

# RADIO TOWER RX

Theodore Roosevelt NP  
South Unit

04 October 2007



## Prescribed Fire Monitoring Report

Prepared by Marcus Lund  
Northern Great Plains Fire Effects Monitor  
23 October 2007

**Burn Unit Summary :**

The Radio Tower burn unit was treated in one burn period. The unit was circled in fire by two squads north and two squads south. Participants included personnel from Theodore Roosevelt NP, Knife River Indian Villages NHS, Northern Great Plains Fire Management, Dakota Prairie Grasslands (USFS), and Miles City BLM fire personnel.

The unit was bound by a mow line and fire was flapped out as the ignitions team moved along the perimeter. A contingency engine and an ATV were staged at the radio tower enclosure to perform initial attack on spot fires and to assist the prescribed fire control effort.

**Date:** 4 October 2007

**Size of Burn:** 98 acres

**Aspect:** Mesa top with slight (<5%) slope in all directions

**Elevation:** 2699 feet

**Vegetation Type:** Mixed grass prairie, sage brush, and limited green ash and juniper component.

**Personnel:**

Burn Boss: Gary Luce

North Ignition/Holding: Jesse Olsen CRWB

South Ignition/Holding: Rod Skalsky CRWB

Fire Monitor: Marcus Lund (t)

Engine 7199: Matt Weakland ENOP

ATV 6x6

**Incident Objectives :**

1. Ensure firefighter and public safety:
2. Restore fire to mixed grass prairie ecosystem:
  - a. Evaluate and document fire effects and fire behavior of fall burning.
  - b. Release nutrients to invigorate native grass and forbs.
  - c. Reduce one-hour grass litter to  $\geq 70\%$  immediate post-burn.
  - d. Encourage nutrient cycling and soil gas exchange.
3. Provide educational opportunities for the public concerning the role of fire in mixed grass ecosystems:

**Weather Observations :**

Weather observations local to the Radio Tower burn unit were slightly cooler and more humid than the spot weather forecast from Bismarck NWS. Winds were variable throughout the burn period and acted as the primary influence on fire behavior and spread. Topography influenced the weather, with upslope winds apparent throughout the burn period. The location of Radio Tower burn unit atop a badlands mesa revealed limits to spot weather forecasting.

10/4/05 Time	Temperature		Dew Point	RH	Wind		Comments
	Dry	Wet			Speed	Direction	
0700	43	38	-	64	3-4	W NW	Early obs. for spot
0745	43	38	-	64	3-4	W NW	Early obs. for spot
1000	49	43	37	63	1-3	W NW	20% / 20% POI
1030	51	44	37	58	1-3	NW	30% / 20% POI
1100	55	45	35	46	2-5	E SE var.	30% / 20% POI
1130	55	45	-	46	2-5	NW var.	30% / 20% POI
1200	58	46	34	40	2-5	E var.	40% / 30% POI
1230	61	48	35	38	2-5	E var.	50% / 30% POI
1300	59	46	32	36	5-7	E var.	50% / 30% POI
1330	58	45	31	35	5-7	E var.	50% / 30% POI
1430	57	45	32	39	2-5	E	50% / 30% POI
1500	58	45	-	35	5-7	SE	40% / 30% POI

**Fire Behavior Observations :**

Fire behavior observations were recorded periodically as fire progressed through Radio Tower burn unit. Rate of spread (ROS) and flame lengths (FL) were documented at numerous random locations and at both fire monitoring plots: NGP 01 and NGP 02. Observations were made in native mixed-grass fuels (fuel model 1) as well as ash and juniper woody draw (fuel model 5).

10/4 Time	Location	Fire Type	ROS	FL	Comments
1055	Radio Tower Test	H	3-5	2-5'	Fire Behavior x3 w wind alignment.
1055	Radio Tower Test	B	.5-1	3-12"	Fire behavior x10 w wind alignment.
1111	North side of unit	B	1.25	3-12"	<3% slope
1130	West side of unit	B	1.5	4-16"	<3% slope
1200	NGP 02	B	3-4	1-3'	Sage component introduced
1230	NGP 02	H	10 +	1-5'	Wind alignment = head fire
1311	Ash Coulee (DP3)	H	4	1-10'	Torching in live and dead trees
1330	NGP 01	F	6-8	2-3'	Two flanks merged in the NGP plot.
1330	NGP 01	B	1-2	6-12"	5% slope
1330	NGP 01	H	6-8	1-4'	5% slope

ROS= chains per hour (c/h)

**Smoke Observations :**

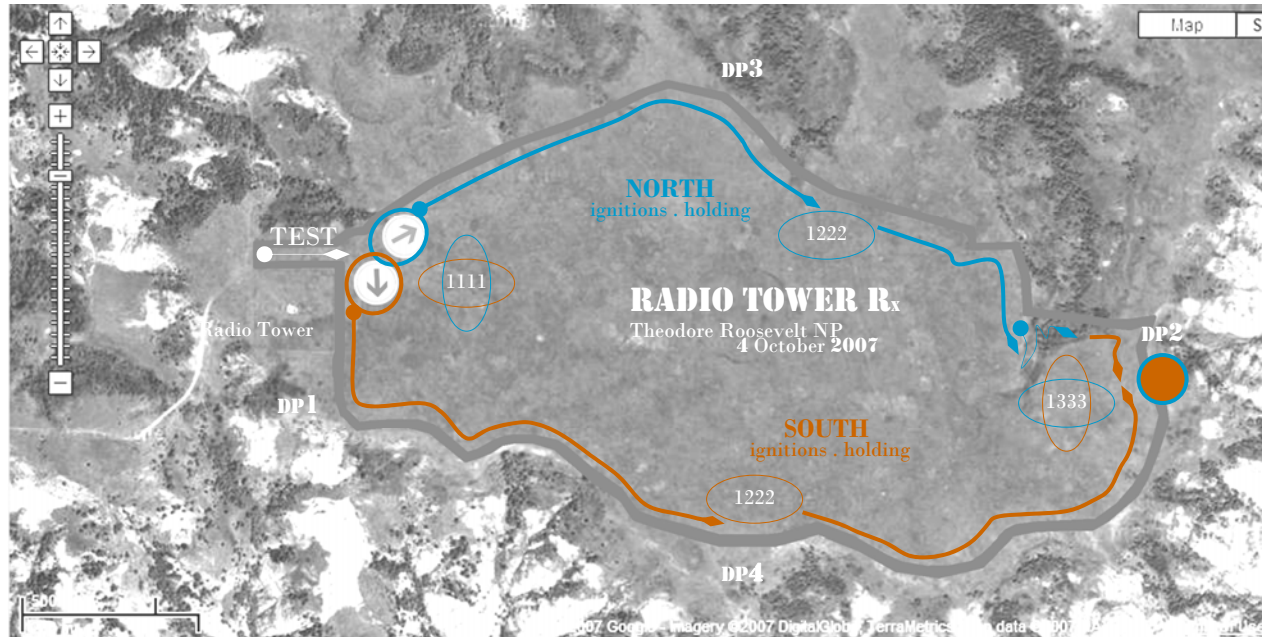
Smoke columns drifted apart after limited rise (100-300 ft) due to stable atmospheric conditions. The smoke was directed by variable wind, therefore fireline visibility relied heavily upon wind direction. Fireline visibility ranged from 40 to 70% throughout the burn.



NGP 02 plot installation | 25 July 2007 | View north from A0



NGP 02 backing fire | 04 October 2007 | View east from A0

**Fire Progression :**

10.04.2007 ::

Radio Tower burn unit ::

After 0830 briefing, fire personnel assumed positions on the Radio Tower burn unit. First, a test burn was completed directly north of the radio tower enclosure. This test burn was initiated at 1045 and was concluded at 1100. Fire was drawn from W to E, in accordance with the wind conditions of the hour. This fire exhibited both backing and head fire behavior characteristics.

1111 marked the initiation of Radio Tower prescribed fire. Two divisions were announced, (1) NORTH ignitions and holding (2) SOUTH ignitions and holding. Fire was drawn along mow lines, simultaneously to the North and South, circumscribing the fire perimeter. Winds were light and variable and the topography was minimal (slope mesa top) with consistent mixed grass prairie fuel. Fire behavior varied from backing to head to flanking dependent upon variable wind direction.

NORTH division and SOUTH division worked parallel to one another reaching DP3 and DP4 respectively at 1222. Then, SOUTH continued lighting the south perimeter until NORTH division ignitions reached a small woody draw due west of DP2. This draw required extra attention in order to fire with consideration to complex slope and fuel conditions. Once the draw was burned through, SOUTH split into two squads and finished burning the east perimeter of the burn unit, while NORTH held the perimeter of the woody draw and put out spots and embers that were drifting down drainage towards the wilderness area of THRO south unit.

Firing operations on the Radio Tower burn unit were concluded at DP2, time 1333. At this point the FEMO (t) assessed plot burn severity, while NORTH and SOUTH division mopped up and gathered round for an 1600 After Action Review at radio tower enclosure.

Two NGP style fire monitoring plots were burned. **NGP 01** and **NGP 02**.

**NGP 01 :**

Complete burn period : 1315 – 1337

Notes: Backing fire from W to E [1-2 chains/hr in grass] | Head fire from E to W [10+ chains/hr in grass] | Flanking fire [4 chains/hr in grass]

**NGP 02 :**

Complete burn period : 1200 – 1243

Notes: Backing fire from S to N [4 chains/hr in grass] | Head fire from N to S [10+ chains/hr in grass] | No flanking fire recorded



Fire in NGP 02 | Foreground backing fire | Background head fire

**Soil moisture :**

The soil moisture averaged 3% on **NGP 01** and **NGP 02** plots. Minimal precipitation had accumulated in the 30 days prior to Radio Tower prescribed burn.

**Biomass :**

Biomass ranged from 0.81 to 2.71 tons/Acre, with an average of 1.72 tons/Acre. All samples were collected in a native mixed grass prairie ecosystem.

**Post burn severity analysis :**

Post burn severity notes indicate that **NGP 01** vegetation was 55% moderately burned and 45% lightly burned, while substrate was 100% lightly burned. **NGP 02** vegetation was 15% moderately burned, 65% lightly burned and 20% scorched, while substrate was 10% moderately burned and 90% lightly burned.

**Conclusions :**

Fire monitoring plots **NGP 01** and **NGP 02**, within Radio Tower burn unit, will be monitored at 1, 2, 5, and 10 year post-burn intervals.