



	tools.	drip torch fuels and gasoline. Secure containers on vehicle.  D. Use guards and secure tools in engine compartments or on vehicles.
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**JOB HAZARD ANALYSIS**

United States Department of Interior <b>NATIONAL PARK SERVICE</b>	<b>1. WORK PROJECT/ACTIVITY</b> Prescribed Fire	<b>2. LOCATION</b> Ozark National Scenic Riverways	<b>3. UNIT</b> Stegall Mountain
<b>JOB HAZARD ANALYSIS (JHA)</b>	<b>4. NAME OF ANALYST</b> Scott Bressler	<b>5. JOB TITLE</b> Engine Foreman	<b>6. DATE PREPARED</b> 01-18-02
<b>7. TASKS/PROCEDURES</b>	<b>8. HAZARDS</b>	<b>9. ABATEMENT ACTIONS ENGINEERING CONTROLS – SUBSTITUTION - ADMINISTRATIVE CONTROLS - PPE</b>	
2. Motor Vehicle Operation (Cont.)	E. Loading vehicles.  F. Trailer use.	E. Use of proper lifting techniques.  F. Use safe loading and operation procedures. Refer to Job Hazard Analysis on trailer use. Use spotter when backing.	
3. ATV Operation	G. Smoke on Roadways  A. Operation accidents	G. Use smoke ahead signs and smoke monitors.  A. Proper ATV procedures. Refer to Job Hazard Analysis on ATV operations for more detail. Use qualified atv operators and wear DOT approved helmets.	
4. Holding Operations	A. Proximity to intense heat and erratic fire behavior.  B. Fatigue  C. Excessive Smoke Exposure  D. ATV Operations  E. Poor visibility due to smoke.	A. Use Personal Protective Equipment (PPE), maintain close supervision. Thorough briefing on expected fire behavior. Use appropriate tactics to insure personnel are not subjected to unnecessary heat.  B. Rotate personnel on different tasks. Limit smoke exposure. Take adequate breaks. Drink plenty of water.  C. Rotate personnel so that one group is not always in the smoke.  D. Stay alert and watch for ATV traffic on fireline  E. Stay alert. Watch for tripping and overhead hazards, sudden drop-offs, ATV traffic.	
5. Mop-up Operations	A. Poor footing		

	B. Falling snags	<p>A. Be constantly aware; identify hazard areas; slow down.</p> <p>B. Be alert, post lookouts when necessary. Flag off dangerous areas. Watch for strong winds. Use qualified fallers only.</p>
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**JOB HAZARD ANALYSIS**

United States Department of Interior <b>NATIONAL PARK SERVICE</b>	<b>1. WORK PROJECT/ACTIVITY</b> Prescribed Fire	<b>2. LOCATION</b> Ozark National Scenic Riverways	<b>3. UNIT</b> Stegall Mountain
<b>JOB HAZARD ANALYSIS (JHA)</b>	<b>4. NAME OF ANALYST</b> Scott Bressler	<b>5. JOB TITLE</b> Engine Foreman	<b>6. DATE PREPARED</b> 01-18-02
<b>7. TASKS/PROCEDURES</b>	<b>8. HAZARDS</b>	<b>9. ABATEMENT ACTIONS ENGINEERING - CONTROLS – SUBSTITUTION - ADMINISTRATIVE CONTROLS - PPE</b>	
<b>6. Monitoring Operations</b>	<p>C. Fatigue</p> <p>A. Possibility of entrapment</p> <p>B. Proximity to intense heat and erratic fire behavior.</p>	<p>C. Rotate personnel on different tasks. Take adequate breaks. Drink plenty of water.</p> <p>A. Stay in communication and relay location to Burn Boss and Ignition Specialists. Identified escape routes and safe zones in briefing.</p> <p>B. Use Personal Protective Equipment (PPE), maintain close supervision. Thorough briefing on expected fire behavior. Use appropriate tactics to insure personnel are not subjected to unnecessary heat.</p>	

10. SUPERVISOR'S SIGNATURE /s/Bobby Bloodworth	11. TITLE FMO	12. DATE 2-17-06	



**A. SIGNATURE PAGE**



**WILSONS CREEK NATIONAL BATTLEFIELD**

**PRESCRIBED FIRE PLAN**

**UNIT NAME: SW-1, SW-2, NW-5, 6, 7**

Prepared By: /s/ Bobby Bloodworth  
Bobby Bloodworth  
Ozark NSR FMO

Date: 3/18/2005

Reviewed By: \_\_\_\_\_  
Gary Sullivan  
Chief of Resource Management

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

Regional  
Reviewed By: /s/Scott Beacham

Date: 4-12-05

Technical  
Review By: /s/Chad Suppa  
Buffalo Fire Use Foreman

Date: 4/6/05

Approved By: \_\_\_\_\_  
Superintendent

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

FirePro Project #  
Account Number:

Copies of approved plan will be sent to:

**PRESCRIBED FIRE PLAN - TECHNICAL REVIEW**

Park: Wilson's Creek National Battlefield

Project Name: SW-1, SW-2, NW-5, 6, 7

Prescribed Fire Plan Elements	Status	Date	Initial
a. Signature Page	+	4-6-05	CS
b. Executive Summary	+	4-6-05	CS
c. Description of Prescribed Fire Area	+	4-6-05	CS
d. Goals and Objectives	O	4-6-05	CS
e. Project Complexity/Risk	+	4-6-05	CS
f. Organization	+	4-6-05	CS
g. Cost	+	4-6-05	CS
h. Scheduling	+	4-6-05	CS
i. Preburn Considerations	O	4-6-05	CS
j. Prescription	+	4-6-05	CS
k. Ignition & Holding Actions	+	4-6-05	CS
l. Wildland Fire Transition Plan	+	4-6-05	CS
m. Protection of Sensitive Features	+	4-6-05	CS
n. Public and Firefighter Safety	O	4-6-05	CS
o. Smoke Management	+	4-6-05	CS
p. Interagency Coordination and Public Information	+	4-6-05	CS
q. Monitoring	+	4-6-05	CS
r. Post Fire Rehabilitation	+	4-6-05	CS
s. Post Fire Reports	+	4-6-05	CS
t. Appendices	O	4-6-05	CS

Status Coding:

- + Adequate – Meets NPS Standards
- O Adequate with modification. See comments.
- Deficient. See comments.
- NC Unable to evaluate.

Comments:

Sec D : May want to word first objective as something that is physically measurable. (This is measure by the fire effects crew during post burn surveys, BB).

Sec J : Line J, Medical Plan is in Appendix 16 and Com plan is in Appendix 17. (corrected, BB)

Sec N : Include number for Cox Air evac in Med plan. (911, corrected, BB)

Sec U : #1- titles needed for headers of pages (will include in the future, BB)

#4 Consider lowering your elapse time in the Behave runs (will do so in the future, BB)

#12 Notifiactions- are all contacts notified. (Yes by the park, BB)

#13- #4 firefighter safety needs to be changed to medium. (corrected, BB)

#16 Medical Plan- Would like to see addresses (towns) and phone numbers for Cox air evac or radio freq. (The air evac is handle thru 911 dispatch and will fly to local hospital, BB)

Signature: /s/Chad Suppa

Date: 4-07-05

Title: Foreman Office: Buffalo NR

## REVIEWERS' COMMENTS

**Fire Management Officer:**

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**Chief Ranger:**

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**Chief of Natural Resources:**

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**Park Superintendent:**

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**Regional Review:**

The Project map is missing. One needs to be made with all relevant information such as: burn units, water sources, roads, and structures.... This map needs to be made before Prescribed Burn and distributed to burn personnel. I approve of the Holding Forces Worksheet Justification, as long as conditions are as stated, on burn day. Found a typo on pg 55, Prescribed Fire Risk Analysis Worksheet. 1d Weather, the risk should be M.

Plan meets NPS standards

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## B. EXECUTIVE SUMMARY

This burn supports the park's broad historic landscape restoration efforts to reestablish native plants and open savanna found during the civil war battle on August 10, 1861, for which the park was established. This project is part of continuing sequence of entry and maintenance burn projects to restore this historic landscape. The park brochure (1992) entitled "A Guide to Historic Landscape Restoration" reads:

*"Prior to European settlement, savanna covered one third of Missouri. Today, only a few remnants of original savanna remain. Reestablishing an example of this unique biological community is not only an investment in our future but will, with time, recreate the 1861 landscape that was the stage for this important battle."*

This project also supports the following specific objectives found in the park Fire Management Plan:

- To utilize prescribed fire as a professional management tool to restore and perpetuate the natural environment and its processes and the historic scene. Initially, the park may implement prescribed burning for savanna restoration and preservation. Ultimately, as research provides the necessary knowledge and management recommendations, prescribed fire use are envisioned to be utilized for other management purposes.
- To research the proper role and effects of fire upon the park's natural and affected historical resources to provide management recommendations.

## C. DESCRIPTION OF PRESCRIBED FIRE AREA

**GENERAL AREA:** The area is flat to rolling grasslands and hardwood timber with Wilson's Creek bisecting the park through the center from north to south.

### LOCATION:

- Legal:
1. T 28 N, R 23 W, SEC 23
  2. Latitude N 37 07' 07" (37.1185)  
Longitude W 93 25' 04"(93.4178)
  3. UTM Zone 15, Easting 462883, Northing 4108105.

Fire Management Zone: Suppression.

District: N/A.

**GEOGRAPHIC ATTRIBUTES:**

Size: SW-1: 56.6 acres

SW-2: 124.1 acres

NW-5: 6.7 acres

NE-6: 25 acres

NE-7: 73.3 acres

Elevation Range: 1080 to 1250 ft.

Slope Range: 0-10 %.

Aspect Range: Both burn units are fully exposed with a southern to western aspect.

**DESCRIPTION OF PROJECT BOUNDARIES:**

**NW-5:** The eastern boundary is Wilson's creek and the northern line is the park boundary. On the south the unit is bordered by the tour road and to the west a mowed line.

**NW-6:** The unit is bordered by the tour road to the south and on the west a maintenance road. The northern boundary is a paved county road and on the east a mowed line.

**NW-7:** This unit is surrounded by paved roads to the north, south and east. On the west side, the unit is bordered by Wilson's creek.

**SW-1:** The northern boundary is a creek and the tour road. On the east and south, the unit is bordered by a service road. The western boundary is the park boundary and ZZ highway.

**SW-2:** The northern boundary is a service road. On the east, the unit is bordered by a mowed field. The southern boundary is a tram road and on the west is the park boundary and ZZ highway.

**VEGETATION DESCRIPTION:**

The unit is 88% fuel model 3 and 12% fuel model 9. Located within each burn unit are small pockets of hardwood timber less than 1 total acre. The fuel model surrounding the burn units is Fuel Model 1. This is indicated in the Holding forces worksheet. Fuel Model 1 is used to calculate holding resources. The area surrounding the park is pastureland with some residential areas with manicured lawns. The pasture lands surrounding these units are severely grazed with grass of less than 2 inches at this time of year. A justification to the holding worksheet for a lower number of holding resources will be added in that Fuel Model 1 will grossly over predict rate of spread and fire line intensity.

Vegetation Type	Fuel Model NFFL	Estimated Acres	Estimated Tons Per Acre
Short/Tall Grass	1/3	577	2 - 6

PROJECT MAP (Appendix #1) The burn boss will assign points on the map for ease of communication while units are burned.

VICINITY MAP (Appendix #1)

**D. GOALS AND OBJECTIVES**

**GOALS**

1. Provide for Firefighter safety.
2. Reduce wildfire risk to urban interface improvements immediately outside of the park boundary, as well as historic park improvements,
3. Restore fire and associated natural processes in order to retain tall grass prairie species composition and hardwood savannas, characteristic of the park's historic natural communities an average of 10 to 12 oak trees per acre.
4. Provide training opportunity for firefighters

SPECIFIC OBJECTIVES:	PROPOSED REDUCTION WITHIN ONE YEAR	ACTUAL RESULTS
Burn unit with a moderate severity burn.	75-95%	
Reduce 1-hour fuel loading (litter layer).	50-80%	
Reduce 10-hour fuels.	40-70%	
Top-kill of saplings greater than 1.4 meters tall and less than 2.5 meters tall in the forested areas and where hardwoods are encroaching in historic open fields.	>40%	

**Range of Acceptable Results Expected across the Project Area**

Throughout the entire unit a mosaic of different levels of fire severity are desired and acceptable.

## **E. RISK MANAGEMENT**

This burn project has a low risk value as calculated by the hazard risk analysis process. Assessing reasonable risks and the mitigation to lower these risks generates this low rating. This is documented on the Hazard Rating Guide, Prescribed Fire Risk Analysis Worksheet, and Job Hazard Analysis.

## **F. PROJECT COMPLEXITY**

This burn rates as a low complexity project that should pose no unusual risks to personnel safety or property. Burn duration will be 8 hours or less both units combined.

HAZARD, RISK AND COMPLEXITY WORKSHEETS (attached)

## **G. ORGANIZATION**

The Burn Boss may order additional resources to assist with the project before ignition if in their professional judgment, they are needed. This may be done after consultation with the project coordinator or Ozark Fire Management Officer. All non-park resources will be ordered and committed to the prescribed fire project through the Missouri Interagency Dispatch Center (MOCC). The holding resource worksheet and Fireline Handbook will be used to determine adequate number and type of holding resources for each scenario. Specific resources will be identified in an incident action plan prepared prior to each operational period during the implementation of the burn. It is anticipated that one or both Mid-west Fire Use Modules will be used. The regional office will provide a burn boss if Ozark NSR or Buffalo NR can not.

A total of Fourteen (14) persons will be the minimum required conducting the prescribed fire.

### Overhead Personnel:

- 1 Burn Boss/ Incident Commander (RXB2)(The Burn Boss can serve as Ignition Specialist)
- 1 Holding Specialist (Single Resource Boss Qualified or higher)
- 1 Fire Effects Monitor

### Additional Crews/Personnel/Resources For Daytime Holding and Ignition Operations:

- 3 FFT2 – Ignition Crew
- 2 Type 6 engines with operator and asst. operator
- 4 ATVs with Water Tanks and operators

## **H. ESTIMATED PROJECT COSTS (non-base, other agency, contract):**

Costs will be primarily for personnel and equipment preparing and conducting burn operations. The unit requires some preparation. Firing operations and post firing patrols should be of short duration with the goal of keeping overall costs low.

<b>FUNCTION</b>	<b>PROJECTED WORK HOURS/</b>	<b>PROJECTED COSTS*</b>
<b>Planning</b>	10 hours (base salary paid) Rx Fire Plan development	\$0.00
<b>Unit Preparation</b>	20 hours blow line, hazard tree mitigation, brush hog line	\$4000.00
<b>Operations (including burning, holding, mop-up)</b>	50	\$2500.00
<b>Travel</b>	12 people (includes per diem and lodging) X 4 days	\$6000.0
<b>Monitoring &amp; Evaluation</b>	2 (collateral assignment) site visit coordination between WICR staff and FMO.	\$200.00

TOTAL PROJECTED COST \$ 12,700.00 divided by 285.7 acres = \$ 44.45 PER ACRE

\*Required information in final report: ACTUAL COSTS, COST PER ACRE, WORK HOURS PER ACRE.

#### **I. SCHEDULING**

Proposed Ignition Date:	March to Nov. 2005
Projected Burn Duration:	1 day total
Actual Ignition Date:	
Date Declared Out:	
Date DI-1202 Submitted:	

#### **J. PRE-BURN CONSIDERATIONS**

##### ON SITE PREPARATION NEEDS:

- A. Construct a 6-8 foot wide mow line in grass along the park's boundary.
- B. Mow a 3 foot clear diameter around each power pole within the units and remove the thatch from mowing. The thatch to be thrown into the unit.
- C. Foam the Edwards Cabin the day of the burn and have a 8 to 10 foot mowed line in place.
- D. Prepare 20 gallons of burn mix.

- E. Access the nearest remote automated weather station at least two days prior to the ignition date to assess fuel moisture and weather conditions.
- F. Take fuel moisture samples from the site and calculate % fuel moisture for 1-hr. fuels one day prior to the burn.
- G. Set-up four all-terrain vehicles outfitted with water tank and pump and one all-terrain vehicle outfitted for patrol. Transport ATVs to burn site.
- H. DAY OF BURN: Set up "Prescribed Burn" and "Smoke" signs along the Tour Road, Wire Road, ZZ Highway and Route 182.
- I. Fill at least 4 bladder bags and place on the engines.
- J. Program handheld radios for frequencies identified in the Communications Plan (Appendix #17).

**OFF SITE:**

- A. WICR staff will purchase needed equipment and supplies.
- B. WICR staff will notify local fire departments of the scheduled burn and their role.
- C. WICR staff will complete a press release at least one week prior to the proposed burn in the local newspaper.
- D. At least a week prior to the burn, WICR staff will contact the adjacent landowners with a press release of the proposed burn.

**SPECIAL PRECAUTIONS/REGULATIONS:**

- A. All improvements (power poles, traffic and park signs) will be cleared around of fuel prior to the burn.
- B. Smoke Ahead signs will be placed along ZZ Highway and Route 182.

**Safety Hazards:** Visitor safety; smoke on Route 182 and Hwy. ZZ and along control lines. Crew safety; safety zones, visibility, and exposure to smoke. **Mitigation:** The area, including all trails, will be closed while burning. Visibility on roads will be monitored and controlled. "Smoke Ahead" and/or "Prescribed Burn" signs will be posted. Strip burning may be used to increase heat to reduce smoke output. All personnel will have PPE. Escape routes and safety zones will be identified. Engines and Atvs will have headlights on.

**K. PRESCRIBED FIRE PRESCRIPTION**

NFFL Fuel Models used: 1 & 3

Fuel Model 3 for the burn unit and Fuel Model 1 for fuel surrounding the burn units.

**BURNING PRESCRIPTION AND OBSERVED CONDITIONS:**

Prior to ignition, compare prescription elements, both individually and collectively, against local weather forecasts and any other predicted conditions. During implementation of the burn, if objectives are not being met, further ignition shall be evaluated; therefore, prescription parameters must be wide to accommodate established objectives while staying within fire personnel capabilities. All changes to the prescription parameters must be approved with same level of authority required for the plan approval.

The prescription is based on fuel moisture, wind speed and relative humidity. Temperature ranges will not be used as a constraint.

**Fuel Model 3**

<b>ENVIRONMENTAL VARIABLES</b>	<b>HOT</b>	<b>OPTIMUM</b>	<b>COOL</b>	<b>OBSERVED*</b>
<b>Relative Humidity (%):</b>	20	30	50	
<b>Wind Direction:</b>	S/SW to N/NW	S/SW	S/SW to N/NW	
<b>Wind Speed (midflame):</b>	8 mph	4 mph	2 mph	
<b>Dead Fuel Moisture (%) 1 Hour:</b>	5	8	10	

\*At time of ignition

<b>PREDICTED FIRE BEHAVIOR</b>	<b>HOT</b>	<b>OPTIMUM</b>	<b>COOL</b>	<b>OBSERVED*</b>
<b>Rate of Spread (ch/h):</b>	235	78	30	
<b>Fireline Intensity (Btu/ft/s):</b>	3369	980	370	
<b>Flame Length (ft):</b>	18.9	10.7	6.8	

\*Standard observation time

See Appendixes for BEHAVE Projections

**Fuel Model 1**

<b>ENVIRONMENTAL VARIABLES</b>	<b>HOT</b>	<b>OPTIMUM</b>	<b>COOL</b>	<b>OBSERVED*</b>
<b>Relative Humidity (%):</b>	20	30	80	
<b>Wind Direction:</b>	S/SW to N/NW	S/SW	S/SW to N/NW	
<b>Wind Speed (midflame):</b>	8 mph	4 mph	2 mph	
<b>Dead Fuel Moisture (%) 1 Hour:</b>	5	8	10	

\*At time of ignition

<b>PREDICTED FIRE BEHAVIOR</b>	<b>HOT</b>	<b>OPTIMUM</b>	<b>COOL</b>	<b>OBSERVED*</b>
<b>Rate of Spread (ch/h):</b>	256	53	10	
<b>Fireline Intensity (Btu/ft/s):</b>	434	81	11	
<b>Flame Length (ft):</b>	7.7	3.4	1.4	

\*Standard observation time

See Appendixes for BEHAVE Projections

### **Behave Projections**

Fuel Model 3 is used for predictions within the units and Fuel Model 1 outside of the unit. The fuels outside of the burn unit are mowed hay fields and hardwood forest. All units will be surrounded by fuel model 1. **Note:** The high fire intensities and rate of spreads predicted will be interior in each unit. This will be mitigated by the burn boss with firing patterns and sequences. During black lining operations, fire intensities will be low due to burning on the low end of the prescription and the fact that intensities are over predicted in these blocks.

### **L. IGNITION AND HOLDING ACTIONS**

The Burn Boss or Ignition Specialist will thoroughly describe the firing plan and safety considerations to all burn personnel at the pre-burn briefing. Everyone will be provided a copy of the project map. Firing operations for the entire unit should be completed in one to two days. After the unit has been fired and mop up has been completed, the burn will be turned over to the Resource Management Specialist at Wilson's Creek. He will set up daily patrols as needed until the fire is out. The resource specialist will be the person to call the fire out. Once the fire is called out, the Ozark NSR Fire Management Office will be notified.

### **TEST IGNITION:**

A test ignition at the burn site will be conducted with a drip torch to observe ignition and combustion rates on the actual day of the burn. The burn boss will decide this location based on current wind direction. All holding resources will be present at the site. If the observed burning conditions or fire behavior is not acceptable, the test burn will be suppressed and the primary burn project delayed. If deemed successful, firing of the primary unit may continue.

### **FIRING AND IGNITION:**

The Burn Boss will determine prevailing wind direction and create a buffer strip on the downwind side of the burn. Once completed, the flanks will be ignited working up-wind. As the fire backs against the wind, the Burn Boss may decide to use short strip head fires to keep the burn moving into the wind or to keep the backing fire even across the unit. This interior ignition will be at the discretion of the Burn Boss. In the event that smoke becomes an issue, the Burn Boss will decide whether to stop the burn or continue depending on the stage of burn completion. At this point the Burn Boss can ring fire the unit decreasing smoke production and time of burning. The Burn Boss will document these decisions on a unit log.