Theodore Roosevelt National Monument
Cottonwood Campground Prescribed Fire Monitoring Report

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Introduction

The Cottonwood Campground prescribed fire is 250-acres in the south unit of Theodore Roosevelt National Park. Vegetation of the area is composed of fuel models 2 (sage brush with mixed grass prairie), 9 (cottonwood/ green ash), and 10 (closed canopy juniper). The unit contains a narrow strip of forested area running north to south down the middle of the unit. The remainder of the unit is sage brush and mixed grass prairie. The unit excludes both the picnic area and the campground with a mowed line. The boundaries for the unit are the Little Missouri River on the west and the paved main park road on the east. Both the north and south boundaries are 30 foot mowed lines. The south mowline is also the boundary of the Skyline Vista burn, which was completed October 2002 and therefore provided a black boundary. The north mowed line is approximately 1/2 mile north of the campground and extends southwest from the main park road to the Little Missouri River. (see map attachment) Ignition occurred on April 25, 2003.

Overhead personnel for the Cottonwood Campground burn consisted of Burn Boss Beth Card with ignition specialist Chad Suppa, and Rob Gomon as holding specialist. Holding forces included four Type 6 Engines, two ATV's, and one water tender. Resources included personnel from Theodore Roosevelt National Park, Buffalo River and Zion Modules, D&K (private contractors), and Northern Great Plain Fire Monitors.

Objectives

Primary resource objectives for the burn:

- Reduce 1-hour dead and down fuels in prairie/sage by at least 75-85% post burn
- Decrease non-native herbaceous frequency and relative cover by at least 25% one year post burn
- Reduce total brush density at least 20% one year post burn
- Mortality of Cottonwoods will be less than 50% two years post burn
- Mortality of hardwoods will be less than 50% two years post burn

Summary of Events

Prior to the day of the burn, a 30 foot mowed line was prepared along the north boundary which extends southwest from East River Road to the Little Missouri River. Mowlines were also established around the excluded campground and picnic areas.

Biomass and soil moisture samples were collected at two different sites within the burn unit the day before ignition occured. Two long term photo points were also established.

A briefing was conducted for all personnel at 0800 the morning of the burn. A National Weather Service spot forecast and on-site weather observations were obtained before briefing to assess compliance with prescription parameters. On April 24, ignition commenced at 1045 with a successful test burn at the southwest corner of the campground exclusion. Ignition ceased at approximately 1600 as all interior and perimeter ignition was successfully complete. Perimeter mop up began immediately after the burn was complete. Mop-up of isolated heavy fuels continued the following day.

Weather Observations

Monitoring of weather conditions for the Cottonwood Campground Prescribed Fire began on site the evening before ignition and continued through ignition day until 1700, after ignition ceased. Observations were taken every hour during ignition and broadcast over the radio on the command and tactical 1 channel. On April 24, winds were recorded at 2-8 miles per hour with gusts to 15. Winds were predominantly from the east, although in the afternoon, varying wind directions were observed due to geography and topography. Temperatures ranged from 56-65° F, with relative humidity from 73% to 38%. Observed and predicted weather conditions are summarized in Table 1.

Table 1, Weather Conditions Observed on April 24 2003

Condition	Temperature	Relative Humidity	Wind Speed (mph)	Wind Direction
Prescription	None given	20-60%	0-20	any
Predicted	51-59° F	Min 40-80%	10-15	East
Observed	Max 65° F	Min 38%	2-8, gusts to 15	Predominantly E with occassional SE

Ignition Pattern

All ignition was done using drip tourches. Ignition began on April 24 at 1045 with a successful test burn at the southwest corner of the campground exclusion. The ignition team then ignited along the west side of the campground exclosure sending backing and flanking fires towards the river. Ignition team reached the northwest corner of the campground exclosure by 1115. The ignition team then broke into 2 teams with Shawn Gaines from the Zion Module leading the second team. Team one continued to the northeast corner of the unit bringing backing and flanking strips with them on the west side of the narrow wooded strip. They reached the northeast corner at 1230. Team two continued to ignite around the campground mowlines, further securing the perimeter of the campground exclosure. They reached the northeast corner of the exclosure at 1200. Team one reached the northeast side of the mowline at 1300. Team two used backing fired in the wooded strip to minimize the fire intensity in the cottonwoods before working down the east side of the campground exclosure with flanking and backing strips up to the campground road. Meanwhile, ignition team one secured the north mowline before laying down flanking strips along east side of the burn unit perimeter (moving south along the east perimeter) and reached the campground road at 1345. Ignition began again at 1445 at the northwest corner of the southern section of the burn unit. Fire reached the river at the south corner of the campground exclosure at 1500. Ignition of the east side of the southern unit began at 1520. Both ignition teams worked cooperatively to secure the picnic area and bring fire toward the south boundary. Special attention was again given to the wooded strip and the ignition pattern minimized the effects on the cottonwoods. Both ignition teams finished at the southeast corner of the burn unit at 1600. At 1640 the interior finished burning out and mop up began. (See attached fire progression map)

Fire Behavior Observations

Fire behavior observations were taken regularly during the Cottonwood Campground RX in different fuel types. Active fire behavior occurred as soon as ignition began and continued until 1640. Backing fire flame lengths ranged between 4 and 8 inches. Rates of spread for backing fire ranged from 0.4 to 0.7 chains per hour. Head fire rates of spread ranged from 0.8 to 40 chains per hour. Flame lengths for head fire ranged from 6 inches to 3 feet, with flame zone depths of up to 2 feet. Fire behavior observations are summarized in Table 2.

Table 2, Fire Behavior Observed on April 24, 2003

Time	Fuel Model	Fire Type	Rate of Spread (ch/hr)	Flame Length	Flame Zone Depth	Comments
1100	Smooth brome	back/flank	1	4-8”	4”	W edge of unit
1124	Smooth brome	back	1.3	6-8”	4-6”	N end of campground
1230	Smooth brome/ leafy spurge	Flank/back	2	4-8”	4”	
1310	Buffaloberry/ juniper	Flank/head	unknown	Approx. 20’	Approx. 20’	Torching clumps of immature hardwood & juniper
1510	Sage/ leafy spurge	Back	1.1	1-1.5’	6-12”	Dry spurge fully consumed
1530	Mixed grass/ spurge	Back	1.7	4-8”	4-6”	Picnic area
1540	Mixed grass	back	1.1	4-10”	3-6”	West mowed line
1545	Sage/ mixed grass	Back	Approx. 1-2	1-2.5’	1’	Taken from high obs. point; 100% active perimeter in fuel model 1 & 2
1545	Cottonwood	Back	< 1	6-12”	4-8”	Dense FRPE; 60-80% active perimeter

Biomass, Fuel and Soil Moisture Measurements

Biomass and soil moisture samples were collected at two different mixed grass sites within the burn unit on April 23, the day before ignition occurred. Biomass ranged from 2.08 to 3.26 tons per acre with an average of 2.67 tons per acre. Fuel loading in wooded area was not measured. Soil moisture content ranged from 24.8% to 29.9%.

Smoke Monitoring

On ignition day, east winds predominated so most of the smoke traveled west. Strong transport winds dispersed the smoke well once it rose above the river valley. Some smoke settled into the Little Missouri River Valley. Smoke did not impact visibility on the main park road (East River Road) or I-94. Overall smoke volume was light to moderate.

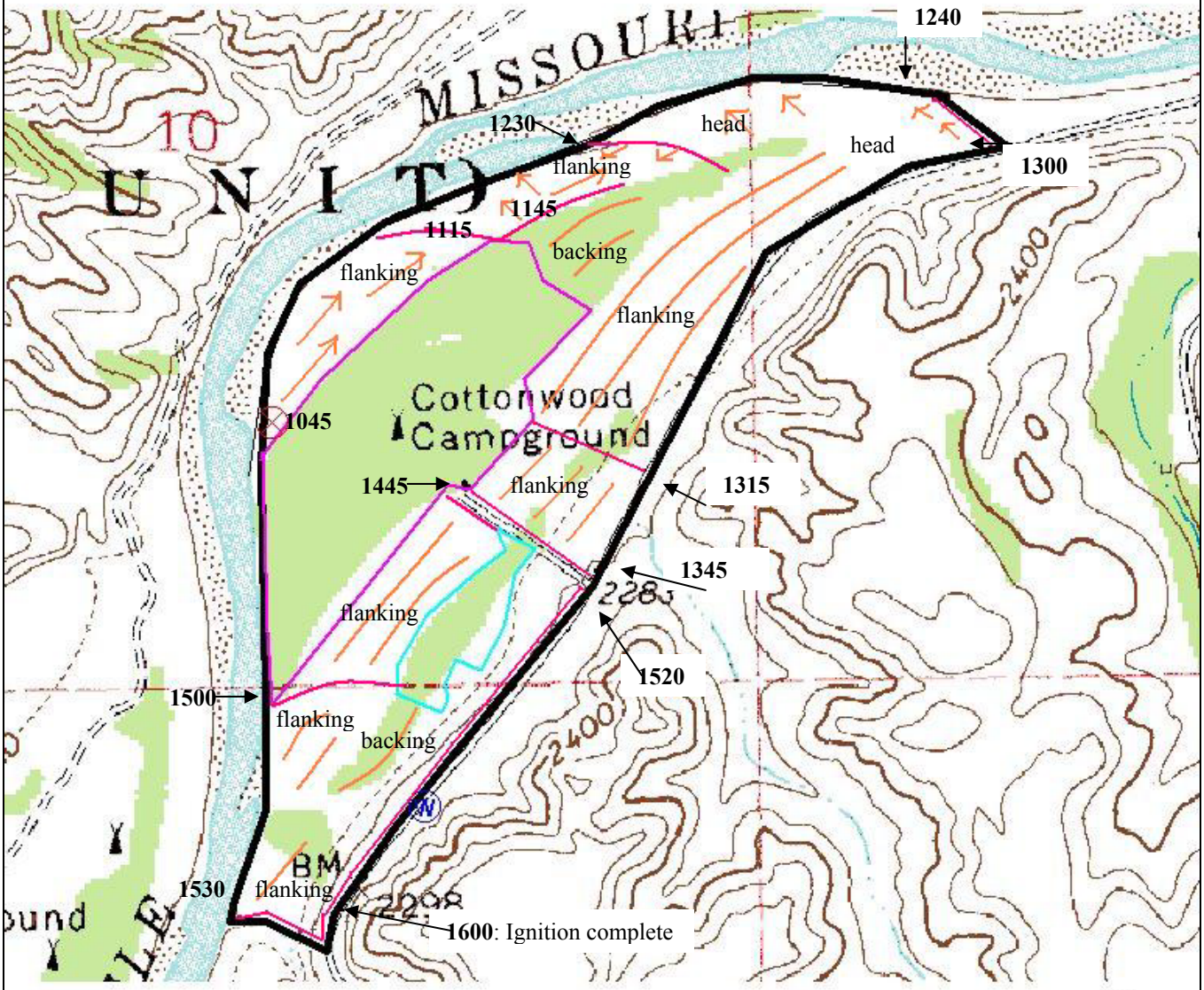
Fire Monitoring

No long term fire monitoring plots are within this burn unit. Two long term photo monitoring points were installed the day before the burn. Photos were taken prior to and immediately post burn. Resource Management at Theodore Roosevelt National Park has plots installed within this burn unit for monitoring leafy spurge.

Conclusions

No standard fire monitoring plots are installed in this unit. The two long term photo monitoring points that were installed will help to provide a qualitative visual assessment of the resource objectives.

Theodore Roosevelt National Park
Cottonwood Campground RX 2003



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