Devils Tower National Monument
Southwest Prescribed Fire Monitoring Report

Prepared by Keith Mitchell
Northern Great Plains Fire Effects Module
November 13, 2007

Burn Unit Summary

The Southwest Prescribed Fire is located in the southwest corner of Devils Tower National Monument. The unit is bounded by meadow on the east, paved road on the north, two-track road on the northwest and is bordered by private property on the south and west sides. The majority of ignition occurred October 4th with additional ignition October 5th in a small area of the lower meadow. Mop-up and monitoring began on October 4th continued through October 6th. Participants included; Black Hills Fire Use Module, Northern Great Plains Fire Effects Module, State of Wyoming Smoke Busters, and personnel from Devils Tower, Badlands National Park, Wind Cave National Park, and Scotts Bluff National Monument.

4, 5, and 6 October 2007
Size: 115 acres
Aspect: predominantly northeast
Elevation: 3900-4300 feet
Vegetation Types: ponderosa pine forest, pine woodland with mixed-grass understory; bur oak savanna in the drainages and non-native grassland meadows.
Personnel:

Burn Boss: Dan Morford
Ignition Specialists: andy thorstenson, Sonya Feaster
Holding Specialist: Eric Allen
Fire Monitors: Keith Mitchell
Engine Bosses: E-623:Netiffee; E-622:Manasek; E-625:Henry; E-627:Carlbom; E-628:Koller; E-629:Lewis
6 Type-6 Engines
4 Squads: Smoke Busters
3 ATV's; Reiner, Suhr, Devcich

Objectives

- Limit overstory tree (>6" dbh) mortality to less than 20% at 2 years postburn
- Reduce dead and down (10, 100,1000 hr.) fuels 30-50% immediate postburn
- Reduce non native species by at least 50% at 1 year post burn.
- Burn 80-95% of the burnable project area.

Weather

Stable weather conditions dominated during ignition of the Southwest RX. Temperatures remained in the lower sixties throughout the day on October 4 with relative humidity values in the twenties and low thirties with a low of twenty-two percent. Winds were light out of the east at one to two miles per hour, with gusts to four.

10/4/07	Temperature		Dew		Wind		
Time	Dry	Wet	Point	RH	Speed	Direction	Comments
1030	58	44	29	33	3-4 G-8	E	Taken from top staging
1100	60	45	29	31	1-2 G-N/A	E	Test fire
1200	61	45	28	28	1-2 G-4	E	Above cliff
1300	63	46	28	27	1-2 G-4	E	Lower west flank
1400	64	46	24	27	1-2 G-4	E	FMH Plot #4
1500	61	47	34	36	1-2 G-4	E	Northwest flank
1600	61	47	34	36	1-2 G-4	E	
1700*	65	46	25	22	1-2 G-4	E	Lower Housing
1800*	64	47	30	28	1-2 G-4	E	Lower Housing

* Relative humidity values were lower than expected, when compared to previous readings. Possible explanations included; loss of cloud cover around 1600, a drier air mass moved into the area, or changing locations from the northwest flank to the southwest flank caused change in values.

Fire Behavior Observations

The fire behavior during the Southwest RX was moderate, and the majority of the fire behavior was creeping with the occasional runs when wind and upslope topography aligned. Also single and group torching were observed on the main ridgeline running north-south through the unit. Two meadows within the unit had been chemically treated for non-native plants and had limited fuel available to support fire spread.

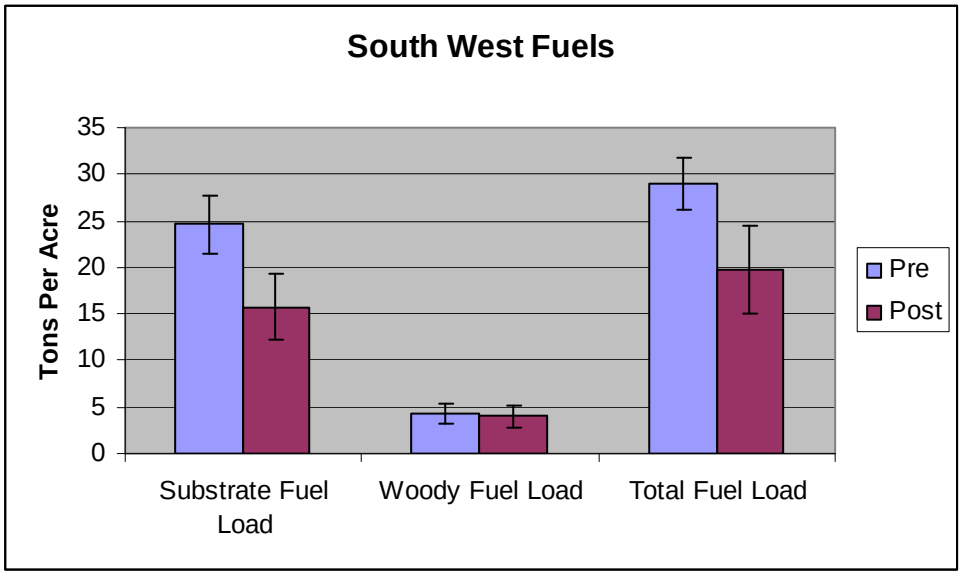
10/4/07 Time	Location	Fire Type	ROS	FL	Comments
1120	Test	B	1.5	8-12 in	South east corner of unit
1200	Upper Meadow	H/B/F	< 1	4-12 in	Limited fire spread due to lack of fuel
1230	West Cliff	H	4	4-5 in	Before drop off to northwest
1436	FMH Plot 4	B	< 1	2-3 in	Northwest
1700	Lower Meadow	H	15	4 ft	Northeast end of unit

ROS=Rate of Spread in chains per hour (c/h). 1 chain = 66 feet.

Fuel Loading

Southwest Fuel Loading				
Plot/Year	**Substrate Depth**	**Substrate Fuel Load**	**Woody Fuel Load**	**Total Fuel Load**
DNGP-01 2005	1.8 inches	20.8	5.3	26.2
DNGP-01 2007	1.0 inches	12.1	2.8	14.9
DNGP-02 2005	2.3 inches	28.4	3.2	31.7
DNGP-02 2007	1.3 inches	19.3	5.2	24.5

Fuel loading in tons/acre

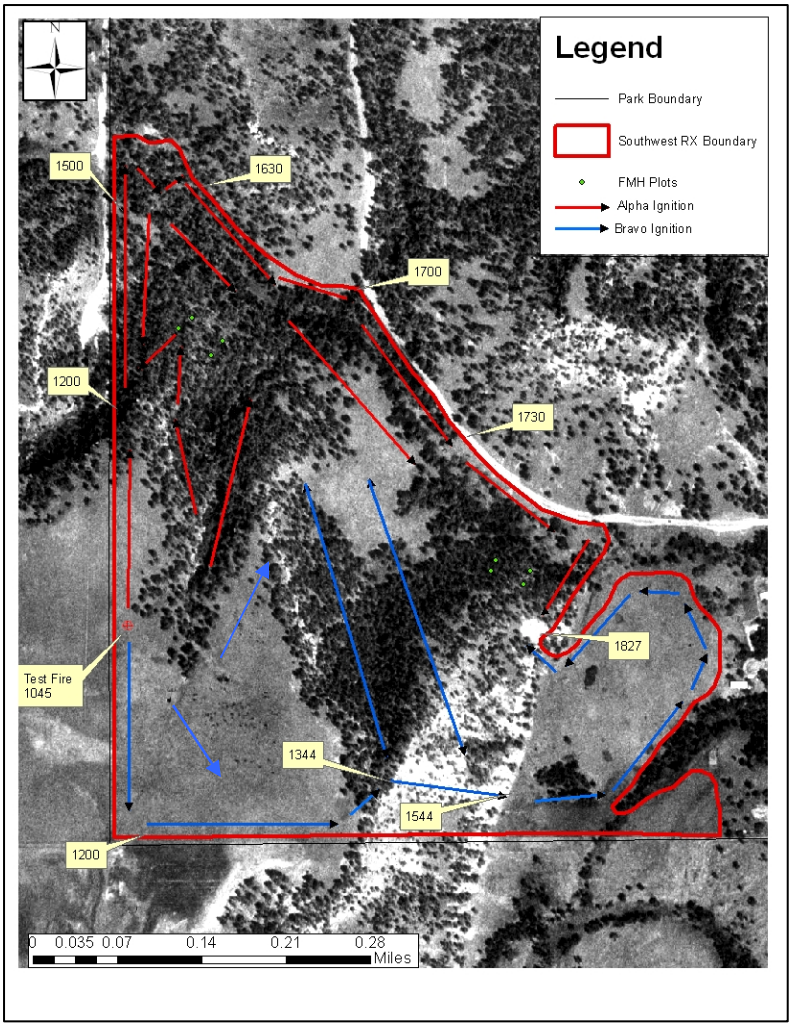


Smoke Monitoring

The spot weather forecast predicted a mixing height at 6000 Feet above ground level, mixing winds out of the southwest at 20-25 mph, and a clearing index of very good. Smoke dispersed primarily to the west and southwest through most of the burn period. Smoke production was moderate to heavy depending on ignition and fuels. Smoke rose approximately 500 to 1000 feet above ground level for much of the day. Toward the end of the day smoke shifted to the west and northwest intermittently impacting the paved road.

Fire Progression

The test fire for the Southwest RX was started at 1045, on the upper west side of the burn unit. Ignition team Alpha ignited north while Bravo ignited south. At 1200 hours Bravo reached the southwest corner, while Alpha navigated down a cliff face to continue burning to the Northwest corner. Around 1400 Bravo held perimeter ignition after reaching the eastern edge of the upper meadow, while continuing igniting strips interior, as Alpha continued to the NW corner. At 1500 Alpha held as management discussed tactics for rounding the NW corner. During this time Bravo made the transition from the upper meadow to the lower meadow after constructing holding line from the top of the cliff to the bottom. At 1630, Alpha round the NW corner and begun burning down the two track, to the main entrance road (1700). Bravo continued burning after reaching the lower meadow but struggled to get the fuels to burn in backing and head fire. Alpha continued igniting down the entrance road to the lower meadow meeting up with bravo, concluding ignition at 1827.



Conclusions

Approximately 115 acres were treated in the Southwest Prescribed Fire. As a first entry of prescribed fire into this area in decades, this fire has succeeded in reducing ground fuel and stem density of smaller diameter Ponderosa pine. Based upon post-burn observations of 2 monitoring plots, one project-specific objective was met successfully and one was not fully met. Other objectives will be assessed in the future.

- Burn 80-95% of the burnable project area (approximately 90% of the unit was burned)
- Reduce dead and down (10, 100, 1000) fuels by 30-50% immediate post-burn (Woody fuel reduction was just under 10% though total fuel reduction was 32%)