



**National Park Service
Fire Ecology Annual Report
Calendar Year 2009**

Saguaro National Park
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A. Summary

Fire activity at Saguaro NP was slow, with one lightning-caused fire managed for resource benefit burning 62 acres. It burned into the Chimenea WFU fire of 2008. A 54-acre, human-caused fire burned 23 acres on Tumacacori NHP. The fire torched out patches of salt cedar on private land, but salt cedar removal on the park probably helped reduce fire behavior and fire size. Lightning started a 0.1-acre fire at Coronado NM, which was promptly extinguished by Forest Service firefighters.

Two hazard reduction prescribed burns were conducted at Coronado NM. The first (11 acres) was conducted just south and east of the visitor center. The second was 37 acres and conducted near two homes on inholdings. That burn was in Lehmann lovegrass and was treated post-burn with herbicide in an effort to reduce that non-native species and restore native grasses. Pile burning was conducted Tuzigoot NM and Tumacacori NHP (both mainly salt cedar piles).

Mexican spotted owl monitoring was conducted by park staff and USFS Santa Catalina Ranger District biologist Josh Taiz. Four trips were made, and owls were found in each of the four PAC's checked. A nestling was observed in one PAC (Figure 3). Participating from Resources were Natasha Kline and Mike Ward, and from Fire were Perry Grissom, James Leckie, and Kevin Parrish.

Plot Work

Two five-year reads from the Devil's Bathtub burn were done in combination with an MSO monitoring trip in mid-July. The late July-early August trip consisted of reading plots and monitoring the Telegraph Fire as it died from precipitation. The Telegraph Fire (Figure 4) burned one pre-existing plot, and its immediate post-burn read was completed. For that plot,

burn severity of the organic substrate was mostly lightly burned or scorched and burn severity of herbaceous vegetation was mostly scorched or unburned. In addition, three pre-existing plots burned in last year's Chimenea WFU and four 5-year reads were done. Assisting with plot work were SCA David O'Donnell, Backcountry Ranger Shannon McCloskey, and the Saguaro Fire Use Module. Assisting with plot work at CORO was Kevin Parrish, biologist Danielle Foster, and intern Ed Stowe. Assisting at WACA were SCA Mike Montalvo and NAU student Samantha Dorr.

Table 1. Fire Effects Plot Workload 2009

Park	Monitoring Unit	Type of Plot (FMH, photo point, other)	Pre-burn	Immed. Post	Postburn (1-20 yrs)	Total Plots
Saguaro National Park	Ponderosa Pine Forest	28 FMH Forest Plots 1 Rapid Assessment Plot	1		4*	29
	Madrean Evergreen Woodland- Encinal Woodland (Arizona oak)	FMH Forest Plots		1	3*	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			2*	3
	Pine Oak Forest (Chihuahuan pine)	7 FMH Forest Plots 3 Rapid Assessment Plots				10
Sunset Crater N.M.	Montane Meadow	FMH Grassland Plots				10
	Pine Encroachment Area of Montane Meadow	FMH Brush Plots				5
Wupatki N.M.	Plains/Great Basin Grassland-short grass community	FMH Grassland Plots				16
Walnut Canyon N.M.	Ponderosa pine Forest	FMH Forest Plots			4	11
	Pinyon-Juniper Forest	FMH Forest Plots				2
Coronado National Memorial	Semi Desert Grassland (disturbed)	15 FMH Grassland Plots	15	15		15
Total	10 monitoring types	82 Forest, 5 Brush, 41 Grassland Plots, 7 Rapid Assessment Plots	16	16	13	135
* Did trees and poles, not full read						

Table 2. Fire Ecology Staffing 2009

	Starting Date	Ending Date	# of Pay Periods	Training and Development
Perry Grissom Fire Ecologist	1/1/09	12/31/09	26	Fireline refresher, First Aid/CPR, WFDSS, S-495 (Geospatial Fire Analysis, Interpretation, and Application), Mexican Spotted Owl Monitoring, B3 Aviation On-line Refresher, AZ Department of Agriculture Pesticide Applicator
James Leckie Lead Monitor	3/31/08	10/17/08	15	Fireline refresher, S-212, Mexican Spotted Owl Monitoring

Table 3. Management Objectives and Monitoring Results 2009

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (XX% confidence interval)	Objective Achieved?
CORO Semi Desert Grassland (disturbed)	Immediate Post-burn: Remove up to 100% of the Lehmann lovegrass cover	Total Lehmann lovegrass cover reduction = 99.9-100% (n=15 plots, 1 fire)	Yes
	Long-term: Reduce Lehmann lovegrass cover and increase native herbaceous cover Keep agave mortality less than 20%	(Burned area herbicided post-monsoon)	TBD
No broadcast prescribed burns were conducted on Saguaro NP in 2009. Pile burning was accomplished at TUMA and TUZI, which accomplished objectives. The contract to clean up FMH data with the University of Arizona Center for Applied Spatial Analysis through the Desert Southwest Cooperative Ecosystem Studies Unit continued. One pass was made through the data in 2008. Further work depended on the conversion to FFI. A converted database was received in August, but it contained some systemic errors. A corrected conversion was received on December 16 th . Continued cleanup and entry of the data backlog has begun.			

B. Fire ecologist accomplishments and areas of focus**Table 4. Fire Ecologist Accomplishments/Focus Areas**

Category	Percent Time	Accomplishments/Focus Areas
Planning	9%	Catalina-Rincon FireScape (SAGU); Huachuca Area Fire Partners FireScape Planning (includes CORO), draft FONSI; consultation with FWS; amend SAGU FMP, WFDSS loading.
Presentations	5%	Fuels/climate section at 2 interagency fireline refreshers; T&E, Invasives, & Wilderness section for S-580 (Advanced Wildland Fire Applications); results of fuels/fire behavior study to Menudo Society and Southern

		Arizona Buffelgrass Coordination Center board; administrative fire history of SAGU for Coronado NF (CNF) Leadership Team.
NPS meetings/ task groups	2%	WFSA/WFIP preseason prep/sand table exercise; Park, Fire Staff, and Resource Staff Division meetings.
Interagency work	4%	Fuels, non-native invasive plants; Coronado NF, USGS, USFWS/ES, Rural Metro FD, Tucson FD.
Fire Assignments & Fuels Projects	14%	<u>Fuels</u> : RXB2: salt cedar pile burning TUMA, broadcast burn CORO; FEMO: CORO broadcast, Nugget broadcast CNF; site visits CORO, TUMA; spray & pull buffelgrass SAGU; review 4 NPS burn plans & 1 CNF plan; live fuel moisture monitoring. <u>Wildfire</u> : READ Apache Fire TUMA; ICT4 Telegraph Fire SAGU; FEMO Nugget CNF.
Research	9%	Finished work on fire-buffelgrass research project; contributed to 2 JFSP research proposals; co-authored and received funding for two fuels research projects, began implementation, coordinating with investigators and park staff; coordinated pine bud sampling on SAGU for genetics research; reviewed draft journal article about Mexican Spotted owls; attended 1 PhD defense about fire-buffelgrass project.
Data collection	15%	FMH plots, SAGU and CORO; Mexican Spotted Owl monitoring; buffelgrass fuel load degradation following herbicide application; consulted with I&M about monitoring at SAGU and TUMA.
Data entry	1%	Data entry and cleanup (coordinating with contractor and UA).
Data conversion	1%	FMH-FEAT-FFI conversion (coordinating with contractor and UA).
Data analysis	4%	LANDFIRE data calibration/adjustment; CORO FMH plots; plant ID; GIS for fire and Trails Plan BA.
Supervision/Admin	11%	Hiring, supervision, travel, payroll, develop performance plan, etc.; served as acting FMO during Kristy's family leave.
Training	12%	See table 2
Outreach	8%	Drafted or contributed to press releases about wildfire activity and buffelgrass control; sent photos to local TV stations showing Telegraph Fire activity; web content review/creation; SAGU Outreach Committee member; staffed booth at National Parks Expo about buffelgrass; interdisciplinary buffelgrass outreach group; distributed CD's with data, photos, and video from buffelgrass-fire study to collaborators, fire departments, and other interested parties; drafted fuels success stories; interviewed for USFS video about impact of invasive plants on recreation.
Miscellaneous	5%	Contributed to grant application proposals; reviewed plans and reports; contributed to report to FWS-ES for FMP BA on 2009 fire activities; PEPC contributor, various projects; Combined Federal Campaign Coordinator.

C. Fire effects crew accomplishments and areas of focus

Table 5. Fire Effects Crew Accomplishments/Focus Areas

Category	Percent Time	Notes
Data collection	25%	FMH plots and rapid assessment plots, SAGU, CORO WACA; invasives mapping, buffelgrass fuel load.
Fire Assignments & Fuels Projects	30%	Nugget Rx, CORO HQ Rx, TUZI/TUMA piles, Diamond Fire, Telegraph Fire, Elkhorn Fire, Mica Rx, fuel moisture sample collection.
Data entry	10%	Mainly data cleanup and photo sorting.

Category	Percent Time	Notes
Data conversion	5%	Prep for converting FMH data to FFI.
Data analysis	5%	Provided Flagstaff area parks with data summary. They are interested in climate-influenced die-off of pine in the area, and the FMH plots are the longest-term vegetation plots in the area.
Supervision/Admin	5%	Travel, etc., train FEMOs, SCAs etc.
Training	<2%	See Table 2.
Miscellaneous	15%	GIS, logistics for fire operations, career day at local elementary school.

D. Complete Annual Report Supplement (“2009 Annual Report Supplement.xls”)

E. Annual Report Supplement Additional Information

Be sure to **complete numbers 1 and 2 below**. Number 3 is optional.

1. Fire effects monitoring databases or spreadsheets being used:
Almost entirely FFI; Excel used to summarize 2009 post-burn information. Waiting on conversion before resuming serious data entry.
2. Annual Meetings:
Observations and photos about the Telegraph Wildfire, being managed for resource benefits, on SAGU were provided to park staff during the fire and immediately after the monitoring trip. Informal discussions have occurred periodically during the year about fire effects, fire use, and other topics. General fire ecology discussions were had with park staffs during site visits to TUMA and CORO. For CORO, discussions continued with the park staff and interagency and NGO partners about fire effects monitoring protocols and design criteria for treatments. These were incorporated into the EA and draft FONSI.
3. If further explanation for the Annual Report Supplement information is needed, please provide it here as well as any other information relating to the spreadsheet that you would like to include.

F. Optional

When James reported to the Elkhorn Fire as a FEMO, he was met with a new assignment--mapping burn severity by fuel type by day. This was required by the Arizona Department of Environmental Quality for calculation of emissions from this wildfire being managed for resource benefits. State regulatory agencies are trying to adapt to implications resulting from changes in terminology regarding wildfire management, and incident personnel must also adapt.

The biggest issue for SAGU continues to be non-native plants, especially buffelgrass (*Pennisetum ciliare*, known in Australia as *Cenchrus ciliaris*), and the increasingly severe fire

threat to the Sonoran desert and the park's resources that they are creating. For more information, see www.buffelgrass.org. It is estimated that the park contains about 2,000 acres of buffelgrass, and it is increasing at an average of about 35% per year.

Two research projects involving buffelgrass were funded with fuels research funds during 2009. One project will examine the effects of glyphosate, which is the most commonly used herbicide against buffelgrass, on native plants and buffelgrass, as well as the effects of herbicides that are more grass-specific and a pre-emergent. Land managers are considering the use of aerial herbicide application, and research is needed to determine the potential impacts. A second project will involve examination of past and on-going treatments to identify factors important in determining treatment success and longevity.

A third research project is wrapping up--characterizing Sonoran Desert buffelgrass with appropriate fuel models. In Saguaro NP, buffelgrass fuel loads of 1.16-3.85 tons/acre were documented. An experimental burn conducted on relatively moderate conditions on Tucson Water property near the Tucson Mountain District generated rates of spread of 115-240 chains/hour; average flame lengths of 8.5-11 feet; peak flame lengths of 14-18 feet; peak flame temperatures of 1,650°F; and an average soil surface temperature of 1,050°F. Fuel loads in the burned area ranged from 2.99 to 5.4 tons/acre. For the Sonoran Desert, these are unprecedented fuel loads and fire behavior.

Based on observed fuel loads and fire behavior, most buffelgrass in the park should be classified as GR6. Lighter stands should be classified as GR3. Further observations are needed to clarify the factors influencing this difference. FARSITE simulations of continuous buffelgrass stands indicate the potential for difficult to control, dangerous, and devastating wildfires (see figures 1 and 2).

Publications:

Drury, S.A. and P.J. Grissom. 2008. Fire history and fire management implications in the Yukon Flats National Wildlife Refuge, interior Alaska. *Forest Ecology and Management* 256:304-312.

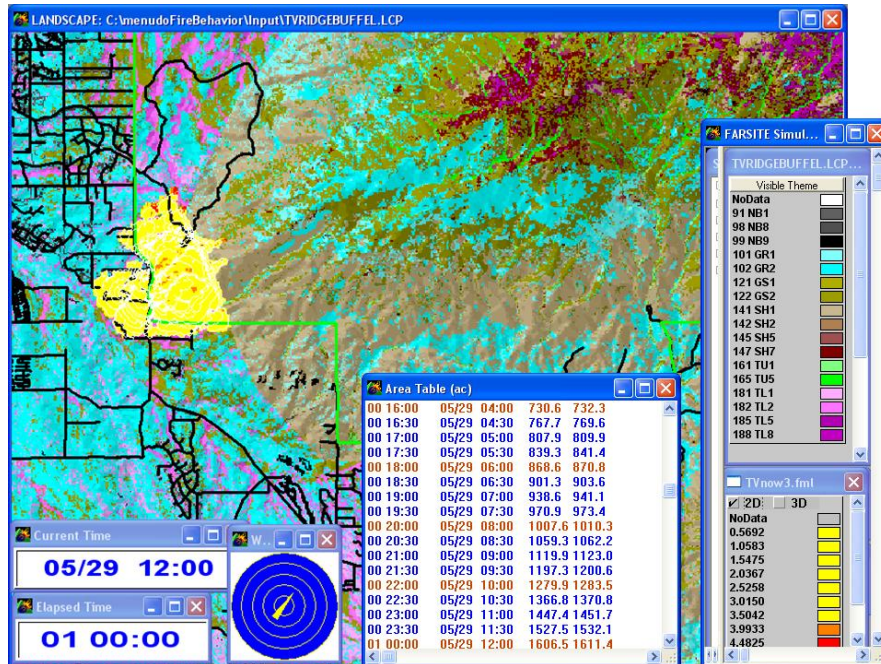


Figure 1. FARSITE simulation of a fire starting along the southwestern boundary (green line) of Saguaro National Park using existing LANDFIRE Rapid Refresh fuel model data. Duration of the simulation is 24 hours, beginning at noon on May 28, 2008. Conditions are those of the day of the experimental burn except that relative humidity was adjusted downward to agree with observations at the Tucson airport. They are for a relatively average May day (winds 3-8 mph, generally SW; temps 59-96F; RH's 4-17%). The fire interior is color-coded for flame length (<4 ft = yellow,...).

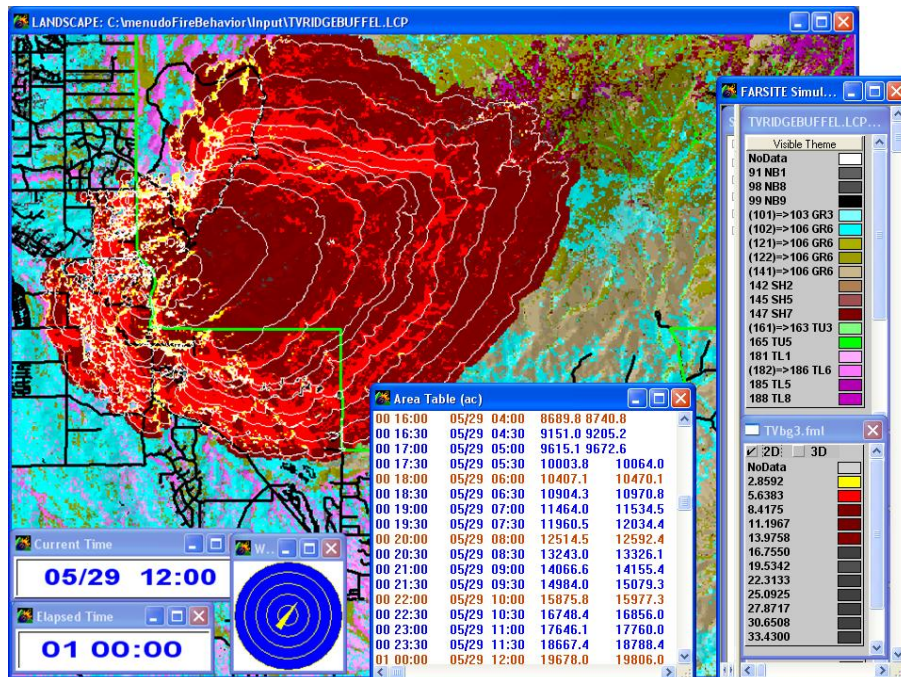


Figure 2. FARSITE simulation of a fire starting along the southwestern boundary of Saguaro National Park. Conditions are identical to those used in the simulation shown in Figure 1, except that desert fuel models have been converted to buffelgrass.



Figure 3. Mexican spotted owl nestling and female in the Italian Springs PAC.



Figure 4. Telegraph Fire at its most active (7/21/09). The red needles visible on the left are from the previous year's fire, Chimenea WFU.