

**J. CLARK SALYER NATIONAL WILDLIFE REFUGE  
PRESCRIBED BURN PLAN PACKAGE - FY-2003**

Refuge or Station: J. Clark Salyer National Wildlife Refuge

Unit: Unit G-50 Aspen Parkland

Prepared By: \_\_\_\_\_ Date:  
                  Brian Riddle - FMO

Reviewed By: \_\_\_\_\_ Date:  
                  Lisa Lang- Refuge Manager

Reviewed By: \_\_\_\_\_ Date:  
                  Prescribed Fire Burn Boss

Reviewed By: \_\_\_\_\_ Date:  
                  Regional Fire Management Coordinator

Reviewed By: \_\_\_\_\_ Date:  
                  Zone Fire Management Officer

The approved Prescribed Fire Plan constitutes the authority to burn, pending approval of Section 7 Consultations, Environmental Assessments or other required documents. No one has the authority to burn without an approved plan or in a manner not in compliance with the approved plan. Prescribed burning conditions established in the plan are firm limits. Actions taken in compliance with the approved Prescribed Fire Plan will be fully supported, but personnel will be held accountable for actions taken which are not in compliance with the approved plan.

Approved By: \_\_\_\_\_ Date:

BURN DAY Concurrence by Refuge Manager? YES      NO (Circle One)

Refuge Manager Signature: \_\_\_\_\_ Date:

## PRESCRIBED FIRE PLAN

Refuge: J. Clark Salyer NWR Refuge Burn Number: #9  
Sub Station: \_\_\_\_\_ Fire Number: \_\_\_\_\_  
Name of Area: Unit G-50 including subunits G-50 c-h  
Acres To Be Burned: 630 acres Perimeter Of Burn: 4.5 miles  
Legal Description: Lat. 48'31" Long. 100'31"  
TWP: 158 N. RANGE: 76 Sec: 7 Qtr. Sec: W 1/2, W1/2 E1/2  
158 N. Range: 77 Sec: 12 Qtr. Sec: E1/2, E1/2 NW1/4

County: McHenry, North Dakota

Is a Section 7 Consultation being forwarded to Fish and Wildlife  
Enhancement for review ? Yes No X

### **I. General Description of Burn Unit:**

This is a large 630 acre unit consisting of 495 acres of short prairie grasses less than 2 feet tall, with 135 acres of scattered stands of aspen and isolated oak trees on north facing slopes of sandhill ridges. Topography is generally flat with the exception of three large sandhill ridges in the interior of the unit. A dirt refuge road is along the north side and a 2-track, refuge dirt road is along the east side. Refuge and private grassland lie along the south and west sides. The west side of the burn will be held along a mowed line and the south side is mow line along half its length and disced line along the other half where the unit abuts private grasslands (hay fields). The size of the burn, expanses of aspen, difficult topography in the sandhills, and the need to burn the unit during higher than normal fire behavior conditions to achieve results will make this a more difficult burn than most on this station.

**Physical Features and Vegetation Cover Types:** Prairie grasses and exotic invader species, mainly cool-season varieties (stipas, bromus, Kentucky bluegrass) less than 2 feet tall. Aspen clumps are scattered throughout the unit and are expanding. Litter accumulation is not excessive because much of the tract has been burned or grazed in the last 4 years. Aspen suckers produced from the Sept. 1992 wildfire have increased the size of the aspen stands considerably. This wildfire also killed a substantial amount of the older growth aspen clumps, increasing fuel loadings in these areas and raising the expected fire behavior considerably.

### **Primary Resource Objectives of Unit:**

- 1) Establish and maintain a hazard fuel reduction program for the unit to minimize effects of wildfire and costs involved in suppression efforts while increasing the efficiency and safety of suppression operations.
- 2) Control aspen expansion into the native grassland through prescribed burning.
- 3) Enhance and protect remaining native prairie areas to provide native grassland ecosystems to support indigenous species of plants and animals.
- 4) Reduce presence of undesirable plant species including western snowberry, bromus, Kentucky bluegrass, aspen and other non-typical brush species.

### **Objectives of Fire:**

- 1) Reduce hazard fuel loadings to protect personnel, visitors and adjacent private property.
- 2) Stabilize or set back invasion by woody plant species.
- 3) Remove accumulated litter and rejuvenate warm season native grasses.
- 4) Reduce exotic grasses to 10-20% coverage over 10-15 years.

### **Acceptable Range of Results:**

- 1) Burn 80-100% of the unit and 50-100% of the fuels.
- 2) Reduce litter accumulation by 50-90%.
- 3) Reduce exotic grass coverage by 5-40%
- 4) Reduce aspen and other woody vegetation by 10 to 50% over the next 20-30 years.

## II. PRE-BURN MONITORING

**Veg. Cover Types: (species, height, density, etc.)** Prairie grasses and exotic invader species, mainly cool-season varieties (stipas, bromus, Kentucky bluegrass) less than 2 feet tall. Aspen clumps are scattered throughout the unit and are expanding due to suckering produced from the Sept. 1992 wildfire. Aspen stands vary from old decadent overmature stands with heavy large fuel loadings (fuel model 10) to new growth from the A92" fire in dog-hair thickets from 3 to 20 feet in height (fuel model 5/6) and the typical mature, healthy stands (fuel model 9). The sandhills harbor a variety on unusual vegetation including oaks, elm, sumac and chokecherry not commonly found in the grassland areas. This is a very diverse unit both vegetatively and topographically.

Vegetation Type	Acres	%	Fuel Model
grasses, mainly cool-season	465	74	1
Aspen, fire killed, 1992 fire	40	6	9/10
Aspen, healthy mature stands, oak, sandhills brush	95	15	9
Aspen, new growth since 1992 burn	30	5	5/6
<b>Total</b>	<b>630</b>	<b>100</b>	

**Habitat Conditions:** The majority of the unit consists of short prairie grasses and exotic invader species, mainly cool-season varieties (stipas, bromus, Kentucky bluegrass) less than 2 feet tall. Exotic grasses have increased significantly with the lack of fire and are the dominant vegetation in a significant portion of the unit. Aspen and other woody intrusive species have been expanding in the unit for years. The NE corner of the unit was burned in a wildfire in September of 1992 and harbors heavy large fuel loadings due to aspen die-off following the fire. Aspen clumps are typically expanding with new growth around the edges. Sandhills are rugged and relatively high for the area. Often the south slopes are sparsely covered with grasses and forbs while the north sides are predominantly tree and shrub covered.

**Type of Transect:** Vegetation and native bird surveys have been conducted in this unit as a baseline for future monitoring efforts. A number of point source plots and vegetative transects were completed in the summer of 1996. Post burn sampling will also be conducted. This area of the refuge is scheduled for GIS mapping in 1997 and will be burned on a rotational bases for the next 20 to 30 years. Monitoring will continue throughout this period with data and GPS plot points entered into GIS plot maps. This is a long term study.

**Photo. Documentation:** Historical aerial photos from 1938, 1968, and 1991 are available for the unit and are useful for vegetative comparisons over time. The 1991 maps, or more current versions if available, will be digitized into a GIS database. Future aerial photo=s will also be digitized allowing for comparison studies over time.

## III. PLANNING AND ACTIONS

**Complexity Analysis Results:** Normal. The burn is moderately complex for this area due to the variety of vegetation and fuel loading, size and topography of the unit, required burn team size and treatment objectives. Smoke management should not pose much of a problem though as there are no smoke targets within two and a half miles downwind of the burn with the exception of County Road 17. This is a gravel road that receives minimum traffic and is still a mile south of the burn. There is one seasonal residence a mile south of the burn, but this should not be inhabited at the time of the burn (occupied from mid June through the beginning of September). Due to the size of the unit and potential holding problems, assistance will be required from off station if the unit is all burned on the same day. If the east and south lines are blacklined prior to the main burn, our staff will be sufficient to conduct the burn.

**Site Preparation:** A large amount of site prep has already been accomplished on this unit. In 1995 the trail along the east side and the border along the south were widened and cleared under contract with a drum chopper. This machine basically chops trees and brush into wood chips and distributes them on

site. The contract was utilized to remove aspen stands and other brush along the south, east and west borders of the unit to remove some of the highest potential problem areas. Our fire crew and the SCA prescribed burn team work on the east and south sides for several days in 1996, removing and standing dead trees from within 100 feet of the lines. The crew also spent a week clearing the west fire line of aspen stands adjacent to the line and cleaned up other work done by the drum chopper to widen lines on this side. In 1996 mow lines were established along the west and half of the south line a minimum of 20 feet wide. The other half of the south line was prepped in 1996 with the establishment of a 10 foot wide disked line along the refuge border with private hay fields to the south. Internal mow lines were cut in the fall of 1996 along the east, west and south line to enable preburning of blacklines in these areas ahead of the main burn. 80% of the east line was blacklined between 20 and 100 feet wide in the fall of 1996 as well in preparation of the burn in the spring of 1997. If time allows, this will be completed along the south side in the spring of 1997 to expedite ignition of the main unit.

Remaining site prep includes a few more days of saw work along the north, south and west sides, and marking of interior firing trails prior to the main burn. These trails are needed to guide the ignition crew through the center of the unit for safety reasons. The plan is to mow strips from east to west through the unit to allow ignition crew members to walk along these mowed paths while firing. This will insure that individuals do not lose their way, will facilitate finding them if a problem should occur, and will provide a safety zone to deploy in a worst case situation. The other alternative would be to flag each route with flagging tape and/or stick flags. This method would also work but would not provide the benefits that mowed lines would. The topography of the lines will determine which method is used along each line.

If time and conditions allow, the burn would go much smoother if the south line and the remaining 20% of the east line blacklines were burnt out prior to the main burn. This is not a requirement, but it would make the main burn much easier and quicker to accomplish and would require fewer people the day of the burn.

**Special Constraints and Considerations:** According to the available literature and previous research related to spring burning of aspen, the conditions needed to achieve success also provide heightened fire behavior including increased spotting potential. Fire must be allowed to back into the downwind sides a minimum of 300 feet before any wide strip head firing is completed. Strip head firing can be used to widen these lines through the grass areas, but through the aspen clumps any strips must be kept to 10 feet wide or less. Contingency plans have been made in the event an escape occurs (see contingency planning section and associated maps). Due to the topography and vegetation of surrounding areas, direct attack will prove difficult if not impossible. Indirect attack will have to be utilized quickly if the initial attack fails. Secure indirect attack lines with adequate anchor points are located up to three miles away from the burn unit in places (SE corner). The backing fire progression will need to go slow and additional holding forces will be required until the lines have been widened to at least 300 yards (maximum spotting distance for prescription conditions)

Span of control will be another consideration. A burn boss (RXB2), holding boss and ignition specialist will be required. There will be too much happening for one person to attempt to function in more than one of these positions.

Although there are no smoke management target areas within a mile of the burn, smoke may still be a problem. The size of the unit, along with the amount of 10, 100 and 1000 hour fuels, will cause residual smoke for the next day or two. Mop-up will continue the day after the burn to eliminate as much of this as possible, but we will have to constantly monitor the situation in the event weather conditions and residual smoke combine to cause problems downwind.

**Other Safety Hazards:**

Listed above! Special attention will be paid to internal ignition operations and communications. This will be vital. All burn crew members will have refuge frequency radios and all will carry a spare battery in their gear during the burn. Only one internal strip will be ignited at a time, and teams of two will be utilized to increase the safety factor.

**Weather information required:** The Burn Boss will be responsible for obtaining weather information. Current weather information will be recorded the morning of the scheduled burn. A **Spot Weather Forecast** will be obtained (if available) from the National Weather Service in Bismarck (1-800-247-0212 or 1-701-223-4582). Weather information will be taken with a belt weather kit hourly during the burn and will be recorded on the forecast form and attached to this plan. Automated Weather System (A.W.S.) data, if

available, will be collected from the refuge station and utilized for fire effects monitoring. If available, weather forecasting from Weatherbrief will be utilized and compared to NWS forecasts for increased prediction accuracy.

**PRESCRIBED BURN COMPLEXITY ANALYSIS WORKSHEET**

Using the attached criteria, rate each element on a scale of 1 to 10, then multiply by the weighting factor (shown in parentheses in first column) to determine the weighted subvalues. Add the subvalues to determine the total weighted value which is used to determine the complexity of the prescribed burn.

**MANAGEMENT IGNITED PRESCRIBED BURNS:**

COMPLEXITY ELEMENT/ (WEIGHTING FACTOR)	RATING VALUE	WEIGHT SUBVALUE	LOW BURN COMPLEXITY	HIGH BURN COMPLEXITY
1. Potential for escape (10)	5	50	Very low probability.	High probability.
2. Values at risk (10)	3	30	Very little risk to people, property, resources.	Great risk to people, property, resources.
3. Fuels/fire behavior (5)	5	25	Mostly uniform and predictable.	Great variability & unpredictability. Prescription includes very low fuel moisture conditions.
4. Fire duration (5)	3	15	Fire generally of short duration & require little management.	Fires of long duration & require continuous management.
5. Smoke/air quality (7)	3	21	Smoke impacts are low or insignificant.	Smoke sensitive areas frequently affected.
6. Ignition methods (3)	5	15	Simple & rarely hazardous.	Highly technical or frequently hazardous.
7. Management team size (3)	7	21	Burn requires a few generalized positions.	Burn requires large team of separate, specialized positions.
8. Treatment objectives (7)	5	35	Objectives simple & easy to achieve. Prescriptions are broad & encompass safe burning conditions.	Objectives are difficult to achieve. Prescriptions are restrictive or burning conditions are risky.
<b>Total Weighted Value:</b>		<b>212</b>	<b>Normal Complexity</b>	

Low Complexity: 50 - 115 Total Weighted Value Points  
 Normal Structure: 116 - 280 Total Weighted Value Points  
 Complex Structure: 281 - 450 Total Weighted Value Points

\_\_\_\_\_  
 Brian Riddle  
 Prepared by (RXBB/FMO)

\_\_\_\_\_  
 January 21, 2003  
 Date

**Safety considerations and protection of sensitive features:**

The north side of the unit is bordered by a refuge gravel road, the east side by a refuge trail, the west side is a mow line and the south border consists of half disked line and half mown line. There is one seasonal (summer only) residence one mile south of the burn, two residences a little over one mile west of the burn, 2 farmsteads three miles to the SE of the burn, one 3 miles south and two farmstead 2+ miles to the SW. County road 17, a gravel road receiving minimal traffic, is located one mile to the south. Private hayfield border the south boundary and the remainder of the unit borders on refuge lands. Safety considerations include possible spotting and escape potential, interior ignition sequences, and residual smoke concerns due to the size of the unit and heavy fuel loadings. Gail Natwick lives a little over a mile straight west from the NW corner of the burn. She has numerous health problems and we need to insure smoke does not impact her.

All personnel will wear the required PPE equipment (Nomex clothing, boots, fire shelter, gloves, hard hat, ear and eye

protection) at all times. All fire management activities will be in accordance with policies listed in 6 RM 7. Fire personnel will be briefed on escape routes and safety zones. The soil firebreaks, gravel roads, burned areas, wetlands and cropland will serve as safety zones. **(SEE ATTACHED MAPS)**

Smoke dispersal will be monitored during the burn to insure that smoke sensitive areas, especially the occupied farmsteads west, SW and SE of the burn and the gravel road are not adversely affected. Adjacent landowners and local VFD's will be notified on the day of the burn.

**Media Contacts:** General news release pertaining to the prescribed fire program will be submitted to local news agencies prior to the initiation of prescribed burning in the spring. **Contacts will include the** Mouse River Journal 537-5610, Bottineau Courant 228-2605, Minot Daily News 852-3341, and KBTO Radio 228-5150.

**Communication and Coordination on the Burn:** All burn crew members will have access to refuge frequency radios, either hand held or mobile. All crew members using hand held radios will carry a spare radio battery with them at all times during the burn. The burn boss will have radio contact with refuge headquarters and State radio communications capability. All engines have mobile, refuge frequency radios. The burn boss will coordinate all activities during pre-burn, burn, and post-burn operations.

**IV. IGNITION, BURNING AND CONTROL**

**Scheduling: Approx. Date(s)** 4/15 to 6/15, 8/15 to 11/15  
**Time of Day** 10:00 a.m. Start

**Actual**

**Acceptable Range**

<b>FBPS Fuel Model <u>1/3</u></b>	<b>Low</b>	<b>High</b>	<b>Actual</b>
<b>Temperature</b>	55	89	
<b>Relative Humidity</b>	25	50	
<b>Wind Speed (20' forecast)</b>	5	20	
<b>Wind Speed (mid-flame)</b>	5	12	
<b>Cloud Cover (%)</b>	0	100	
<b>ENVIRONMENTAL CONDITIONS</b>	No rain in past	5 days needed	
<b>Soil Moisture(%)</b>	Moist w/in	6" surface	
<b>1 hr. Fuel Moisture (%)</b>	5	10	
<b>10 hr. FM (%)</b>	6	15	
<b>100 hr. FM (%)</b>	10	20	
<b>Woody Live Fuel Moisture</b>	N/A	N/A	
<b>Herb. Live Fuel Moisture</b>	N/A	N/A	
<b>Litter/Duff Moisture</b>	Moist W/IN	6" SURFACE	
<b>FIRE BEHAVIOR</b>			
<b>Type of Fire (H,B,F)</b>	BACK/FLANK	HEADFIRE	
<b>Rate of Spread(FT/MIN)</b>	4 to 14	30 to 482	
<b>Fireline Intensity</b>	53 to 194	366 to 6926	

<b>Flame Length(FT)</b>	2.8 to 5.1	6.8 to 26.3	
<b>Energy Release Component NFDRS Fuel Model <u>L/F/G</u></b>	4 to 6	10 to 16	

All fire behavior values based upon available literature required for target response. Literature cited includes; Spring Fires in Semi-Mature Aspen Stands in Central Alberta, Forestry Canada, Northwest Region, Information Report NOR-X-323, 1991; Predicting Fire Behavior in Canada's Aspen Forests, Forestry Canada, 1990; USDA Forest Service, Research Note NC-171, Repeated Prescribed Burning in Aspen, Donald A. Perala, North Central Forest Experimental Station, 1974; and Prescribed Burning in an Aspen - Mixed Hardwood Forest, USDA Forest Service, North Central Forest Experimental Station, 1973. See also attached BEHAVE runs for fuel models 1, 5, 6, 9 and 10.

FUEL MODEL 1

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=====
RATE OF SPREAD, CH/H      HEADFIRE          (V4.1)
=====
1-HR | MIDFLAME WIND, MI/H
MOIS |
  | 2.0  4.0  6.0  8.0 10.0 12.0 14.0
(%) |-----
  |
4.0 | 20.  69. 154. 275. 345.* 345.* 345.*
  |
5.0 | 19.  64. 143. 255. 297.* 297.* 297.*
  |
6.0 | 18.  61. 135. 242. 270.* 270.* 270.*
  |
7.0 | 17.  57. 127. 228. 242.* 242.* 242.*
  |
8.0 | 15.  52. 117. 199.* 199.* 199.* 199.*
  |
9.0 | 13.  45. 101. 136.* 136.* 136.* 136.*
  |
10.0 | 10.  35.  65.* 65.* 65.* 65.* 65.*
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=====
FIRELINE INTENSITY, BTU/FT/S  HEADFIRE          (V4.1)
=====
1-HR | MIDFLAME WIND, MI/H
MOIS |
  | 2.0  4.0  6.0  8.0 10.0 12.0 14.0
(%) |-----
  |
4.0 | 35. 121. 270. 484. 607.* 607.* 607.*
  |
5.0 | 32. 109. 242. 433. 504.* 504.* 504.*
  |
6.0 | 29. 101. 224. 402. 449.* 449.* 449.*
  |
7.0 | 27.  93. 206. 369. 392.* 392.* 392.*
  |
8.0 | 23.  81. 179. 305.* 305.* 305.* 305.*
  |
9.0 | 18.  62. 138. 186.* 186.* 186.* 186.*
  |
10.0 | 11.  37.  70.* 70.* 70.* 70.* 70.*
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FUEL MODEL 1

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=====
FLAME LENGTH, FT      HEADFIRE          (V4.1)
=====

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1-HR MOIS (%)	MIDFLAME WIND, MI/H							
	2.0	4.0	6.0	8.0	10.0	12.0	14.0	
4.0	2.3	4.1	5.9	7.7	8.6*	8.6*	8.6*	
5.0	2.2	3.9	5.6	7.3	7.9*	7.9*	7.9*	
6.0	2.1	3.8	5.4	7.1	7.5*	7.5*	7.5*	
7.0	2.0	3.6	5.2	6.8	7.0*	7.0*	7.0*	
8.0	1.9	3.4	4.9	6.3*	6.3*	6.3*	6.3*	
9.0	1.7	3.0	4.3	5.0*	5.0*	5.0*	5.0*	
10.0	1.3	2.4	3.2*	3.2*	3.2*	3.2*	3.2*	

FUEL MODEL 1

=====

RATE OF SPREAD, CH/H      FLANKING FIRE      (V4.1)

=====

1-HR MOIS (%)	MIDFLAME WIND, MI/H							
	2.0	4.0	6.0	8.0	10.0	12.0	14.0	
4.0	5.	9.	13.	16.	17.	17.	17.	
5.0	5.	9.	12.	15.	15.	15.	15.	
6.0	4.	8.	11.	14.	14.	14.	14.	
7.0	4.	8.	11.	13.	13.	13.	13.	
8.0	4.	7.	10.	12.	12.	12.	12.	
9.0	3.	6.	8.	9.	9.	9.	9.	
10.0	3.	5.	6.	6.	6.	6.	6.	

=====

FIRELINE INTENSITY, BTU/FT/S      FLANKING FIRE      (V4.1)

=====

1-HR MOIS (%)	MIDFLAME WIND, MI/H							
	2.0	4.0	6.0	8.0	10.0	12.0	14.0	
4.0	9.	16.	23.	28.	30.	30.	30.	
5.0	8.	15.	20.	25.	26.	26.	26.	
6.0	7.	14.	19.	23.	24.	24.	24.	
7.0	7.	12.	17.	21.	22.	22.	22.	
8.0	6.	11.	15.	18.	18.	18.	18.	
9.0	5.	8.	11.	13.	13.	13.	13.	
10.0	3.	5.	7.	7.	7.	7.	7.	

FUEL MODEL 1

FLAME LENGTH, FT		FLANKING FIRE (V4.1)						
1-HR MOIS	MIDFLAME WIND, MI/H	2.0	4.0	6.0	8.0	10.0	12.0	14.0
4.0	1.2	1.6	1.9	2.1	2.1	2.1	2.1	2.1
5.0	1.2	1.5	1.8	2.0	2.0	2.0	2.0	2.0
6.0	1.1	1.5	1.7	1.9	1.9	1.9	1.9	1.9
7.0	1.1	1.4	1.7	1.8	1.8	1.8	1.8	1.8
8.0	1.0	1.3	1.6	1.7	1.7	1.7	1.7	1.7
9.0	0.9	1.2	1.4	1.5	1.5	1.5	1.5	1.5
10.0	0.7	0.9	1.1	1.1	1.1	1.1	1.1	1.1

FUEL MODEL 1

RATE OF SPREAD, CH/H		BACKING FIRE (V4.1)						
1-HR MOIS	MIDFLAME WIND, MI/H	2.0	4.0	6.0	8.0	10.0	12.0	14.0
4.0	3.	5.	7.	8.	9.	9.	9.	9.
5.0	3.	5.	6.	8.	8.	8.	8.	8.
6.0	3.	4.	6.	7.	7.	7.	7.	7.
7.0	2.	4.	6.	7.	7.	7.	7.	7.
8.0	2.	4.	5.	6.	6.	6.	6.	6.
9.0	2.	3.	4.	5.	5.	5.	5.	5.
10.0	1.	2.	3.	3.	3.	3.	3.	3.

FIRELINE INTENSITY, BTU/FT/S		BACKING FIRE (V4.1)						
1-HR MOIS	MIDFLAME WIND, MI/H	2.0	4.0	6.0	8.0	10.0	12.0	14.0
4.0	5.	9.	12.	14.	15.	15.	15.	15.
5.0	5.	8.	11.	13.	13.	13.	13.	13.
6.0	4.	7.	10.	12.	12.	12.	12.	12.
7.0	4.	7.	9.	11.	11.	11.	11.	11.
8.0	3.	6.	8.	9.	9.	9.	9.	9.
9.0	3.	4.	6.	7.	7.	7.	7.	7.

10.0 | 2. 3. 3. 3. 3. 3.

FUEL MODEL 1

FLAME LENGTH, FT	BACKING FIRE (V4.1)						
1-HR MOIS (%)	MIDFLAME WIND, MI/H						
	2.0	4.0	6.0	8.0	10.0	12.0	14.0
4.0	1.0	1.2	1.4	1.5	1.6	1.6	1.6
5.0	0.9	1.2	1.3	1.5	1.5	1.5	1.5
6.0	0.9	1.1	1.3	1.4	1.4	1.4	1.4
7.0	0.8	1.1	1.2	1.3	1.4	1.4	1.4
8.0	0.8	1.0	1.2	1.3	1.3	1.3	1.3
9.0	0.7	0.9	1.0	1.1	1.1	1.1	1.1
10.0	0.6	0.7	0.8	0.8	0.8	0.8	0.8

**Cumulative effects of weather and drought on fire behavior:** Weather and drought conditions will be monitored prior to the burn. Drought indexes will be followed utilizing a variety of methods in order to present the best overview of actual conditions due to the unavailability of a current system for North Dakota that has proven accuracy. Systems monitored may include the Palmer Drought Index, Keetch/Byram Drought Index, State of North Dakota rangeland fire danger index, and NFDRS indices including Burning Index, Energy Release Component, Ignition Component and others. These factors will be computed either by on site RAWs stations, acquired from the NWS, Billings Dispatch Center or through Internet data acquisition.

All available factors will be considered to determine if conditions are present which will give the desired results and what effects those conditions may have on fire behavior. A test burn will be ignited prior to the main burn and will show expected fire behavior. No burning will be done when the Rangeland Fire Danger Index is in the extreme category or when Red Flag Watches or Warnings are present.

**Although drought conditions are not desired for this burn, we will need a minimum of five days of no rain prior to ignition.**

**Ignition Technique:** Ignition will be done using hand-held drip torch(es). A backing fire will be used to establish blacklines on the downwind side(s) along the firebreak. Ignition sequence will depend on wind direction, working into the wind whenever possible. The actual firing pattern will be decided the day of the burn by the burn boss based on personnel and equipment availability, weather, and fuel conditions. Regardless of conditions, backing fires will be employed on all baselines, specially sensitive locations, and areas with possible holding problems. **(SEE SAMPLE IGNITION SEQUENCE ON ATTACHED MAPS)**

**Prescribed Fire Organization:** Minimum crew size will be 12 including a fully qualified burn boss (RXB1 OR RXB2 can be utilized on this burn), ignition specialist, and holding specialist. Other positions may be filled if deemed necessary to maintain adequate span of control or for training purposes. The crew size of 12 can be used if black lines along the downwind boundaries have been established prior to the main burn. If this has not occurred, a minimum crew size of 15 will be needed including 14 field personnel and one dispatcher. If available, more than the minimum numbers of crew members can be utilized. **(SEE ATTACHED FLOW CHARTS)**

**Other:** N/A

**Prescription monitoring:** Weather will be monitored hourly during the burn. Temperature, relative humidity, wind direction and speed, fire behavior and fire intensity will be closely monitored and recorded to insure conditions remain within prescription parameters. Hourly weather monitoring will be accomplished on site utilizing a belt weather kit. One member of the burn team will be assigned this duty and hourly weather reports will be broadcast to all crew members over the crew radio. If necessary, the burn boss may also call in to refuge headquarters and request a current spot weather forecast or current readout of the station RAWS unit. If weather parameters differ from those outlined in this plan, a decision will be made by the burn boss and refuge manager as to whether the burn should be terminated. If the corresponding decision is to continue with the burn, an addendum will be written justifying this decision, will be signed off by the burn boss and refuge manager, and will be attached to the plan.

## V. SMOKE MANAGEMENT

**Permits required:** A burn permit will be obtained from North Dakota Department of Health prior to ignition.

### **Distance and Direction from Smoke Sensitive Area(s):**

**TARGET AREAS:** There is one seasonally occupied farmstead (summer only) located a mile south of the burn as is County Road 17, a gravel road that receives minimum traffic. Two occupied farmstead are located a little over a mile straight west from the NW corner of the burn. One of these residences is occupied by Gail Natwick, who has serious health problems and could be adversely affected by smoke. There are five additional occupied farmsteads between two and three miles from the unit to the S, SW and SE.

**Smoke signs will be available at the refuge fire cache. These signs will be carried to the burn and can be placed at strategic locations if necessary. State and county law enforcement personnel will be notified immediately of any impending smoke problems and will be asked to provide assistance.**

### **Necessary Transport Wind Direction, Speed and Mixing Height:**

**TRANSPORT WIND SPEED (MPH):** 8+

**WIND DIRECTION:** N, NW, W preferred, but any except E, SE or NE may be used.

**MIXING HEIGHT (FT):** >1640

**ATMOSPHERIC STABILITY (STAG):** <7 Unstable

If available, this information will be obtained from the NWS or Weatherbrief as part of the Spot Weather Forecast.

### **Visibility Hazard(s):**

Same as Smoke Sensitive Areas listed above. Heavy smoke may also occur along the fire perimeter directly impacting fire crew members.

**Actions to Reduce Visibility Hazard(s):** All burning parameters as specified in this plan will be followed. Planned wind and atmospheric conditions will allow smoke to rise and disperse. The burn will not be conducted with a wind direction which will put smoke directly into or over the occupied farmsteads that are within a half mile of the burn. Smoke management contingency plans will be initiated immediately if needed. No burning will be done on an east wind that could push smoke into Gail Natwicks property.

Mop-up will begin as needed when firing is completed. If warranted, mop-up will continue after the burn until all smokes are extinguished. The amount of mop-up needed will be determined by the burn boss depending upon weather and other factors. Fire engines used in the vicinity of the firelines where personnel are working will travel slowly and have their headlights on at all times. Communication between engine operators and fire line personnel will be maintained for the duration of the burn, and all line personnel will be made aware of equipment movements.

Visibility hazards will be discussed during the pre-burn briefing. If exposed to heavy smoke, fireline personnel will be rotated out of heavy smoke areas on a regular basis to allow their vision to clear and to limit exposure to carbon monoxide.

**Residual Smoke Problems:** Mop-up will be an ongoing process as the burn progresses, with engine crews mopping up areas along the line as time permits. If warranted, a complete mop-up will be conducted. Burning will be initiated as early in the day as possible to allow total smoke dissipation prior to nighttime inversion development. All attempts will be made to complete burning by the middle of the day when fuels are driest to allow more complete combustion. Due to the size of the burn and heavy loadings of 10, 100 and 1000 hour fuels, mop-up may need to be ongoing for several days following the burn. The mop-up will continue until either all smokes are out or smoke emissions are at such a low level that they will not impact target areas.

**Smoke Management Contingency Planning:** Smoke signs are available in the refuge cache and will be brought to the site on the day of the burn. These will be utilized on area roads if needed. Burn personnel will monitor smoke dispersal throughout the burn and will take necessary actions in the event that possible smoke management problems develop. Smoke management mitigation may include extensive mop-up, early shut-down of firing, smoke sign placement, traffic control by refuge personnel, state police, county sheriff or department of transportation notification and request for assistance, temporary closure of refuge or county roads, and any other actions deemed appropriate by the burn boss.

VI. FUNDING AND PERSONNEL

Activity Code: 1260/9251/9252

**Planned Costs**

	<b>Equipment &amp; Supplies</b>	<b>Labor</b>	<b>Overtime</b>	<b>Staff Days</b>	<b>Total Cost</b>
<b>Administration (planning, permits, etc.)</b>	50	500	0	3	550
<b>Site Preparation</b>	900	2000	0	25	2900
<b>Ignition &amp; Control</b>	300	2000	500	20	2800
<b>Travel/Per Diem</b>	0	0	0	0	0
<b>Total</b>	1250	4500	500	48	6250

**VII. BURN-DAY ACTIVITIES**

**Public/Media Contacts on Burn Day:**

Upham VFD (768-2900) or Upham Elevator (768-2541), Towner VFD (537-5151), Gary & Gail Natwick (768-2620), Karlyle Erickson (776-6837), Richard Stigen (537-5171) **(SEE ATTACHED PHONE CONTACT SHEET)**

**Crew & Equipment Assignments:** \*Needs will be determined by the burn boss the day of the burn depending on weather, site conditions, and staff availability. At a minimum there will be a holding boss, firing boss and burn boss. **(SEE ATTACHED BURN ORGANIZATIONAL CHART)**

**Burn Boss/Manager -**

**Ignition Specialist -**

**Ignition Crew -**

**Holding Supervisor -**

**Holding Crew/Fire fighter -**

**Dispatcher-**

**Other -**

12 person crew (minimum), 3 pumper units, 1 pumper/wetliner (1,000 gal.) water tanker (5,000 or 2,600 gal. parked and available for refilling pumpers), 2 ATV's with electric pumper or back pack pumps, 1 4x4 pickup. Personnel and equipment will be selected and job assignments made on burn day. One pumper crew will be used to respond to any spot fires which may occur outside the burn unit. An individual may serve more than one position. Additional personnel may be utilized if available.

**Crew Briefing Points:** A pre burn briefing will be conducted by the burn boss prior to the start of ignition. All personnel assigned to the burn will be briefed and will have maps of the unit. The following checklist will be covered as will all aspects of the Go-No-Go checklist. A post burn briefing will also be held after the burn has been completed and prior to burn team members departing the area.

# **PRESCRIBED BURN BRIEFING OUTLINE:**

## **I. Handouts:**

- A. Map of Burn
- B. Organization Chart

## **II. Description of Burn Area**

- A. Objectives
- B. Vegetation Type
- C. Acreage
- D. Slope
- E. Roads/Access
- F. Values at Risk
- G. Water Sources
- H. Natural/Manmade Barriers

## **III. General and Spot Weather Forecast**

- A. Wind Direction and Speed
- B. Relative Humidity
- C. Temperature
- D. Fuel Moisture
- E. Atmospheric Stability
- F. Predicted Changes

## **IV. Burn Organization**

- A. Organizational Chart/Position Assignments
- B. Equipment Assignments
- C. Other Resources
- D. Escaped Fire Situations

## **V. Firing Sequence**

- A. Test Burn
- B. Type and Sequence of Firing Patterns
- C. Ignition Equipment (drip torch, flare pistol etc.)

## **VI. Communications**

- A. Procedures
- B. Frequencies/Channels
  - 1. Burn Crew
  - 2. Refuge Dispatch
  - 3. State Radio
  - 4. Aerial Ignition Personnel
  - 5. Other

## **VII. Safety**

- A. Escape Routes
- B. Safety Zones
- C. Hazards (power lines, wildlife, topography,
- D. Potential Problems
- E. Smoke Management
- F. Aviation
- G. Personal Protective Equipment
- H. Refueling Procedures

## **VII. Comments and Questions**

**Personnel Escape Plan:** This will be discussed during the pre-burn briefing and shown on the unit map. Escape routes and safety zones will include burned areas, firebreaks, cultivated cropland, harvested hay fields, sand ridges with sparse vegetation, mow lines on the interior, wetland areas and gravel roads.

**Special Safety Requirements:** Weather changes, erratic fire behavior, and the potential of fire smoldering or creeping through the litter accumulations along the blacklines/firebreaks will be stressed during the pre-burn briefing. Spotting up to 100 yards can be expected along the east and south sides. Refuge roads may require closure in the area of the burn. If so, road blocks will be established north of the unit at Johnson Bridge, south of the burn along county road 17 and west of the burn near the Natwick farm **(SEE ATTACHED TRAFFIC CONTROL MAP)**

**GO-NO-GO CHECKLIST**

- \_\_\_\_\_ **Burn plan complete and approved?**
- \_\_\_\_\_ **Burn prescription specifications met?**
- \_\_\_\_\_ **Smoke Management planning completed/prescription parameters met?**
- \_\_\_\_\_ **Current and projected weather favorable?**
- \_\_\_\_\_ **All required prescribed burn personnel on site and briefed?**
- \_\_\_\_\_ **All required equipment on site and functioning properly?**
- \_\_\_\_\_ **All Personnel briefed on hazards, escape routes, safety zones?**
- \_\_\_\_\_ **All required PPE in use?**
- \_\_\_\_\_ **Personnel functioning in critical positions qualified?**
- \_\_\_\_\_ **Are available resources (including backup) sufficient to contain anticipated escape situations?**
- \_\_\_\_\_ **Adequate contingency plan developed and implemented?**
- \_\_\_\_\_ **In your opinion, can the burn be carried out according to plan and will the burn meet minimal planned objectives?**
- \_\_\_\_\_ **Emergency medical plan reviewed?**
- \_\_\_\_\_ **Cooperators, media and adjacent landowners notified?**
- \_\_\_\_\_ **Firelines checked and complete?**
- \_\_\_\_\_ **Has the area been checked for visitors?**

**\*\*FINAL GO-NO-GO DETERMINATION: GO:\_\_\_\_\_ NO GO:**

**IF NO GO - EXPLAIN WHY?:** \_\_\_\_\_

**Burn Boss Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Refuge Manager Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Holding and Control:** Lines on the downwind side will have to be widened to at least 300 feet wide before any wide headfire strips are ignited. Spotting may occur along the east and south lines, crews will have to be alert for this possibility. Any spots that occur will have to be attacked immediately and aggressively, making sure to knock to the hot spots first to allow control. If fire escapes to adjacent lands to the south and east, indirect attack may be necessary. Coordination of the ignition crew will be of the utmost importance. See contingency planning maps.

**Critical Control Problems:** South and east lines may exhibit spotting. These will be burned out slowly with backing

fire and minor flank or spot/strip head with very short strip widths (10 feet or less) will be used to widen them to at least 300 feet prior to interior ignition. Be aware of aerial fuels igniting close to the line torching and throwing fire brands. All personnel will be briefed on contingency plans in the event of an escape.

**Water Refill Points:** A water tanker will be parked and available for refilling pumpers on the NE corner of the burn. There is also a water source (dugout) 1/4 mile east of the east side of the burn and a wetland off the SW corner. (See attached maps for location of water sources)

**Other:**

**Contingency Plan for Escaped Fires:**

Initial attack on any spots outside the line must be rapid and effective. If the fire gets away, it will have a long run to the nearest contingency lines. There are numerous refuge trails to the north, east and southeast, and county road 17 is located a mile south of the burn. With a NW wind, the contingency may include burning off county road 17 and tying into the Souris River near Nelson Bridge, depending upon the rate of spread. Contingency planning maps are included in this package and will be discussed the day of the burn. Actual contingencies will depend upon conditions at the time the escape occurs. Several options are available as shown on the attached maps. **(SEE ATTACHED CONTINGENCY PLANNING MAPS)**

If fire escapes the following actions will be taken:

- A. If fire burns outside the specified perimeter limits, and cannot be quickly contained by on-site resources, the fire will then become a wildfire.
- B. All prescribed firing operations will cease.
- C. Available holding forces will perform initial attack.
- D. The burn boss or highest wildfire qualified individual on site will assume the duties of Incident Commander until relieved
- E. Safety and protection of private property will be the highest priorities.
- F. If in the opinion of the burn boss, on-site resources cannot contain the fire, the refuge fire dispatch plan will be put into operation.

**\*\* (ANY SPOT FIRE OR SLOP-OVER WILL BE TREATED AS AN ESCAPED FIRE. FIRING ON THE BURN WILL STOP AND ALL REQUIRED PERSONNEL WILL CONCENTRATE ON THE SPOT UNTIL EXTINGUISHED.) \*\***

**Mop Up and Patrol:** Mop-up of the burn perimeter will commence with ignition of the burn, with holding crews extinguishing burning fuels immediately adjacent to the line that pose a threat to control. Checks for spot fires outside the firebreaks will continue throughout the duration of the burn. Mop-up will continue until all smokes are extinguished or until the possibility of escape or smoke management problems are eliminated. At least a 100 foot wide perimeter will be used for mop-up standards on all prescribed burns. Burning materials within this area will be extinguished with water and hand tools. Unburned areas inside the burn will not be burned out. This will allow for a mosaic pattern of burn which will ultimately benefit wildlife. If an unburned area is located near a control line, it will be burned out to prevent the possibility of spotting over the line. Mop-up may continue for several days after the burn to reduce and/or eliminate possible smoke management problems. The burn will be staffed daily after completion until all smokes are out to insure security.

Patrol will be an ongoing process during the prescribed burn. All personnel assigned to the holding crew will have their eyes to the "green" to catch any spot fires outside the control lines. At all times during the burn, the holding boss will be in communication with the burn boss. This person will be mobile (ATV, 4X4) to continuously check the lines as the burn progresses. If a spot is found, the holding boss will inform the burn boss and ignition will stop until the situation is controlled.

**Rehabilitation Needs:** None.

**DI 1202 Submission Date:**

**Special Problems:**

### VIII. CRITIQUE OF BURN

Were burn objectives within acceptable range of results? (Refer to Section I):

What would be done differently to obtain results or get better results?

Was there any deviation from plan?

If so, why?

Problems and general comments:

### IX. POST-BURN MONITORING

Date: \_\_\_\_\_ Refuge Burn Number:

Length of Time after Burn:

Vegetative Transect:

Comments on Habitat Conditions, etc.:

Photo Documentation:

Other:

### X. FOLLOW-UP EVALUATION

Date: \_\_\_\_\_ Refuge Burn Number:

Length of Time after Burn:

Vegetative Transect:

Comments on Habitat Conditions, etc.:

Photo Documentation:

Other:

## ATTACHMENT J. CLARK SALYER NATIONAL WILDLIFE REFUGE

**PREBURN PHONE CONTACT LIST  
SOUTH NEWBERG GRAVEL PRAIRIE RX BURN**

<u>CONTACT NAME/REASON:</u>	<u>CONTACT PHONE NUMBER:</u>	<u>CONTACT MADE: DATE/TIME/COMMENTS</u>
Upham VFD	768-2900	_____
Upham Farmers Elevator	768-2541	_____
Towner VFD	537-5151	_____
Gary & Gail Brown	768-2342	_____
Karlyle Natwick	776-6888	_____
Richard Erickson	537-5199	_____

Other:

Comments:

Signed: \_\_\_\_\_ Date: