Badlands National Park
Conata I Prescribed Fire
October 11 and 12, 2007
Prepared by andy thorstenson

Burn Unit Summary

The Conata I Prescribed Fire was completed during two operational periods on October 11 and 12, 2007. It consisted of 2222 acres of mixed grass in primarily flat terrain. The vegetation type is a mix of native perennial and non-native annual grass.

Objectives

- Provide for firefighter and public safety during the implementation of this plan.
- Reduce 1-hr dead and down fuels in prairie by at least 75-85% immediate post-burn.
- Increase relative cover of native grasses by 10 to 25% 1-yr. post burn.
- Enhance active prairies dog colony size by 20%, 1- year post-burn.
- Burn 65-80% of the burnable project area.

Flanking fire in the center of the Conata I unit with smoke dispersing to the southeast

Personnel

Burn Boss: Dan Morford
Ignition Specialist: Zac Suhr, Cody Wienk (trainee)
Holding Specialist: Eric Allen
Fire Monitors: andy thorstenson, Marcus Lund (trainee)
4 Type 6 Engines
4 ATV's
1 Type II handcrew

Weather conditions

The National Weather Service in Rapid City predicted a cold front passage with strong northwest winds for the day of October 11. Winds shifted from light southeast to northwest at 10-15 miles per hour at around 1030 a.m. These strong winds influenced fire behavior and ignition pattern through late afternoon.

Weather Observations

Date	Time	Temp.	RH	Wind Speed	Wind Direction	Comments
11 Oct	0910	56	67%	2-7, G-9	SE	30 % thin cirrus
11 Oct	0950	61	56%	Light	SE/var	40 % thin cirrus
11 Oct	1105	64	49%	5-12, G-15	NNW	Frontal clouds visible to NW
11 Oct	1155	65	50%	8-13, G-16	NNW	Frontal clouds visible to NW
11 Oct	1300	67	47%	8-15, G-19	NW	Frontal clouds overhead
11 Oct	1400	70	42%	10-15, G-18	NW	

Date	Time	Temp.	RH	Wind Speed	Wind Direction	Comments
11 Oct	1510	69	41%	8-12, G-15	NW	10% cloud cover
11 Oct	1530			8-12, G-14	NNW	Slight decrease in windspeed
11 Oct	1600	67	43%	5-7, G-10	N	< 10% cloud cover, wind decrease
11 Oct	1700	67	43%	6-10, G-12	N	
11 Oct	1800	62	52%	5-8, G-10	N	Smoke column shading fire
12 Oct	0940	51	70	calm	-	
12 Oct	1030	57	62	light	S	Thin clouds
12 Oct	1130	61	47	1-3	S	

Wind speed in miles per hour, Temperature in degrees Fahrenheit

Fire Behavior

Fire behavior was driven by primarily by strong northwest wind while patchy fuel loading contributed to reduced activity near areas of prairie dog colonies. Areas of continuous cured native perennial grass and mixed annual Brome grass allowed extensive flanking and head fires to cross the prescribed fire area.

Fire Behavior Observations

Time	Location	Fire Type	ROS	FL	Comments
1230	Test fire	H	120 c/h	3'-4'	Wind driven, gusts 15-18 mph
1240	Test fire	B	1 ½ c/h	4"-12"	Mixed grass, 100% active perimeter
1300	Point 9 & 10	H	Not meas.	3'-4'	Fire whirls developing
1420	Near Plot 01	H	120 c/h	3'	10' FZD
1425	Near Plot 01	B/F	2.1 c/h	12"-20"	8"-10"
1450	Plot 01	H	~150 c/h	4'-6'	High intensity head fire, approx. ½ of plot burned in head fire
1515	Point 6	F	1 ½ c/h	6"-16"	Continuous cured Green Needlegrass
1729	Plot 02	H/F	2-3 c/h	12"-20"	Non-native grass, limited duration head/flank push
1731	Plot 02	B/F	< 1 c/h	0"-8"	Green patchy fuel limiting backing spread to < 50% active perimeter

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

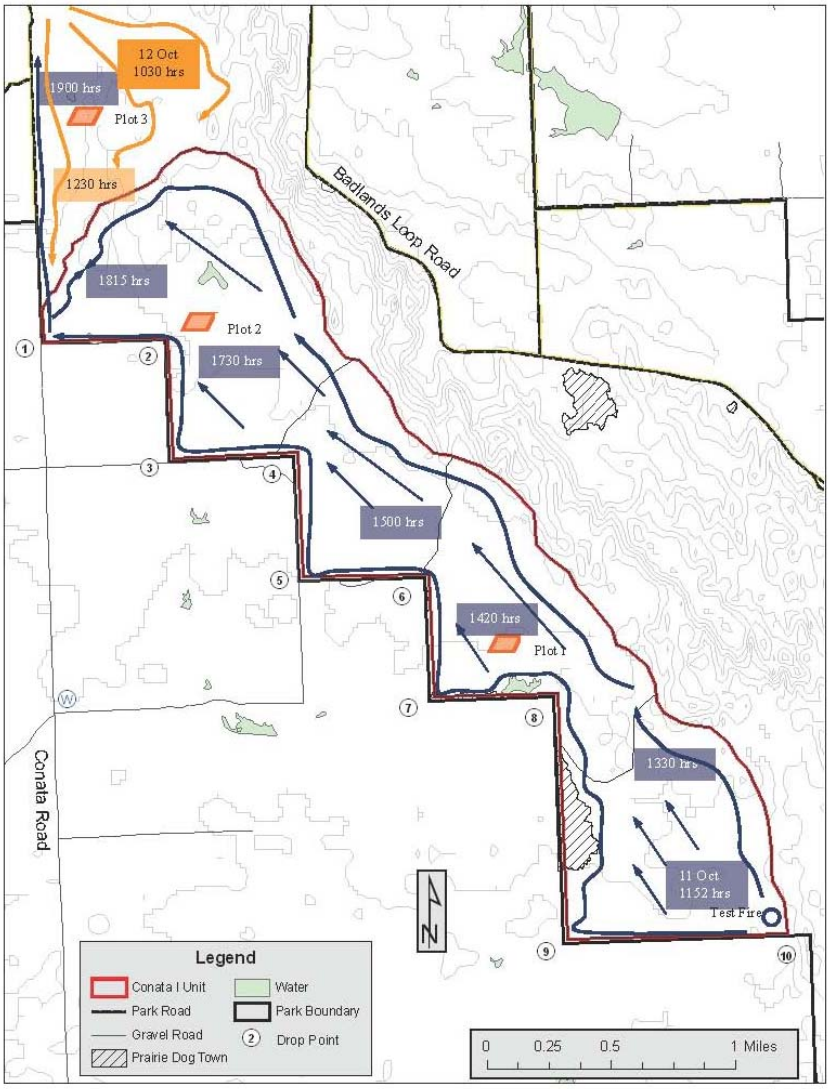
With northwest winds, a test fire was ignited in the southeast corner of the unit at map point '10' at 1230 hours. During the ignition sequence, 2 ignition teams were used to ignite the unit.

Initially, one ignition team moved west along the south perimeter toward points '9' while a second ignition team moved northwest igniting the interior of the unit. Fire backed away from the south perimeter where sufficient grass fuel was present. The perimeter ignition and holding teams continued north and west, finding about 50% of the immediate perimeter carrying fire while the other 50% had insufficient fuel to sustain fire.

The interior ignition team continued northwest into the wind igniting much of the unit in flanking and head fire. Conditions for fire deteriorated after sunset and ignition ceased at approximately 1830 hours.

The northernmost 200 acres were unburned at the end of October 11. Ignition continued on the morning of October 12 completing the unit. Under light winds the area was ignited from north to south.

Fire Progression Map



Smoke Monitoring

The National Weather Service forecast predicted "Good" smoke dispersal with mixing heights 3500 to 4500 feet above ground level. With wind direction primarily north-northwest during ignition, smoke moved exclusively to the southeast. Initially, smoke did not rise significantly, but eventually rose to a height of greater than 1000' above ground level dispersing to the southeast. Smoke volume ranged from light to moderate. Moderate volumes occurred when ignition teams moved through favorable continuous fuel.

Holding along the west perimeter

Biomass and Soil Moisture

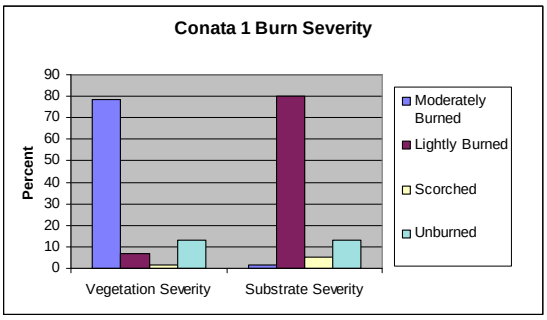
Total aboveground biomass was sampled at each of the 3 monitoring plots located in the Conata I unit. Fuel load measured approximately 4 tons per acre and ranged from 2.6 to 5.1 tons per acre.

Soil moisture sampling in the top 1 inch of soil at the 3 plots averaged 23% with a range from 14.4% to 27.4%.

Fire Effects Monitoring

Three fire monitoring plots lay within the boundaries of the Conata I prescribed fire. Monitoring will continue at 1 Year, 2 Years and 5 Years to track changes in vegetation composition and ground cover.

Immediate postburn severity for vegetation measured 78 % of the sample points as moderately burned. This indicates that most of the standing grass was completely consumed. Thirteen percent of the sample was unburned and the remaining 9% lightly burned or scorched. At the substrate or litter layer, 80% was lightly burned, indicating the litter was partially consumed and the lower duff layer unimpacted. The remainder of the sample points was either scorched or unburned.



Conclusions

Conata I The area treated in the Conata I prescribed fire burned well in areas of native perennial grass and consumed less completely in areas of non-native grass and forbs. Three fire effects plots within the unit will be read at 1, 2, and 5 years following the fire to determine vegetative changes following fire.