of species, and will also aid firefighters in controlling wildfires.

Fuel type must be evaluated because fire behavior and fire intensity changes depending upon the type of fuel in which the fire is burning. In southern Florida, the pinelands with a palmetto understory burn most actively. The prairies also burn very readily but are easier for firefighters to extinguish than pinelands.

The distance that a structure or road is from the previously described fuel types, with a higher fire return interval, can have a greater impact on roads, structures, habitat, and public and firefighter safety. For example: The closer the distance that a road or structure is to a pineland that has not burned in seven years, the greater the risk to the public and firefighters. Primarily, smoke impacts to highways could cause road closures or accidents. The closer the proximity to these structures means there is even less time for firefighters to respond and try to extinguish the fire. Fire behavior and fire spread rates that cannot be contained quickly by firefighters could result in damaged or destroyed property.

Areas are defined as being “high priority” if they have not burned for longer than five years, lie less than half a mile to the nearest structure or road, and were located within or adjacent to pinelands and prairies. Areas meeting these criteria were identified as requiring immediate treatment (**Figure 2: Red Areas**).

In contrast, areas that had been burned recently (five years or less), farther from roads and structures (more than half of a mile), and in varying fuel types (pine, prairie, cypress, or hardwood hammocks) were defined as “moderate or lower priority” treatment areas (**Figure 2: Orange Areas**).

Each year, progress toward desired conditions will be reassessed, and fire staff will generate a new map. Under normal projected conditions, the map will never be the same, as wildfires, prescribed fires, and uncompleted projects will have an immediate effect on proposed treatment areas for the next year. The map must be updated annually to make certain that no areas with burnable vegetation, structures, or roads will be overlooked.

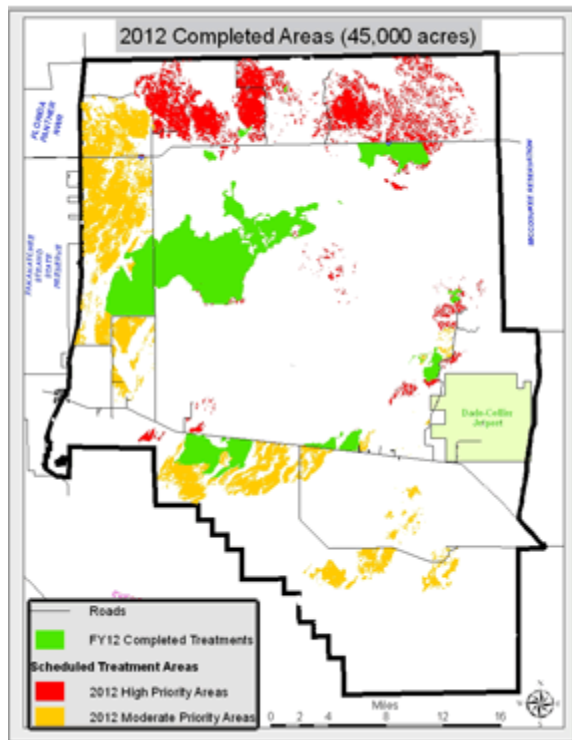


Figure 3 – Areas in the Fiscal Year 2012 treatment area that were completed and scheduled by April 2, 2012. Click map for larger version.

In November 2011, the fire crew at Big Cypress National Preserve began implementing the Priority Treatment plan. As of April 2, 2012 approximately 45,000 acres have been treated (**Figure 3**). The areas remaining in red would be a good representation of the high priority targets for FY 2013 if burning ceased on April 2, 2012, when this map was produced.

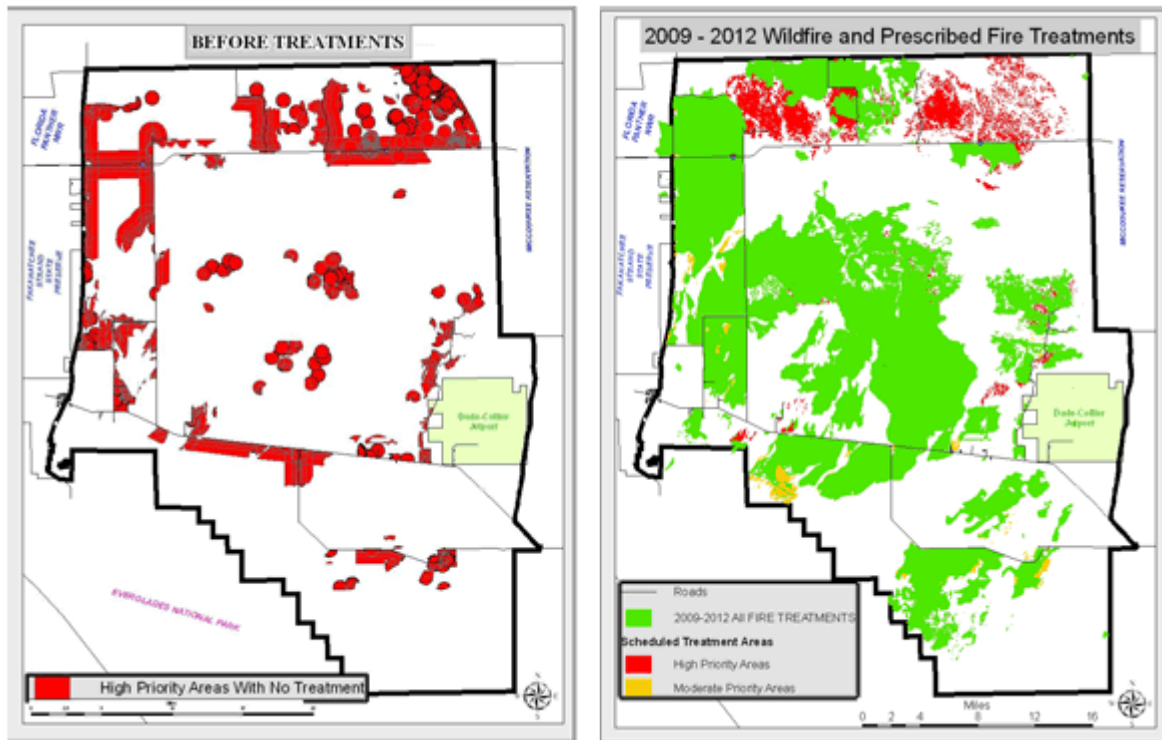


Figure 4 shows a representation before and after of the treated and untreated areas side-by-side. The picture on the left shows pre-treatment before 2009, or what the Preserve's high priority areas would have looked like without prescribed fire or wildfire treatments. The picture on the right shows post-treatment from 2009 to 2012 including natural wildfires. Currently, a fuels treatment plan is being written for the northeast corner of the preserve and implementation of that plan will begin in 2013.

The Big Cypress National Preserve fire crew plans to treat all burnable vegetation on the Preserve on a five to seven year rotation using the methods previously described. This fuels treatment plan will simultaneously protect life and property while maintaining and protecting the Preserve's diverse ecosystem and habitat, by replicating the natural fire return interval in the more volatile fuel types that are in close proximity to structures and roads.

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F. Optional Information:

Excerpt from Jill Waisley's TFM project: "A Statistical Analysis: Effects of Multiple Fire Treatments on Wax Myrtle"

The prescribed fire staff is developing long-term objectives as directed in the National Park Service Reference Manual #18 to monitor the effects of fire treatments (U.S. Department of Interior, National Park Service, 2008). However, BICY Fire Managers are concerned that current monitoring objectives may not be adequate to determine if fire treatments are maximizing long-term resource management benefits in the pineland and prairies of BICY.

The number of stems-per-acre of wax myrtle was examined at 49 fuels plots. 29 plots in pineland and 20 plots in prairie vegetation were analyzed independently each against 58 variables. Two models, one in pineland and one in prairie vegetation types, were generated at the 95% confidence interval ($\alpha = 0.05$) using linear regression.

The best-fit pineland model which includes an adjusted R-squared of 57% indicates a poor goodness-of-fit of the data to the model. More samples and variables will need to be examined to further validate fire effectiveness in pinelands at BICY.

In contrast, the prairie model found six best-fit predictors including: plot elevation, 100-hr fuel moisture on day of last fire treatment, water level on day of last treatment, average wax myrtle height, fire return interval (FRI) between last two treatments, and most frequently burned season. The R-squared value of 88.9% measures the goodness of fit of the data to the model and is significant at the 95% confidence interval ($\alpha = 0.05$).

