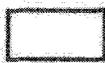
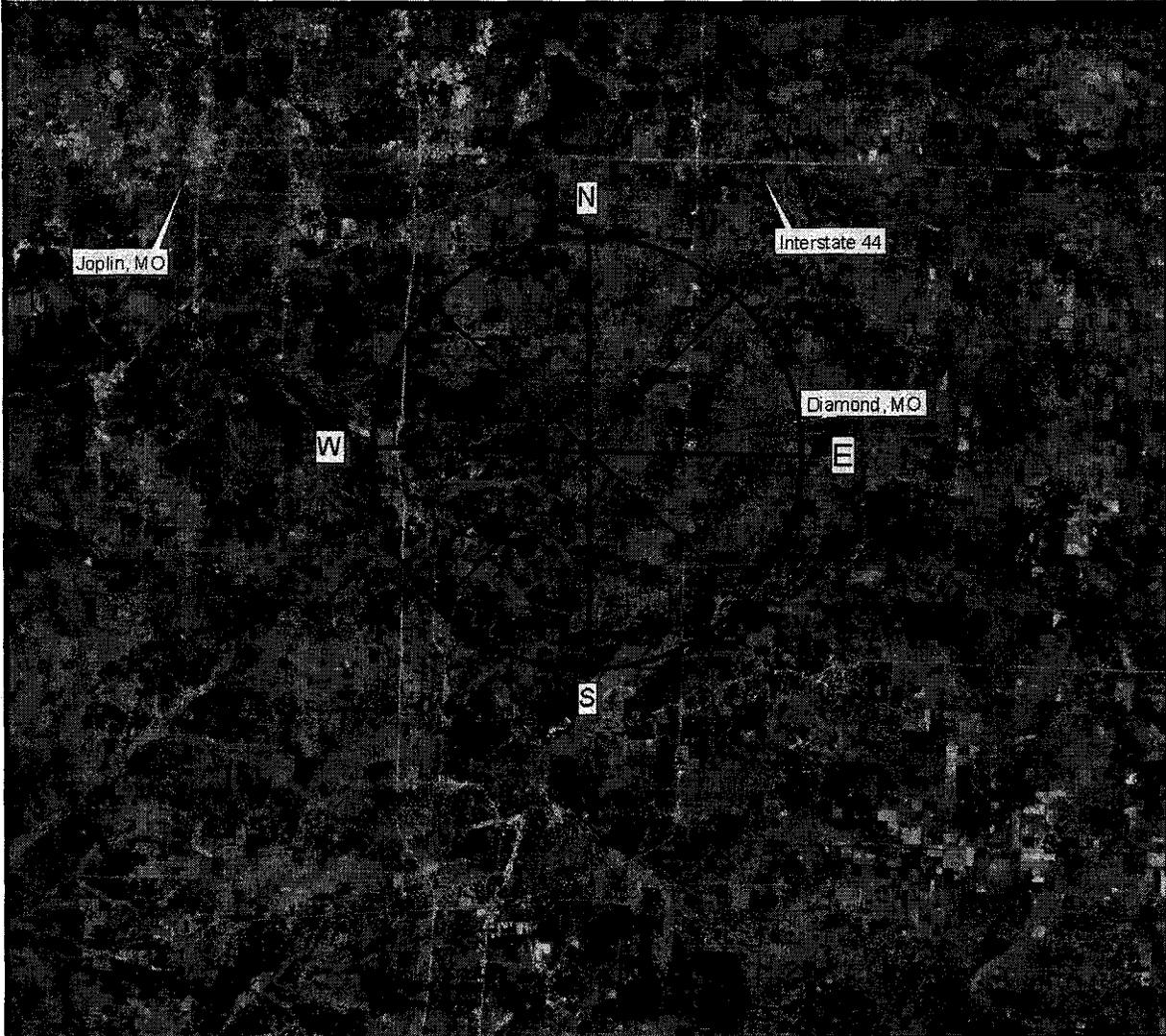


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George Washington Carver NM

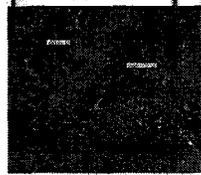
National Park Service
U.S. Department of the Interior

Smoke Dispersal Map



Park_boundary.shp

Map Location



Fire Management Program
George Washington Carver National Monument



0.5 0 0.5 1 1.5 2 Miles

1 : 63,360 1 inch = 1.00 miles

February 4, 2005

c:\gis\data\gwca\projects\burns.apr

APPENDIX#4
Quarry Prescribed Fire
Hazard Rating Guide

Hazard Element	Hazard Probability			Potential Consequences		
	L	M	H	L	M	H
1. Environmental Data						
a. Seasonal severity	Energy Release Component below 90 th percentile levels.	Energy Release Component at or above 90 th percentile levels – above average drought conditions.	Energy Release Component at or above 97 th percentile levels – severe drought conditions.	Low probability for problematic fire behavior or difficulty in holding activities.	Some potential for problematic fire behavior or difficulty in holding activities.	High probability for problematic fire behavior and difficulty in control.
b. Fire Behavior	Flame lengths confined to surface fuels, spread rates low.	Flame lengths extending into shrub and tree regeneration, spread rates moderate.	Flame lengths highly variable, frequently involving individual tree crowns, spread rates moderate to fast.	Low probability of difficulty in holding fire or for adverse fire effects.	Some potential for fire behavior to approach upper prescription limits and cause undesirable effects.	High potential for fire behavior to create holding problems, exceed prescription ranges, and cause undesirable effects.
c. Fuels	Surface fuels light with open tree canopies, small shrub component present.	Surface fuels moderate with variable forest stand density and moderate shrub presence.	High surface fuel loading with dense shrub component and dense stands with abundant regeneration.	Fuels present no specific implementation problems.	Fuels will have a marked effect on implementation activities and holding force requirements.	Fuels will dramatically affect management organization and qualifications for implementation.
d. Weather	Weather stable, winds light and predictable, no frontal activity.	Weather slightly variable, winds present but light, occasional gusts, no frontal activity.	Weather highly variable, winds near prescriptive limits, gusts prevalent, frontal activity possible.	Little impact on implementation.	Weather variation will require mitigation actions involving additional resources.	Weather will serve as a major influence on organization, personnel qualifications, and specific implementation actions.
e. Topography	Low variability in slope and aspect.	Some variability in slope and aspect, will affect fuel moisture and fire behavior.	High variability in slope and aspect, major implications on fire behavior and must be considered in prescription development and implementation.	Little influence on burn implementation.	Consideration of topography during planning process is necessary.	Topography will necessitate mitigation actions to be developed and firing patterns and ignition methods to be modified to reduce impacts.

2. Agency Values						
a. Ecological and Environmental Considerations	Fire poses little threat to cause adverse effects or long- term disturbances to natural resource values. No T and E species or critical habitat.	Fire poses moderate threat of adverse effects on natural resources and may cause short- to mid- term alterations or inconveniences such as air quality. Small amounts of T and E species present.	Fire poses high potential for adverse effects to natural resource values or to cause long- term degradations in air quality. Some T and E species present and/ or critical habitat.	Low probability for adverse impacts and little need for mitigation actions.	Mitigation actions may need to be developed to ensure desirable outcomes. Some short- term effects may have to be accepted.	Prescribed Fire Plan must address mitigation actions to prevent undesirable outcomes.
b. Social and Cultural Values	No known social or cultural values in or adjacent to the project area.	Features of social or cultural value have been identified in and adjacent to the project area. Mitigation measures can be accomplished.	High social or cultural values have been identified in or adjacent to the project area. Mitigation actions are difficult to accomplish.	Severe fire behavior or fire outside the unit would not damage the identified values.	Severe fire behavior or fire outside the unit poses potential for moderate damage to special values. Concerned parties are aware and supportive of the project.	Excessive fire severity or fire outside the unit will have adverse effects (substantial damage to or potential destruction of the special sites). Acceptance by concerned parties is low.
c. Project Duration and Logistics	Fire planned to be of short duration, logistical needs easily accommodated.	Fire planned to be of short to moderate duration, logistical needs pose some difficulty.	Fire planned to be of moderate to long duration, logistical needs create much difficulty in accomplishing.	No consequences because of duration or logistics.	Duration may impact firefighters and public and logistical needs must be specifically addressed.	Long duration fire necessitates greater information dissemination, mitigation to remove impacts to firefighters and the public, and logistical needs must be met or project postponed.
d. Smoke and Air Quality Management	Few smoke sensitive areas near project area. No potential scheduling conflicts with cooperators.	Multiple smoke sensitive areas, mitigation actions minimize impacts, low potential for scheduling conflicts.	Multiple smoke sensitive areas near burn area, mitigation actions unable to remove all impacts, duration increases impacts, high potential for scheduling conflicts.	No adverse smoke consequences.	Mitigation actions must address smoke impacts, and coordination is required to confirm scheduling.	Mitigation actions must be developed, regulatory agencies must concur, scheduling conflicts may restrict implementation.

Hazard Element	Hazard Probability			Potential Consequences		
	L	M	H	L	M	H
3. Public Values						
a. Land use values	No commercial or agriculture activities near planned burn area.	Some commercial or agricultural activities near burn unit, some managed wildlands (recreation, timber, range values).	Planned burn directly adjacent to urban, commercial, and/ or agriculture areas.	No impacts from land use values.	Escaped fire onto nearby managed land causes some impacts to commercial values. Prescribed Fire Plan must consider actions to prevent fire movement onto commercial and/ or agriculture lands.	Escaped fire onto nearby managed land causes significant impacts to commercial values. Mitigation actions must reflect additional resource needs to protect urban, commercial, and/ or agriculture areas. If mitigation cannot be accomplished, burn must be postponed.
b. Dwellings	No permanent or part-time residences present in area.	Some residences ½ mile or less from burn area.	Planned burn is located in wildland-urban interface zone, permanent residences in close proximity.	No impacts from dwellings.	Plan must address actions to ensure adequate protection of residences.	Notification of all concerned homeowners, residents, and visitors, coordination with local fire protection organizations is needed, and mitigation actions must adequately address potential fire escapes.
c. Non-dwellings	No non- dwellings present.	Some outbuildings and non- residences ½ mile or less from burn area.	Commercial structures in close proximity to burn area.	No impacts.	Planning must consider these non- dwellings.	Planning and implementation must adequately address all measures to prevent any adverse impacts.

4. Human Factors						
a. Firefighter	Little firefighter exposure.	Some firefighter exposure due to fire duration and smoke.	Potential for high firefighter exposure to smoke during burn and to fire during holding actions.	No specific problems, implement standard safety measures.	Mitigation measures to eliminate smoke exposure.	Mitigation measures must address smoke exposure, use of mechanized equipment to eliminate exposure to fire.
b. Public	No public exposure.	Some public exposure, mitigation actions can remove/ minimize exposure.	Public may be exposed to high smoke concentrations for moderately long periods, especially during nighttime hours.	No adverse consequences anticipated.	Mitigation actions necessary to provide for maximum public safety.	Mitigation actions must be developed, coordinated with other emergency organizations and fully understood prior to ignition.
c. Fire Management	No problems with commitment and acceptance by park staff members.	No problems with commitment but some unwillingness to support and prioritize the prescribed fire over other activities.	Park staff not committed to using prescribed fire as a tool and not willing to support and prioritize prescribed fire over other activities.	No adverse consequences.	Park staff must be briefed on need and importance of prescribed fire.	Park management team must be informed of prescribed fire objectives, support needs, and priority.

PRESCRIBED FIRE RISK ANALYSIS WORKSHEET

Hazard Element	Hazard Probability			Potential Consequences			*Risk (Exhibit 4)
	L	M	H	L	M	H	
1. Environmental Data							
a. Seasonal severity		X		X			M
b. Fire Behavior		X		X			M
c. Fuels	X			X			L
d. Weather		X		X			M
e. Topography	X			X			L
2. Agency Values							
a. Ecological and Environmental Considerations	X			X			L
b. Social and Cultural Values	X			X			L
c. Project Duration and Logistics	X			X			L
d. Smoke and Air Quality Management		X		X			M
3. Public Values							
a. Land use values	X			X			L
b. Dwellings		X		X			M
c. Non-dwellings		X		X			M
4. Human Factors							
a. Firefighter		X			X		M
b. Public	X			X			L
c. Fire Management	X			X			L

PRESCRIBED FIRE RISK MITIGATION TABLE

Hazard Element	Risk	Mitigations / Controls	Residual Risk	Reference:
		Briefly explain what actions will be taken relative to each hazard element that will reduce the risk.		In Prescribed Fire Plan
1. Environmental Data				
a. Seasonal Severity	M	The ignition methods will be adjusted to reflect the time of year, day, fuel, and weather conditions.	L	F. Organization, K. Ignition and Holding Actions
b. Fire Behavior	M	Firing patterns and directions will change depending on wind direction and fire behavior.	L	K. Ignition and Holding Actions
c. Fuels	L	_____	_____	_____
d. Weather	M	Firing patterns and ignition times will be dependent upon the weather meeting prescription parameters. If weather exceeds prescription parameters, the burn will not be implemented.	L	K. Ignition and Holding Actions- Test Fire, Firing and Ignition
e. Topography	L	_____	L	_____
2. Agency Values				
a. Ecological and environmental considerations	L	_____	_____	_____
b. Social and Cultural values	L	_____	_____	_____
c. Project duration and logistics	L	_____	_____	_____
d. Smoke and Air Quality Management	M	Firing patterns and directions will change depending on wind direction and fire behavior. This will allow smoke to disperse and lower smoke impacts to V Highway.	L	K. Ignition and Holding Actions- Test Fire, Firing and Ignition
		Mitigations / Controls		Reference:
Hazard Element	Risk		Residual Risk	

		Briefly explain what actions will be taken relative to each hazard element that will reduce the risk.		In Prescribed Fire Plan
3. Public Values				
a. Land use values	L	_____	_____	_____
b. Dwellings	M	Engines will be placed around dwellings with protection lines deployed around the house.	L	I. Pre-burn considerations, M. Protection of sensitive features
c. Non-dwellings	M	Engines will provide protection and pretreatment with deployed hoselays.	L	I. Pre-burn considerations, M. Protection of sensitive features
4. Human Factors				
a. Firefighter	M	Burn Boss will ensure that a complete safety briefing is provided for all assigned personnel. All standard wildland firefighter safety rules will be strictly enforced (ref. Fireline Handbook). Effects of smoke will be managed by limiting prolonged exposure for holding personnel as much as possible. Complete mitigation of smoke exposure hazard may not be possible.	M	N. Public and Personnel Safety
b. Public	L	_____	L	_____
c. Fire Management	L	_____	L	_____

PRESCRIBED FIRE COMPLEXITY RATING WORKSHEET

Complexity Element		Complexity Value		
		L	M	H
Primary Factors	1. Life and Safety		X	
	2. Threats to Boundaries		X	
	3. Management Organization	X		
	4. Political Concerns	X		
	SUBTOTAL OF PRIMARY FACTORS	2	2	
Secondary Factors	5. Objectives	X		
	6. Fuels and Fire Behavior	X		
	7. Air Quality Values	X		
	8. Improvements	X		
	9. Logistics	X		
	10. Natural, Cultural and Social Values	X		
	11. Tactical Operations	X		
	12. Interagency Coordination	X		
SUBTOTAL OF SECONDARY FACTORS		8		
TOTAL COUNT OF COMPLEXITY VALUES		10	2	

QUALIFICATIONS DETERMINATION TABLE:

	Prescribed Fire Burn Boss Type 2 (RXB2)	Prescribed Fire Burn Boss Type 1 (RXB1)
Primary Factors rated "H"	Less than 2	2 or more
	AND	OR
Total Count rated "H"	Less than 4	4 or more
		OR
	Minimum required on all prescribed fires.	When deemed appropriate by the agency administrator or unit Fire Management Officer.
Prescribed Fire Burn Boss Level Indicated (check one):	<input type="checkbox"/> RXB1	<input type="checkbox"/> RXB2
	<input checked="" type="checkbox"/> X	

PREPARED BY: /s/ Scott Bressler

DATE: 02/05/05

APPROVAL BY: _____
Agency Administrator

DATE: _____

REVIEWED BY: _____
(Burn Boss immediately prior to burning)

DATE: _____

Appendix 5

WELCOME TO THE BEHAVE SYSTEM
 BURN SUBSYSTEM
 FIRE1 PROGRAM: VERSION 4.4 -- FEBRUARY 1997

DEVELOPED BY: THE FIRE BEHAVIOR RESEARCH WORK UNIT
 INTERMOUNTAIN FIRE SCIENCES LABORATORY
 MISSOULA, MONTANA

YOU ARE RESPONSIBLE FOR SUPPLYING VALID INPUT AND FOR
 CORRECTLY INTERPRETING THE FIRE BEHAVIOR PREDICTIONS.

ASSUMPTIONS, LIMITATIONS, AND APPLICATION OF MATHEMATICAL
 MODELS USED IN THIS PROGRAM ARE IN:

Andrews, Patricia L. "BEHAVE: Fire behavior prediction and
 fuel modeling system--BURN subsystem, Part 1", INT-GTR-194, 1986
 Andrews, Patricia L., and Chase, Carolyn H. "BEHAVE: Fire
 behavior prediction and fuel modeling system--BURN
 subsystem, Part 2", INT-GTR-260, 1989

DIRECT

1--FUEL MODEL ----- 3 -- TALL GRASS, 2.5 FT (75 CM)
 2--1-HR FUEL MOISTURE, % -- 8.0 10.0 12.0 14.0 16.0
 7--MIDFLAME WINDSPEED, MI/H 2.0 4.0 6.0 8.0
 8--TERRAIN SLOPE, % ----- 5.0
 9--DIRECTION OF WIND VECTOR 180.0
 DEGREES CLOCKWISE
 FROM UPHILL
 10--DIRECTION OF SPREAD ----- DIRECTION OF MAXIMUM SPREAD
 CALCULATIONS TO BE CALCULATED
 DEGREES CLOCKWISE
 FROM UPHILL

=====
 RATE OF SPREAD, CH/H (V4.4)
 =====

1-HR MOIS (%)	I	MIDFLAME WIND, MI/H			
		2.0	4.0	6.0	8.0
8.0	I	33.	77.	128.	185.
10.0	I	30.	69.	116.	167.
12.0	I	28.	64.	107.	154.
14.0	I	25.	59.	99.	143.