



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

A. Summary

Saguaro National Park had six wildfires in 2011 that burned 2.5 acres in pine, oak, and grassland. They were all caused by lightning. Two additional fires burned 0.2 acres at Saguaro in the desert: one was arson, and another was an abandoned illegal campfire. The majority of Coronado National Memorial burned during the human-caused Monument Fire in May. The fire was ignited along the border and consumed almost all of the Memorial's 4,750 acres, plus 84 structures on private property and a significant part of the Huachuca Mountains. Due to rearranging of responsibilities, fire ecology staff at Saguaro will be taking on a more active role at Chiricahua National Monument, which burned entirely this summer (12,163 acres) in the Horseshoe 2 Fire. That fire burned a total of 222,954 acres, which was most of the Chiricahua Mountains, and 23 structures on private land.

B. Plot Work

James Leckie, with assistance from Backcountry Ranger Shannon McCloskey, collected data on ten plots at Saguaro. Four plots were one year after the 2010 Mica Prescribed Burn. To establish somewhat of a "control" baseline, four plots in adjacent unburned areas were also sampled. In addition, two plots burned two years previously in the 2009 Telegraph Wildfire were also sampled. Perry Grissom assumed the role of Acting FMO in March when Kristy Lund took a detail as Coronado National Forest FMO, then applied for and was selected for that job. He was unable to provide any field assistance this year.

Fifteen plots at Coronado National Memorial were schedule to be sampled, but two days before that day, the Monument Fire started and burned those plots. James Leckie responded to the fire as the Lead Resource Advisor heading up rehabilitation efforts on both the Memorial and adjacent National Forest lands. After the assignment, post-burn conditions were not measured on the fifteen plots because the indicators for post-burn assessment had been obscured by wind, tire tracks, and rain.

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

Park	Monitoring Unit	Plot Type (FMH Brush plot, photo point, CBI, etc.)	Pre-burn 2011	Immed. Post 2011	Postburn (1-20 yrs) 2011	Annual Total (2011)	Total Plots
Saguaro NP	Ponderosa Pine Forest	28 FMH Forest Plots 1 Rapid Assessment Plot*			8	8	29
	Madrean Evergreen Woodland- Encinal Woodland (Arizona oak)	FMH Forest Plots			2	2	10
	Madrean Evergreen Woodland- Encinal Woodland (mixed oak-PJ)	Rapid Assessment Pilot Plots*					1
	Pine-Oak Forest (Arizona oak)	FMH Forest Plots					12
	Douglas Fir-Mixed Conifer Forest	10 FMH Forest Plots 2 Rapid Assessment Plots*					12
	Silverleaf oak	3 FMH Forest Plots					3
	Pine Oak Forest (Chihuahuan pine)	7 FMH Forest Plots 3 Rapid Assessment Plots*					10
Sunset Crater NM	Montane Meadow	FMH Grassland Plots					10
	Pine Encroachment Area of Montane Meadow	FMH Brush Plots					5
Wupatki NM	Plains/Great Basin Grassland-short grass community	FMH Grassland Plots					16
Walnut Canyon NM	Ponderosa pine Forest	FMH Forest Plots					11
	Pinyon-Juniper Forest	FMH Forest Plots					2
Coronado National Memorial	Semi Desert Grassland (disturbed)	FMH Grassland Plots					15
Total					10	10	135

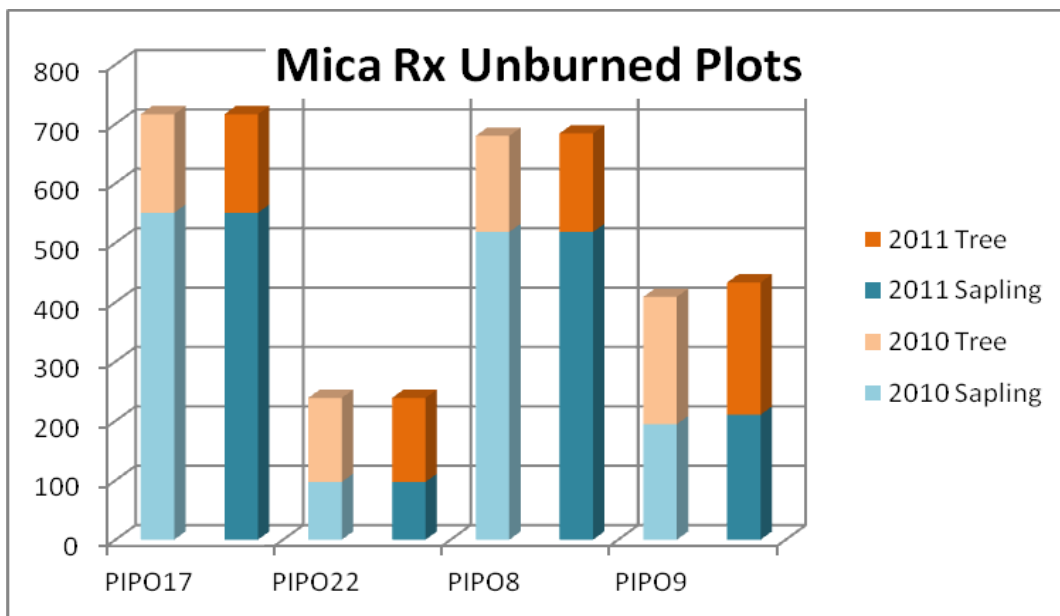
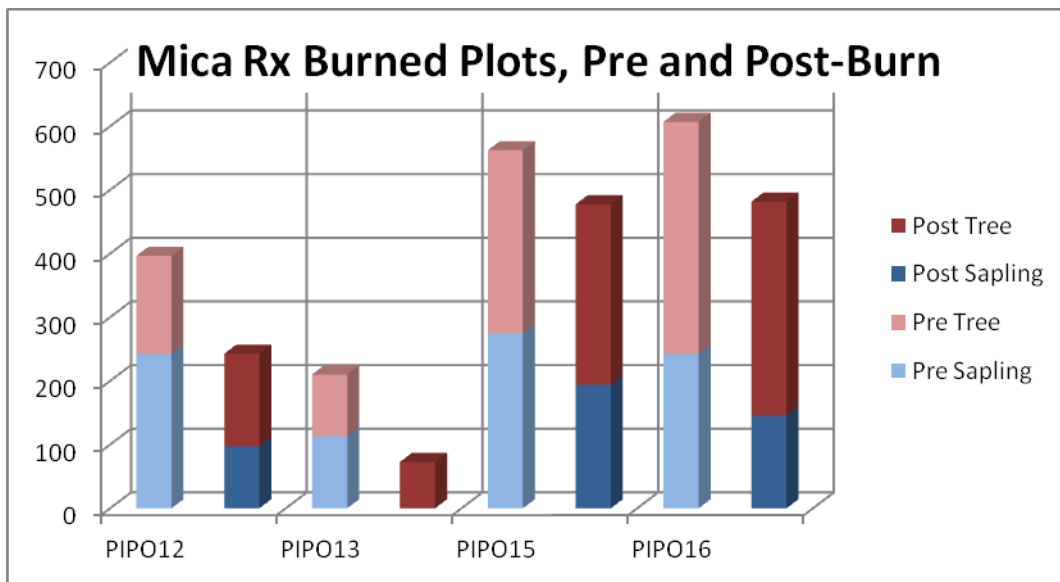
* Pilot sampling plots

Table 2. Fire Ecology Staffing 2011

Ecologist and Monitors	Starting Date	Ending Date	# of Pay Periods	READ Qualified (Yes or No)	Training and Development
Perry Grissom, Fire Ecologist	1/1/11	12/31/11	26	Yes	Fireline refresher, Resource Advisor, supervisory training, communications workshop, WFDSS refresher.
James Leckie, Lead Fire Effects Monitor	1/31/11	10/25/11	19*	Yes	Fireline refresher, Resource Advisor, S-234 (Ignition Operations), communications workshop; completed ICT5 taskbook.
*Received 13 pay periods of fire effects funding. Worked additional pay periods with Deepwater Horizon and BioBlitz funds.					

Table 3. 2011 Management Objectives and Monitoring Results

Monitoring Unit	Management Objective (Restoration)	Monitoring Results	Objective Achieved?	Year Last Analysis Completed
CORO Semi Desert Grassland (disturbed)	Reduce Lehmann lovegrass (non-native) cover.	Plots burned in a wildfire before being read; however, visual observations* after green-up following the fire indicate that Lehmann lovegrass has met or exceeded pretreatment levels.	*No	2010
SAGU Mica Rx (2010)	Year 1: Reduce pine pole-sized trees 15%-70% (see following charts)	Reduced density 57%±31% (n=4 plots) (range 29-100% decrease). In 4 nearby unburned plots, density increased 2% (range 0-8%).	Yes (p=0.03, burned v. unburned)	2011
Ponderosa Pine (Fuel Model 9)	Reduce >18" dbh trees by no more than 10%	Reduced density 0% (n=4 plots). (10 of 10 trees survived.) In nearby unburned plots, 10 of 11 trees survived.	Yes	2011
Monitoring Unit	Telegraph Wildfire, 2009 No numeric objectives.			
SAGU Ponderosa Pine (Fuel Model 9)	One plot. Trees > 18 inches dbh: 8 of 8 trees survived.	Year	Trees/acre	Poles/acre
		2009	85.0	323.7
		2010	80.9	129.5
		2011	80.9	145.7
SAGU Arizona Oak (Fuel Model 9)	One plot. Trees > 18 inches dbh: 1 of 1 tree survived.	2009	153.8	48.6
		2010	157.8	16.2
		2011	157.8	16.2



C. Fire ecologist accomplishments and areas of focus

Table 4. Fire Ecologist 2011 Accomplishments/Focus Areas

Category	Percent Time	Accomplishments and/or areas of activities
Planning	16	Review for CORO Rx (cancelled eventually); Santa Catalina/Rincon FireScope; initiate Rincon Peak Rx (SAGU); NFPORS; MOCA/TUZI mechanical; EA's for MOCA/TUZI, TUMA, ORPI, FOBO, and CAGR; FMP updates; Pima County CWPP.
Presentations/ Outreach	6	2 presentations for the public; co-author for presentation at Geo. Wright Soc.; co-author for article in Arizona-Sonora Desert Museum newsletter; co-author park buffelgrass resource brief; Assoc. Fire Ecol. Conf. abstract.
NPS Meetings/ task groups	17	BioBlitz; SAGU Wilderness character workshop; superintendents' meeting. http://www.nationalgeographic.com/explorers/projects/bioblitz/bioblitz-az-2011/
Interagency work	6	FS acting District FMO duties Mar-May; coordinating restrictions and closures.
Wildfire assignments	5	AREP, ICT4, FEMO; coordination and/or duty officer duties on several fires; Congressional delegation visit for Monument Fire.
Prescribed fire projects	1	Burning piles in snow on Santa Catalina Ranger District.
Non-fire fuels projects	4	SCA contract coordination, writing, and administration for hazard reduction projects at SAGU, CORO, CHIR, TUMA, MOCA, and TUZI; spraying buffelgrass SAGU.
Research	3	Submitted two NPS Reserve Fund Research Requests; continued oversight on two funded projects; reviewed and consulted on restoration research project; reviewed draft MS thesis.
Data collection	1	BioBlitz.
Data entry	0	
Data analysis	2	Annual fire ecology reports.
Supervision/Admin	22	Acting NPS FMO Mar-Dec: hiring, supervision, payroll, travel authorization/vouchers, purchasing; shutdowns' preparations; Fire Module review; severity request writing/oversight; restrictions/closures; preparedness; budget; IMR visit; FS/NPS responsibility reviews.
Training	4	See table 2; plus mandatory online trainings.
Travel out-of-park for plot or project work	0	
Miscellaneous	13	Pre-fire BAER plan, SAGU; BAER plans CHIR and CORO; organize and conduct sand table; Mexican spotted owl (preparation for monitoring, and review draft recovery plan); review border safety documents/protocols; line officer briefing; Resource Advisor notebook construction/review; served as instructor for S130/190, Carhart Wilderness class, and Resource Advisor class.

D. Fire effects crew accomplishments and areas of focus

Table 5. Fire Effects Crew 2011 Accomplishments/Focus Areas

Category	Percent Time	Notes
FMH plots	7	SAGU; prep for CORO.
WUI plots	0	
CBI plots	0	
Other plot work	0	
Wildfire assignments	16	Monument, Bigelow and Butterfly fires, YELL assignment, SAGU step-up/severity. READ, ICT5(t), FFT1(t), FFT2.
Prescribed fire projects	0	
Non-fire fuels projects	0	
Travel out-of-park for plot or project work	0	
Data entry	12	New data and caught up old data.
Data analysis	3	
Supervision/Admin	5	Train READ and backcountry ranger; charge card; purchasing.
Training	3	See table 2; plus mandatory online trainings.
Miscellaneous	54	Deepwater Horizon Response; BioBlitz; MSO Surveys for USFS; NFPORS; live fuel moisture sample collection; GAR write-ups and analysis; open/close Manning Camp; GIS; reports.

E. Additional Program 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?
Saguaro NP	Yes	No	2	1*
Tumacacori NHP	Yes	No	0	0
Organ Pipe Cactus NM	Yes	No	0	0
Casa Grande NM	Yes	No	0	0
Coronado National Memorial	Yes	No	1	1
Chiricahua NM	Yes	No	1	1
Fort Bowie NHS	Yes	No	0	0
Tuzigoot National Monument	Yes	No	0	0
Montezuma Castle/Well National Monument	Yes	No	0	0
Tonto National Monument	Yes	No	0	0
	In other land management plans.			*Programmatic, pre-fire BAER plan.

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
Saguaro National Park	100%	90%	1	0*	1	0
Coronado National Memorial	-	-	0	0	0	1
Chiricahua National Monument	-	-	0	0	0	1
* Non-fire (i.e., chemical) treatments are monitored by Science and Natural Resources Division using their protocols.						

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?
Saguaro National Park	1*	2	0	No
Coronado National Memorial	1*	1	0	No
*Annual report.				

Presentations and Publications:

Backer, D, and PJ Grissom. 2011. Perennial invasive grass fires threaten to convert the Sonoran Desert Ecosystem. George Wright Society Conference on Parks, Protected Areas, and Cultural Sites, New Orleans, LA.

McDonald, CJ, PJ Grissom, and J Betancourt. 2011. The Sonoran Desert transformed by one wild weed. Arizona-Sonora Desert Museum News: 12(3):2-4.



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
Saguaro National Park	Yes	2	1	4	Supported 1 new Fuels Research project, 2 ongoing Fuels Research projects, and 1 resource-funded project.

F. 2012 Direction

An immense workload lies ahead for the next two years for the two fire effects staffers. Some prioritization may have to be done. Saguaro NP's fire effects program is now back to working with Chiricahua NM, which just burned in entirety in the Horseshoe 2 Fire, including 41 FMH plots. For CY12, funding was available through the park to partially fund an SCA crew, which will be available to help some of the time. In addition, CORO has 15 grassland plots that just burned in the Monument Fire, and SAGU has 20 ten-year post prescribed fire plots. Luckily that encompasses the 4 plots that were burned in 2010. Every-third-year Mexican spotted owl monitoring is also slated for 2012, requiring 4 week-long trips into the back-country.

Funding cuts also pose a dilemma. If we do not have sufficient funding to hire a packer or contract the packing, it will be logistically impossible to do the SAGU sampling.

G. Optional Information

Fuels Reserve Fund Research Updates:

1. Excerpt abstract from Final Report:

Assessment and Guidelines for Determining Effectiveness and Longevity of Buffelgrass Treatments in Southern Arizona, by Dr. Molly Hunter, Northern Arizona University

Buffelgrass (*Pennisetum ciliare*, syn. *Cenchrus ciliaris*) is an invasive grass species that poses a critical threat to native plant and animal communities in southern Arizona. This species threatens the Sonoran Desert primarily through its potential to serve as a fuel source for wildfires and due to its ability to out-compete native plant species....Many chemical and manual treatments on public and private lands by employees of the various agencies, roadside management crews, landscape contractors, and volunteers have met varying degrees of success. The purpose of this study is to evaluate effectiveness of treatment techniques for buffelgrass as well as environmental factors that determine success or failure of buffelgrass control efforts. The focus of the project is past treatments in Saguaro National Park and to a lesser degree Organ Pipe Cactus National Monument. Buffelgrass control treatments were less effective on south-facing aspects and on steep slopes. Treatments were more effective in

seasons with higher rainfall. Buffelgrass was effectively controlled when multiple treatments occurred in consecutive seasons and when both manual and chemical treatments were used.

2. Pending Final Report, Excerpt from Objectives:

Phase 1: Herbicide effects on mortality of invasive buffelgrass (*Pennisetum ciliare*)

And Phase 2: Herbicide impacts on native plants and pre-emergent herbicide effects on buffelgrass and native plant seed emergence, Mitch McClaran, University of Arizona.

The project is divided into two phases. The goal of phase one is to test a series of herbicides for use in controlling buffelgrass, in order to find a product that is more selective than glyphosate, but still effective, as well as to improve the effectiveness of glyphosate, the chemical currently in most common use for buffelgrass control in Southeast Arizona. Phase two of the research addresses the impacts of the chemicals used in phase one on non-target plants, and consists of a pre-emergent greenhouse experiment and a post-emergent *in situ* experiment.

3. Objectives of Project Funded in 2011:

Predicting buffelgrass greenup to improve fuels treatment efficacy, Steven Smith, University of Arizona.

We propose to develop a plant growth (“greenness”) index, based on temperature, precipitation, and plant water content that predicts the timing of the initiation of vegetative growth and senescence in buffelgrass. This index will be developed by measuring relative water content (RWC) and plant greenness and relating them to precipitation and temperature and possibly relative humidity or dew point measured for mature buffelgrass plants selected at field sites that are similar to ecosystems existing in Saguaro National Park....Specifically, we will answer the following research questions: 1) What is the relationship between buffelgrass greenness and antecedent temperature, soil moisture (precipitation), and RWC? 2) Can interpolated weather data be used to predict the timing and length of periods of active vegetative growth in buffelgrass and periods for effective herbicide application?



Monument Fire, Coronado NM, 6/13/11, Photo by Kevin Parrish



Monument Fire, Coronado NM, 8/5/11, Photo by James Leckie