

**Badlands National Park
Tick Draw Prescribed Fire Monitoring Report**

Prepared by Tyler Schmitt



Burn Unit Summary

Tick Draw burn unit encompasses approximately 1137 acres in the northwest corner of Badlands National Park. The unit is bounded by Sage Creek on the west and Sage Creek Road on the south, the bison corral gravel access on the east and the national park/national grassland boundary on the north. The unit is predominantly native, mixed grass prairie on uplands and slopes with occasional junipers. The terrain is frequently interrupted by numerous woody draws. The burn unit generally slopes south and west and lies between 2400 and 2900 feet.

16 September 2004

Size: 488 acres burned (total unit acreage = 1137)

Vegetation type: Native, mixed-grass prairie

Personnel:

Burn Boss: Dan Morford

Ignition Specialist: Mark Slovek

Holding Specialist: Ron Twiss

Fire Monitors: Andy Thorstenson, Martha Jakobek, and Tyler Schmitt (trainee)

Holding Resources: 8 Type 6 NPS/USFS engines, 1 Water Tender, and 4 ATVs

Objectives

The objectives of the Tick Draw prescribed fire include:

1. Burn 75-95% of project area.
2. Increase relative cover of native grasses by 10%, 2-year post-burn.
3. Increase relative cover of native forbs by 10%, 2-year post-burn.
4. Increase new stem density of native woody and shrubby species by 20%, 2-year post-burn.
5. Maintain survival of 3-5 year age class of native woody and shrubby species, 5-year post-burn.

Weather Observations

9/16/04 Time	Temperature		Dew Point	Wind			Comments
	Dry	Wet		RH	Speed	Direction	
0800	57°	49°	42°	57	5-7	S/SW	
1100	66°	54°	45°	47	9-10, g 12	S/SE	High clouds
1200	75°	59°	48°	39	5-7, g 8	SSE	Clouds decreasing
1300	80°	61°	49°	34	2-4, g 7	SW	Fdfm= 6%
1400	80°	59°	44°	28	2-3	SW	Fdfm= 5%
1500	80°	59°	44°	28	5-6	SW	Fdfm= 5%
1600	76°	58°	45°	34	6-8	NW/NE	Wind switch at 1540
1700	75°	57°	44°	33	7-9	N	Fdfm= 7%
1800	74°	58°	47°	38	9-10	N	

Fdfm= fine dead fuel moisture

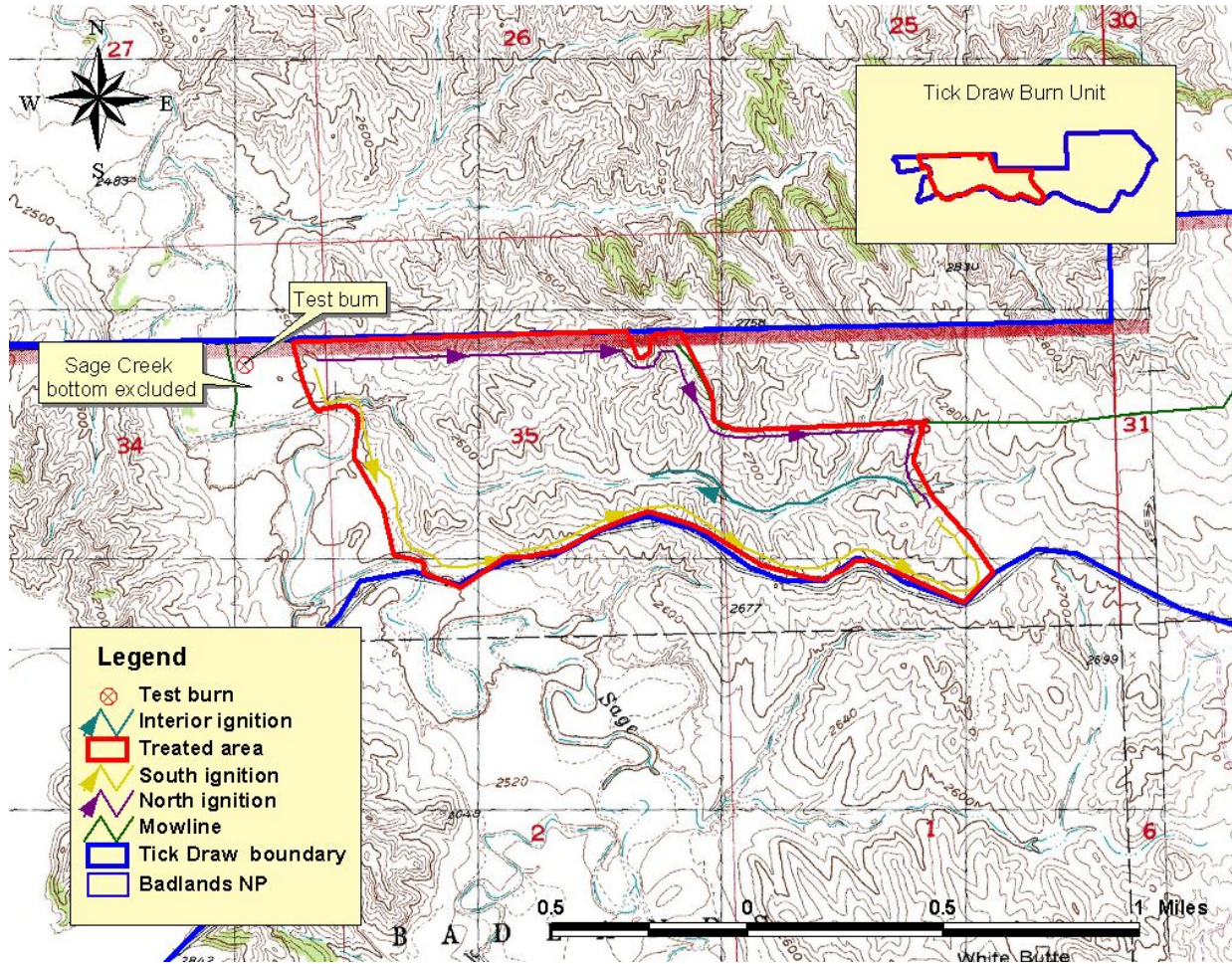
Fire Behavior Observations

Fire behavior observations were recorded periodically as fire progressed through the Tick Draw burn unit. Rate of spread (ROS) and flame lengths (FL) were documented at numerous random locations and at 1 FMH plot. Observations were made in native and non-native, mixed grass fuels (fuel model 1) as well as native shrub fuels (fuel model 5). The most intense fire behavior was observed between 1400 and 1600 as the prevailing winds shifted around to the north. Further channeling by topography seemed to increase fire behavior during the cited timeframe.

Time	Location	Fire Type	ROS	FL	Comments
1200	NW Corner	B, H, F	1	0-2'	Sparse, green fuels
1315	North line	B, H	1.5	12-18"	N winds occasional
1410	North line	H	30	8-10'	NE aspect; N winds
1500	Center of unit	B	2	4-12"	Variable fuels; E aspect
1530	FMH plot area	H, F	6.5	3-5'	Funneled winds from N
1545	FMH plot area	H	30	18-24"	Same as above
1600	FMH plot area	H	8	2-3'	Fuel model 5
1610	FMH plot area	H, F	5	2-3'	N slope
1620	FMH plot area	H, F	15	2-3'	Upslope spread; 16% slope
1700	Center of unit	H	15	0.5-2'	Continuous fuel; N aspect

Fire Progression

The Tick Draw test fire was started at 1130. From the junction of Sage Creek and NPS boundary, two ignition teams proceeded east and south. At 1215, due to poor fire activity, the bottomland area was excluded from the unit with a black line. Ignition continued east along the park boundary and east along Sage Creek. At 1800, a black line was completed from north boundary to Sage Creek Road. Fire operations were postponed due to diminished fire behavior, lack of fuel accumulation, and poor fuel continuity.



Biomass and Soil Moisture Sampling

Type	Sample size	Fuel Loading	Average Fuel Loading	Soil Moisture	Average Soil Moisture
Western Wheatgrass	9	1.94 tons/acre	1.77 tons/acre	25.0%	23.4%
Kentucky Bluegrass	3	1.29 tons/acre		22.7%	
Wild Plum	6	1.75 tons/acre		21.3%	

Note: 3 soil and 3 biomass samples were obtained near each plot.

Fire Monitoring

Six long-term monitoring plots (FMH) are located within Tick Draw burn unit. Only one western wheatgrass plot burned on 9/16/04. The remaining plots are located in the unburned segment of the unit. Post-burn severity measurements showed: 29% of the vegetation as not burned, 58% as lightly burned, and 15% as scorched. Substrate severity measurements showed: 29% as not burned, 29% as scorched, and 42% as lightly burned. This plot will be read 1, 2, 5, and 10 years post-burn to document vegetation changes.

Smoke Monitoring



Due to lack of fire activity, smoke production and related impacts were observed to be minimal. On the north line, ignition/holding operations were unimpeded by smoke. Ignition/holding operations on Sage Creek Road were impacted by north winds and smoke on the road from 1530-1615. During this time, fireline visibility was diminished, but safe operations were not compromised. National Weather Service forecasted very good smoke dispersal with mixing heights at 9200' above ground level.

Conclusions

Approximately 488 acres (of 1137) were treated at Tick Draw. An estimated 25-35% of the treatment area was burned. On south and west-facing slopes, sparse fuels and reduced loading inhibited fire spread. Coverage was highest on north and east-facing slopes due to slightly increased fuel accumulation and fuel continuity. Vegetation monitoring will be conducted at one FMH plot to determine whether or not project-specific objectives were achieved.

In the future, fuel loading data should be used to determine if conditions are appropriate for the application of prescribed fire. It may be that fuel loading less than 2 tons/acre is too low to support adequate fire spread.