Knife River Indian Villages
Peninsula 2003 Prescribed Fire Monitoring Report

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Introduction

The Peninsula prescribed fire is approximately 300 acres with 250 acres on Knife River National Historic Site and 50 acres on private land owned by Lonnie Russell. Ignition occurred on April 28, 2003. This is the second fire treatment of this unit in a effort to reduce the occurrence of non-native cool season grass. This area was previously burned in May of 2002. The vegetation is comprised of Green Ash riparian forest, non-native grassland, and Cottonwood riparian forest. It is bounded by the Knife River on the west and the Missouri River on the east. The remainder of the north and east boundaries of the burn area consists of a mow line on the Park boundary and the edges of plowed fields on private land.

Overhead personnel for the Peninsula prescribed fire consisted of Burn Boss Chad Suppa, holding Specialist Gary Kiramidjian, and Ignition Specialist Steve Smith. Holding forces included three Type 6 Engines and an ATV. Fire monitors were Kevin Rehman and Travis Hartsburg (trainee). Other resources were from the Zion and Buffalo River Fire Use Modules, Knife River NHS, and Washburn, North Dakota Volunteer Fire Department.

Objectives

The primary resource objective for the burn is to reduce the cover of non-native grass, specifically Smooth Brome, *Bromus inermis*. Nine vegetation plots were installed in 2002 within the unit to assess the effects that this fire will have on vegetation within the unit.

Summary of Events

Prior to the burn, personnel from Knife River constructed a mow line that followed the fence line of the park boundary along the perimeter of the burn unit. One portable water tank and pump was placed at the north end of the burn unit. Nine long-term fire effects monitoring plots were installed randomly within the burn unit prior to the burn. Relative cover of native and non-native grass, forbs, and shrubs was sampled during the peak growing season in July. Biomass and soil moistures were sampled within the monitoring plots on the day of 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 weather parameters.

Weather Observations

Monitoring of weather conditions for the Peninsula Prescribed Fire began in the afternoon of April 27 to obtain a spot weather forecast from the National Weather Service. A spot weather forecast was received prior to morning briefing. Beginning at 0700, observations were taken every hour until ignition was completed for the day. Observations were broadcast on the hour over the command channel for all fire personnel during the ignition period.
Observed and predicted weather conditions are summarized in Table 1.

Table 1A, Weather Conditions Observed on 28 April, 2003

Condition	Temperature	Relative Humidity	Wind Speed (mph)	Wind Direction
Predicted	Max 60˚	Min 35%	10 mph	nw
Observed	Max 63˚	Min 38%	1-8 mph gusts to 10 mph	Generally north

Ignition Pattern

Ignition began at 1034 on the east edge of the burn unit at the Missouri River. Two ignition teams were established. One team moved south along the east edge of the unit. The second team moved northwest along the mowline and field edge to secure the east and north perimeters. The south team reached the south end of the peninsula at approximately 1145 then continued firing north along the west perimeter. This team covered the remainder of the width of the unit in one pass, reaching the north end of the unit at approximately 1415. See attached ignition progression map.

Fire Behavior Observations

Fire behavior observations were taken throughout the day predominantly in the smooth brome areas. Fire behavior was recorded on 3 of the 9 fire effects plots within the burn unit. A significant green component of the Smooth Brome understory moderated fire activity on the Peninsula unit. Fire behavior observations are summarized in Table 2.

Table 2A, Fire Behavior Observed on 28 April 2003

Time	Fuel Model	Fire Type	Rate of Spread (ch/hr)	Flame Length	Flame Zone Depth	Comments
1240	Brome	Head	n/a	1'-4'	1'-3'	Plot 1
1250	Brome	Head	5 ch/hr	4"-12"	0-12"	Green fuel, Plot 7
1300	Brome	Backing	3 ch/hr	8"-12"	4"-6"	Plot 7
1315	Brome	flanking	2 ch/hr	0-12"	4"-12"	
1400	Brome	Back/flank	1.5 ch/hr	0"-12"	0-12"	Smooth Brome

Biomass and Soil Moisture Measurements

Fuel loading and soil moisture samples were taken at one of the long term monitoring plots on the day of the burn. Three samples of a known area were clipped to determine biomass or fuel loading by tons per acre. The sample fuel loading averaged 4.04 tons per acre and varied from 3.05 to 5.58 tons per acre in the Green Ash forest with Smooth Brome understory. Three soil moisture samples were taken in the same area within 5cm of the soil surface. Samples were weighed and dried to obtain a mean soil moisture. The average soil moisture was 29.4% ranging between 27.8% to 31.5%.

Smoke Monitoring

Smoke impacts from the Peninsula prescribed fire were monitored periodically throughout the active burning period. The main concern for smoke impact was the town of Stanton, southeast of the unit. During the ignition period, smoke moved predominantly south. Knife River staff reported that minimal smoke was visible in the town of Stanton but dispersed with little impact. Volume of smoke was generally light throughout the day.

Fire Monitoring

Nine long-term fire-monitoring plots are located within the Peninsula burn unit. The plots are located in areas dominated by Smooth Brome. These nine plots were read immediately post-burn to determine burn severity of vegetation and substrate (litter and soil). Severity at these sites showed that a majority of the unit (63%) was lightly burned while 12% of sample points were unburned. The remainder of points were either scorched (12%) or moderately burned (12%) and only one point was measured as heavily burned. These plots will be read 1, 2, 5, and 10 years postfire beginning in the summer of 2003 to assess the effect that the fire had on vegetation.

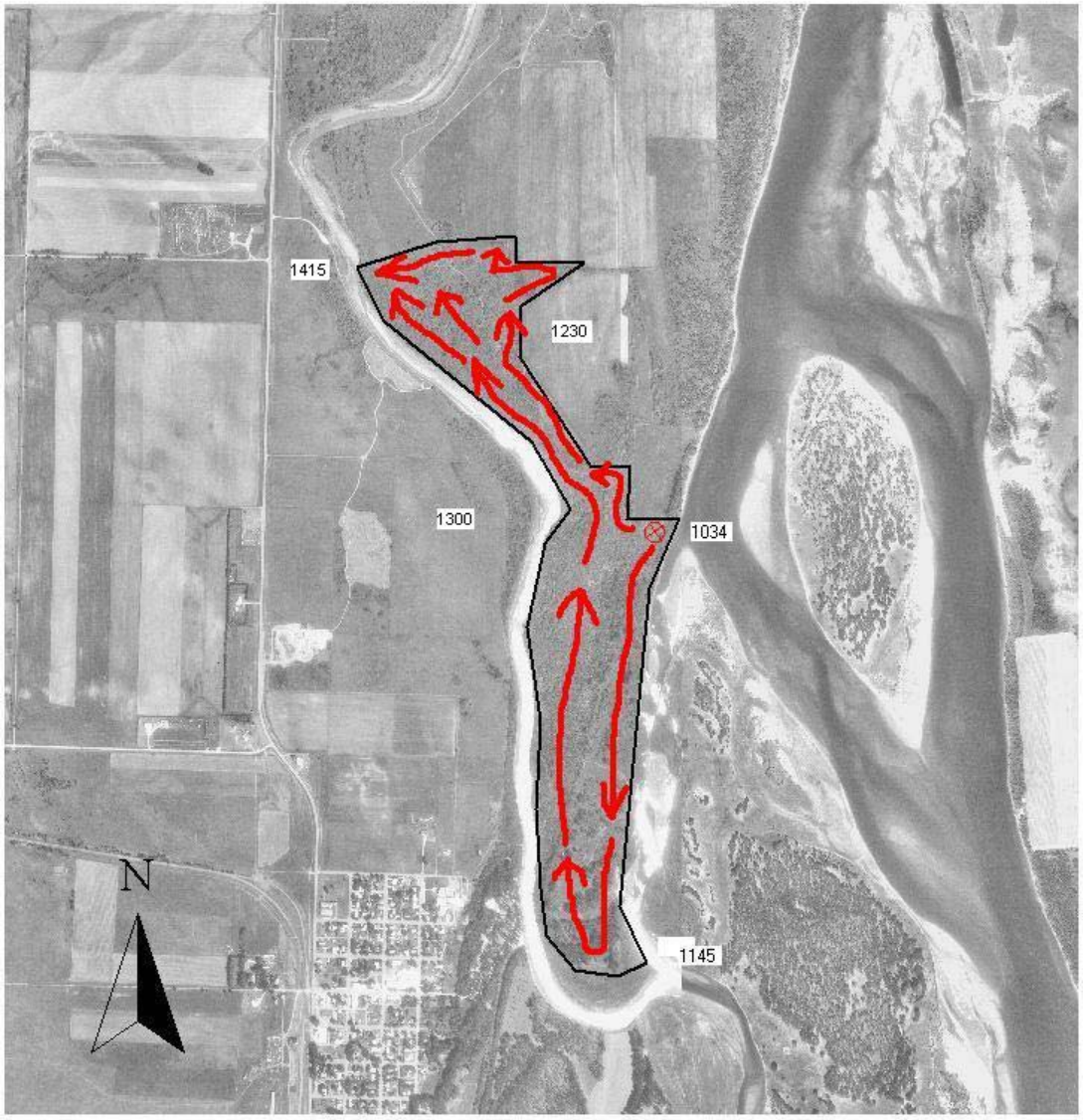
Conclusions

The long-term health of ecosystems is the focus of the prescribed burning program in the Northern Great Plains and at Knife River National Historic Site. Some objectives are immediately measurable such as severity immediate post-burn. Other 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.

Attachment

Fire Progression Map

Knife River Peninsula Burn Unit 2003



Ignition lines

Ignition times 1300

Peninsula RX Boundary

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