Scotts Bluff National Monument
North Platte Prescribed Fire Monitoring Report

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Introduction

The North Platte burn unit is 270 acres of mixed-grass prairie dissected by sparsely vegetated badlands and draws dominated by shrubs and deciduous trees. The unit is bounded by the Union Pacific Railroad to the north, the Gering Canal to the south, and park boundary to the east and west. Ignition of the test fire in the southeast corner of the unit occurred at 0950 on April 15, 2003. Following a successful test burn, ignition of the rest of the unit continued from east to west and ceased at approximately 1515.

Overhead personnel consisted of Burn Boss Dan Morford, ignition specialist Eric Allen, Holding Specialist Doug Alexander, Lead Fire Effects Monitor Andy Thorstenson, and Information Officer Deb Qualey. Holding forces included Task Force Leader Kevin Merrill, six Type-6 Engines, one 20-person hand crew, two ATVs, and one Type III water tender. Additional resources included various personnel from the National Park Service, the US Forest Service, and the Gering Fire Department.

Objectives

Primary resource objectives for the burn:

- Increase relative cover of native perennial grass and forb species by at least 20%
- Reduce relative cover of non-native grasses and forbs by at least 20%
- Limit change in shrub density to no more than ± 30% of pre-burn shrub density

Summary of Events

Prior to the day of the burn, Scotts Bluff personnel prepared for the burn by mowing a line along the western boundary and trimmed vegetation around wooden posts located in the burn unit.

Two long-term fire effects monitoring plots were installed within the burn unit prior to the burn. Fuel and soil moistures samples were collected within the monitoring plots the day before the burn.

A briefing was conducted for all personnel at 0800 on the morning of the burn. A National Weather Service spot forecast and on-site weather observations were obtained to assess compliance with prescription parameters. A test fire was ignited at 0950 and ignition of the unit began at approximately 1000. Ignition continued until 1330 when wind speeds exceeded the prescription. After a short break, ignition commenced between 1440 and 1515. At 1515 the decision was made to stop ignition because of gusty winds and poor fuel conditions. Approximately 50 acres on the western edge of the unit did not burn. Post-burn evaluations on the fire effects monitoring plots were completed after ignition ceased.

Weather Observations

Monitoring of weather conditions for the North Platte prescribed fire began at 0650 and continued until 1725. Observations were taken approximately every half hour and broadcast over the radio on the command channel. On April 15th, 2003 the temperatures during ignition ranged from 66 to 75 degrees Fahrenheit. Winds were predominantly north-northwest to north-northeast during the burn period with a maximum wind speed of 23 mph at eye level. Observed and predicted weather conditions are summarized in Table 1.

Table 1. Weather Conditions Observed on 4/15/03

Condition	Temperature	Relative Humidity	Wind Speed (mph)	Wind Direction	1-Hr Fuel Moisture
Prescription	Not in Burn Plan	20-50%	2-10	N, NE, E, SE	5-11%
Predicted	Max 68 - 72° F	Min 20 - 25%	10-20 (20 foot)	W or NW becoming SE	n/a
Observed	Max 75° F	Min 29% Max 43%	3-15 Gusts to 23	NW, N, E, SE	5-10%

Ignition Pattern

Ignition began at 0950 with a test in the southeast portion of the burn unit. The ignition team split into two teams. One team began lighting strips north from the test burn location working their way toward the railroad tracks. The second team began igniting along the canal road working from east to west. When the north team reached the railroad tracks, they continued working to the west and lit north-south strips on a large table in the eastern portion of the unit. Shortly before 1200 the north team reached the fire effects monitoring plot #6. The north team continued igniting strips parallel to the railroad tracks working their way west. The south team ignited along the canal road and lit north-south strips into the interior when topography permitted. Fire effects monitoring plot #2 was burned at approximately 1300. Ignition was paused at 1330 because of gusty winds. At approximately 1445 ignition commenced and strips were ignited on a table in the western portion of the unit before ignition was terminated at 1515. (see Fig. 1)

Fire Behavior Observations

Fire behavior observations were taken regularly during the day throughout the unit. Strip-headfire and flanking fire were the primary ignition techniques used in the unit. Observations were made on headfire, flanking fire, and backing fire.

For backing fire, flame lengths ranged between 2 and 8 inches. Rates of spread for backing fire ranged from 1.3 to 1.5 chains per hour. Head fire rates of spread ranged from 4 to 8 chains per hour. Flame lengths for head fire ranged from 6 to 12 inches, with flame zone depths of up to 2 feet. Flanking fire behavior was similar to that of head fire. Fire behavior observations are summarized in Table 2.

Table 2. Fire Behavior

Time	Fuel Model	Fire Type	Rate of Spread (ch/hr)	Flame Length	Flame Zone Depth	Comments
0950	1	back/flank/head	minimal	n/a	n/a	test fire
1100	1	flank	2.0	4”	2-4”	fire spreading completely
1110	1	back	1.5	6-8”	2-4”	continuous dead fuel
1115	1	head/flank	8.0	12”		
1148	1	back	1.3	2-6”	2-4”	
1154	1	head	4.0	6-10”	6-24”	STCO 6
1210	1	head	6.0	6-8”		
1300	1	back/flank/head	minimal	n/a	n/a	sparse fuel conditions

Biomass, Fuel and Soil Moisture Measurements

Biomass and soil moisture samples were collected at both of the long-term monitoring plots on April 14, 2003. On the native grass plot biomass was 1.2 tons/acre and soil moisture was 15.0%. The snowberry plot had biomass of 1.9 tons/acre and soil moisture of 22.8%.

Smoke Monitoring

Smoke was monitored on this burn because of the proximity of the communities of Scottsbluff and Gering, Nebraska. Observations are summarized in Table 3.

Table 3. Smoke Observations

Time	Location	Elevation of Smoke Column	Smoke Column Direction	Fireline Visibility	Comments
1010	SE corner	0-200’	ESE	Minimum haze	Dispersing
1022	SE corner	200-500’	ESE	Minimum haze	Gaining lift, low volume
1100	Unit A, mesa	200’	Up, then SE	clear	almost no smoke
1220	NW Unit A	100-400’	Up, then SE	?	light-moderate volume

Fire Monitoring

Two long-term fire-monitoring plots are located within the North Platte burn unit. One plot is located in mixed-grass prairie fuel model 1 and one plot is located in shrub fuel model 6. These plots were sampled the day of the burn to determine burn severity of vegetation and substrate (litter and soil). The native grass plot was lightly burned and the snowberry plot was unburned.

The long-term health of ecosystems is the focus of the prescribed burning program at Scotts Bluff National Monument, therefore certain criteria need to be assessed. Most quantifiable specific objectives need to be viewed over the course of several years before results can be determined. With a long-term ecological monitoring program in place, a quantifiable assessment of prescribed fires specific objectives can be made. Monitoring plots will be sampled 1, 2, 5, and 10 growing seasons after treatment of fire to determine the immediate, short, and long term ecological and vegetative effect fire had on this burn unit.

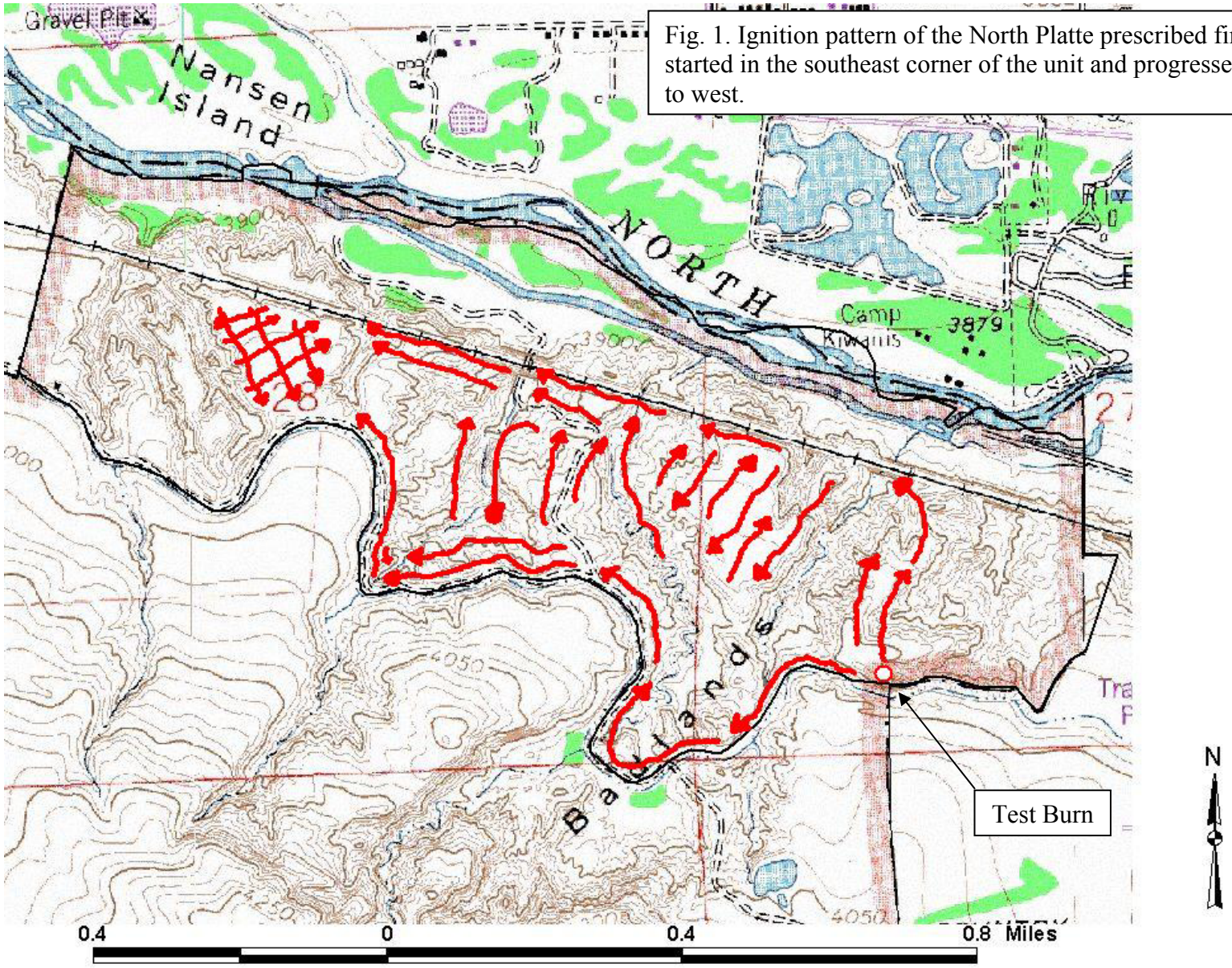

Fig. 1. Ignition pattern of the North Platte prescribed fire. Ignition started in the southeast corner of the unit and progressed from east to west.