

**Wind Cave National Park  
Campground Prescribed Fire Report  
October 29, 2008**

Prepared by andy thorstenson

**Burn Unit Summary**

The Campground Prescribed Fire is a 93 acre area surrounding the Elk Mountain Campground that was ignited in one operational period on October 29, 2008. The fuels in the area are a combination of mixed grass prairie and ponderosa pine.

Included in this project was a Joint Fire Science research project studying the effects of fire on archeological resources.



Fire moving away from containment line

**Objectives**

- Achieve >70-90% mortality (within two years post-burn) in ponderosa pine seedlings
- Achieve >40-60% mortality (within two years post-burn) in ponderosa pine poles 1"-6" dbh
- Achieve >10-30% mortality (within two years post-burn) in ponderosa pine overstory . 8" dbh

**Personnel**

Burn Boss: Eric Allen, Jason Devcich (trainee)  
 Firing Boss: Rod Skalsky  
 Holding Specialist: Jim McMahill, Sonya Feaster (trainee):  
 Fire Monitors: Dan Swanson, andy thorstenson  
 Information Officer: Mike Johnson  
 Archeologist: Jay Sturdevant  
 3 Type 6 Engines  
 2 ATV's  
 1 Water Tender

**Weather conditions**

The National Weather Service in Rapid City predicted warm and sunny conditions with light winds from the southwest. We found the spot forecast accurately reflected actual conditions. High temperature was 72° with a minimum relative humidity of 20% and light winds primarily from the southwest.

**Table 1. Weather Observations**

Time	Temp.	RH	Wind Speed	Wind Direction	Comments
0712	56	31	4-5	SW	Used for spot weather forecast
0955	65	25	3-7	W	
1100	71	22	5-9	WSW	Test burn at 1120 FDFM=5%
1215	72	20	7-10	SSW	FDFM=4%
1330	72	21	2-3	SSE	Sheltered under trees, upvalley wind
1400	72	20	2-4	Variable	upvalley
1520	71	23	3-6	ESE	Upvalley wind
1620	70	21	0-2	W	
1715	63	30	2	W	

Wind speed in miles per hour, Temperature in degrees Fahrenheit

**Fire Behavior**

The Campground area has 2 primary fuel types which exhibited different fire behavior. Unit 5 is composed primarily of mixed grass prairie while Units 1 through 4 are primarily ponderosa pine on wetter north and east aspects. Behavior in the grass exhibited faster rates of spread and higher flame lengths. The ponderosa areas had higher fuel moisture and slower rates of spread but higher radiant heating. Many of the fire behavior observations were taken associated with 6 Archeology research project plots.

**Table 2. Fire Behavior Observations**

Time	Location	Fire Type	ROS	FL	Comments
1200	Unit 5	B	2 c/h	6"-12"	Test Fire at 1126
1242	Arch plot B	F	3 c/h	6"-18"	Green needlegrass, 2' FZD
1248	Arch plot A	B	1 ½ c/h	8"-16"	Big bluestem
1248	Arch plot A	B	2 c/h	4"-8"	Green needlegrass/ Bluegrass
1252	Arch plot C	H	60 c/h	3'-4'	25' FZD, 5% FDFM
1310	Loop D	H	60-80 c/h	6'-8'	Upslope head fire run, grass/pipo mix
1453	Arch plot D	B	1 c/h	12"	Shaded ponderosa stand
1510	Arch plot E	B	½ c/h	8"-12"	Litter, and small woody fuel
1521	Arch plot E	B	1/3 c/h	6"-10"	
1530	Arch plot F	F	2 c/h	8"-18"	Needlecast

B=backing fire; F=flanking fire; H=head fire

ROS = rate of spread measured in chains per hour (1 chain = 66 feet or ≈ 20 meters)

**Fire Progression**

Ignition began at 1126 hours in the southeast corner of Unit 5. Ignition progressed in 2 teams moving to the north and the west securing the perimeter. Interior portions of the unit were ignited by another team lighting near highline poles and by a team monitoring the archeology study plots in the center of the unit. Ignition teams completed unit 5 at 1325 hours near the southwest corner.

The ignition reset to the 5 acre Unit 1 and was completed in 20 minutes. Ignition reset to the south-central perimeter of unit 2 with teams working west and east along the southern boundary. Three archeology plots in Unit 2 burned between 1453 and 1530 hours.

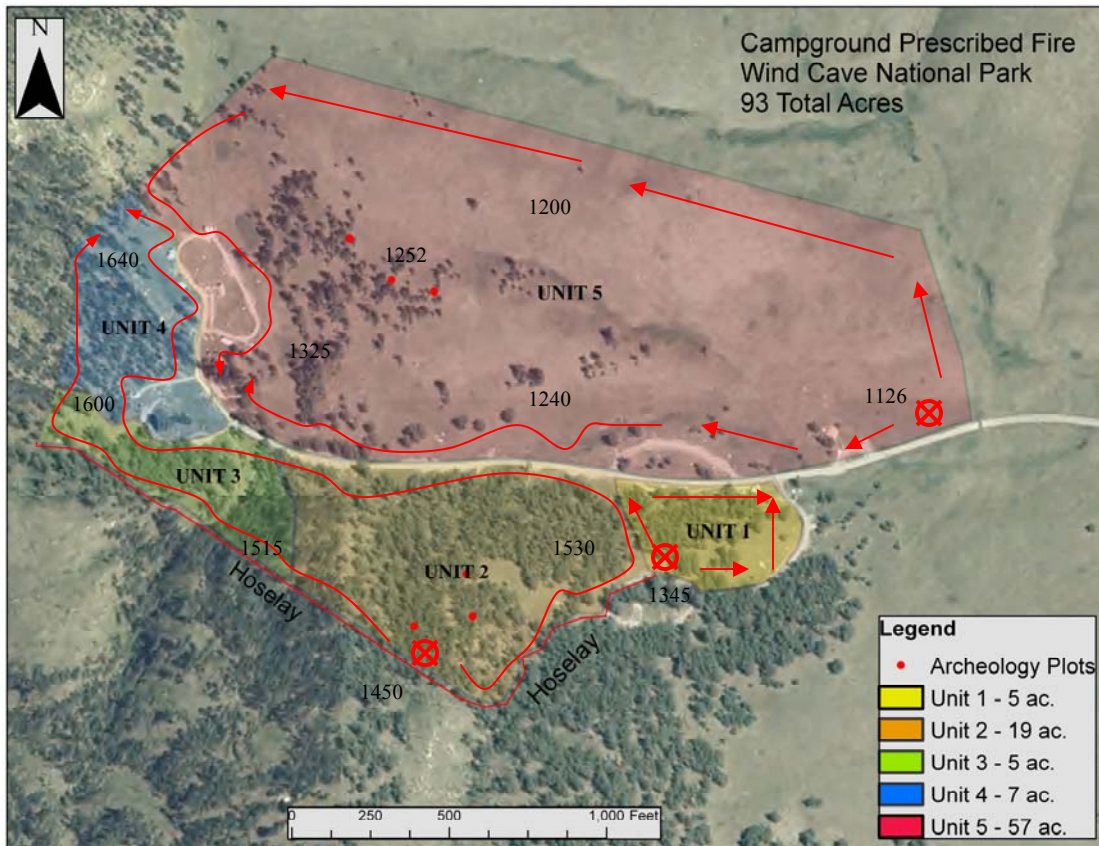
Ignition continued along the perimeter of Unit 3 and 4 with ignition completed at the north corner of Unit 4 at approximately 1640 hours. (See Fire Progression map)

**Smoke Monitoring**

Predominantly west and southwest winds moved the smoke column east and northeast during the day. Smoke dispersal was forecast to be poor in the morning and fair by 1200 decreasing to poor again after 1600 hours. This forecast proved to be quite accurate with generally favorable dispersal and column heights of 300 to 500 feet above ground level. After 1600 hours, smoke column height decreased but this coincided with the end of ignition and smoke production decreased significantly.

During the day, there were no reports of smoke impacts to U.S. Highway 385 or to park visitors. Minor smoke impacts occurred in the early evening when residual smoke drifted down Wind Cave Canyon toward the Visitor Center and park housing area.

## Fire Progression Map

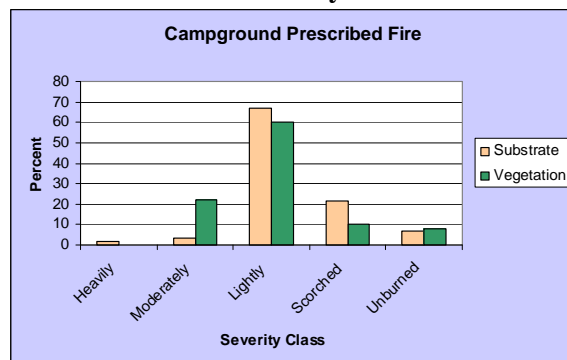


## Fire Effects Monitoring

Six locations were sampled within the boundaries of the Campground prescribed fire for fuel load and fire severity. Immediate postfire fuel load change and burn severity was assessed one week after the fire.

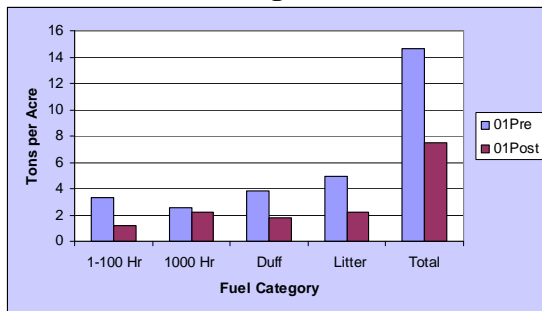
Most of the points sampled showed a “Lightly Burned” severity in both the standing vegetation and the substrate (litter, duff, and woody fuels). The vegetation showed slightly higher severity with 22% of points showing “Moderately” burned. Substrate had slightly lower severity with 22% of points recorded as “Scorched”.

**Table 3. Burn Severity**



Dead and down fuel load was sampled using Brown's planar transects at 6 locations in the Campground before and after the fire. Total fuel reduction of 49.2% occurred with loading reduced from 14.7 to 7.4 Tons per Acre. The large woody fuel in the 1000-Hour fuel category exhibited the least reduction, showing a 13% decline. Litter and duff fuel loading was reduced just over 50% in the unit.

**Table 4. Fuel Loading**



### Conclusions

Goals achieved through the Campground Prescribed Fire include firefighter and public safety, fuel reduction, and restoration of fire into a ponderosa pine ecosystem. Specific objectives related to tree mortality by size class can be assessed over the coming years.

