

**Badlands National Park
Prairie Wind Prescribed Fire Monitoring Report
14 October 2005**

Prepared by Steve Ipswitch



Long-term fire effects monitoring plot burns in the Prairie Wind Prescribed Fire

Burn Unit Summary

Prairie Wind burn unit encompasses approximately 1400 acres on the north boundary of Badlands National Park. The unit is bounded by a mow line and the park boundary on the north, Bigfoot Road on the east, State Highway 244 (Badlands Loop Road) on the south, and a mowed line on the west. The unit is predominantly native, mixed-grass prairie. The terrain is occasionally interrupted by woody draws, and contains one artificial lake. An attempt was made to burn the unit on October 2, 2005, but was cancelled due to winds being out of prescription. The unit was successfully burned on October 14, 2005.

14 October 2005

Size: 1400 acres treated, about 80 % burned.

Vegetation type: Native, mixed-grass prairie

Personnel:

Burn Boss: Steve Ipswitch (trainee), Dan Morford.

Ignition Specialist: Sonja Feaster (trainee).

Holding Specialist: Eric Allen.

Fire Monitors: Tyler Schmitt, Brandon Oberhardt (trainee).

Holding Resources: 5 Type 6 engines, 1 Water Tender, 3 ATVs, 1 squad.

Objectives

The objectives of the Prairie Wind prescribed fire include:

1. Ensure safety of all personnel and public.
2. Restore fire to prairie.
3. Reduce fuel load by 60%.
4. Keep prescribed fire south of the boundary, west of the road, north of Highway 240, and east of the mowed line.

Weather Observations

14 Oct 05 Time	Temperature		Dew Point	RH	Wind		Comments
	Dry	Wet			Speed	Direction	
0915	61	49	38	42	5-7	NW	Clear Skies, Fdfm= 8
1000	66	51	38	35	8-14	NW	
1030	66	51	36	35	5-8	NW	
1100	66	51	36	35	5-8	NW	
1200	70	52	36	28	2-5, 8	NW	Clear, wind holding
1300	70	52	36	28	6-10	NWW	
1400	72	53	36	24	5-9	NW	

Fdfm= fine dead fuel moisture

Fire Behavior Observations

Fire behavior observations were recorded periodically as fire progressed through the burn unit. Rate of spread (ROS) and flame lengths (FL) were documented. The most intense fire behavior was observed when firing progressed east along the north boundary. Head fire pushed by the northwest wind moved southeast toward the backing fire lit along Highway 244.

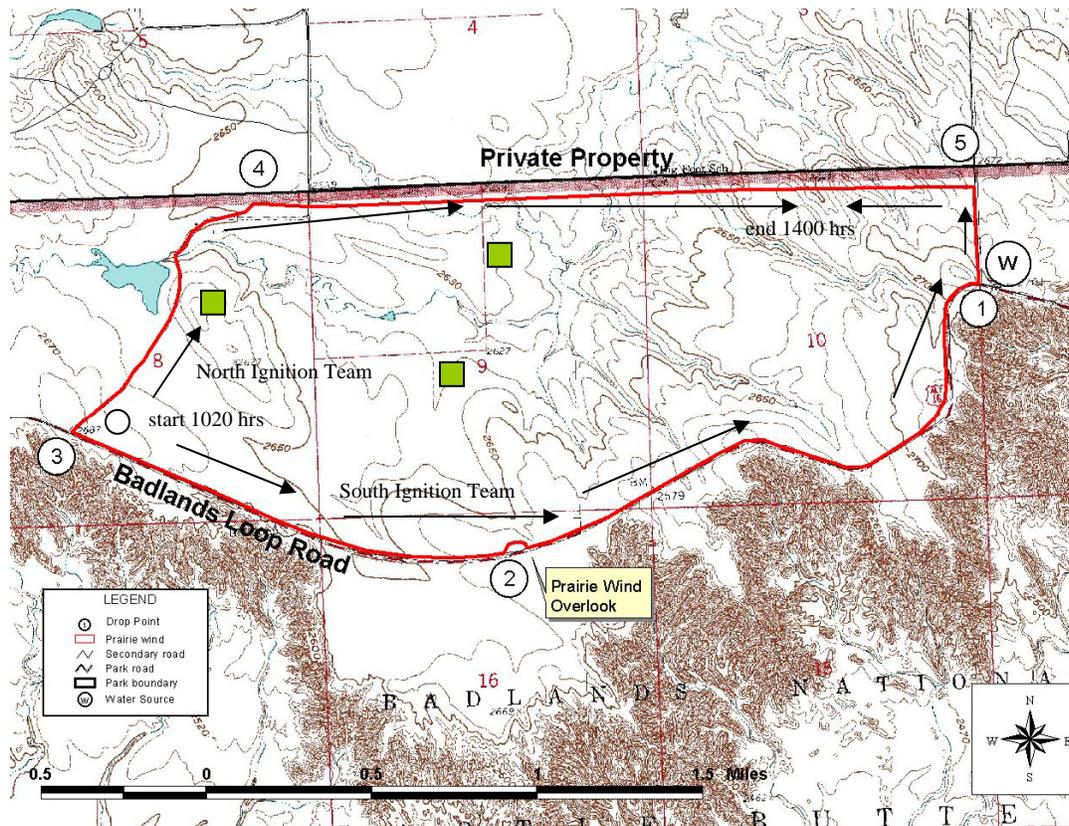
Limited amounts of horizontal fuel (thatch) limited backing fire spread. The standing vertical grass fuel carried head and flanking fires.

Time	Location	Fire Type	ROS ch/hr	FL	Comments
1020	Test fire DP 3	H	25	3-5'	Clear skies
1040	N 150m DP 3	H	30	8'	West line 150m N DP 3
1150	200 m W of pond	F	8	2-3"	
1215	500m E of DP 4	F/B	1.5	6"-12"	
1300	Middle unit	B	1.5	3-8"	
1345	500m W DP 1	H	50	3-6"	

Fire Progression

Ignition on the Prairie Wind project began around the perimeters of three research plots within the Prairie Wind Fire. These ignitions were allowed to spread into the interior of the unit. Perimeter ignition began at 1020 from the southwest corner (DP 3). Two ignition crews were used, the South Ignition Team firing from west to east along Highway 244, and the North

Ignition Team firing north and then east along the mow line. A predicted NE wind which never materialized was the reason for the firing pattern. The fire carried well with the wind in continuous fuels but went out in Smooth brome due to higher moisture content in that grass. At the east boundary of the burn unit, firing progressed north on Bigfoot Road, then west along the north boundary until both ignition teams met at 1400 hours.



Biomass and Soil Moisture Sampling

Biomass and soil moisture samples were collected from 3 long-term monitoring plots. Aboveground vegetation was clipped and collected at 3 points per plot and oven-dried to determine fuel loading. One soil sample was collected at each plot, weighed, oven-dried, and reweighed to determine soil moisture.

Fuel load in this unit was just sufficient to allow head and flanking fire spread but was often insufficient to carry backing fire. A minimum fuel load of 2 tons per acre could be used as a suggested lower limit to achieve adequate fire spread.

Vegetation Type	Sample size	Average Fuel Loading	Average Soil Moisture
Western Wheatgrass	9	2.10 tons/acre	8.72%

Fire Monitoring

Three long-term monitoring plots (FMH) are located within the Prairie Wind burn unit. All of the plots burned during the prescribed fire. Post-burn severity measurements showed: 90% of the vegetation was moderately burned, and 10% was lightly burned. Substrate severity measurements showed: 0% as not burned, 57% as scorched, and 43% as lightly burned. These numbers suggest that most all of the standing biomass was removed and a portion of the thatch consumed. These plots will be read 1, 2, 5, and 10 years post-burn to document vegetation changes.

Smoke Monitoring

Smoke production was light to moderate at times during the prescribed fire, with the smoke dissipating rapidly after ignition ceased. On the north line, ignition/holding operations were unimpeded by smoke. Moderate smoke occasionally impacted visibility on Highway 244, but was mitigated with the use of two traffic guards to warn or stop visitor traffic. Smoke moved primarily southeast at heights of 300 to 1000 feet above ground level. The National Weather Service forecasted very good smoke dispersal with mixing heights at 5200' above ground level.

Conclusions

Approximately 1400 acres were treated at Prairie Wind. An estimated 80% of the treatment area was burned. All objectives of the burn, as stated in the Incident Action Plan, were met. Smooth brome did not burn well or at all during this prescribed fire.

Fuel loading in the unit was light due to drought conditions in the past 5 years and a resulting lack of dead horizontal grass. In future burns under similar conditions, it may be appropriate to sample fuel loading to determine if conditions will allow fire spread. Two tons per acre would be an advised minimum fuel load.

The planned firing pattern was to be from DP 1 to the west if there were northwest winds. This was changed during the burn, since the winds were forecasted to switch to the northeast in the afternoon. The winds did not switch as predicted, but firing progressed well due to coordination between the two ignition teams.

Radio communications were sometimes difficult, despite the 1-10% slope, and in the future a human repeater may be useful on this burn unit.



Prairie Wind Prescribed Fire October 14, 2005