

# PRESCRIBED FIRE PLAN



ADMINISTRATIVE UNIT(S): Wasque

PRESCRIBED FIRE NAME: Wasque Grasslands: Subunits 1, 2, 3, 4

COMPLEXITY RATING: MODERATE

PREPARED BY: *Ross M. Garlapow* DATE: 01/21/09

Printed Name: Ross M. Garlapow

Agency: Northeast Forest and Fire Management, LLC

Qualification: Firefighter Type 1 (FFT1)

TECHNICAL REVIEW BY: *Joel R. Carlson* DATE: 01/09/09

Printed Name: Joel R. Carlson

Agency: Northeast Forest and Fire Management, LLC

Qualification: Prescribed Burn Boss Type 2 (RXB2)

APPROVED BY: *Kathy Abbott* DATE: 1/22/09

Printed Name: Kathy Abbott

Agency: The Trustees of Reservations

Title: Vice President of Field Operations

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## ELEMENT 2A: AGENCY ADMINISTRATOR GO/NO-GO PRE-IGNITION APPROVAL CHECKLIST

**Instructions:** The Agency Administrator's GO/NO-GO Pre-Ignition Approval is the intermediate planning review process (i.e. between the Prescribed Fire Complexity Rating System Guide and Go/No-Go Checklist) that should be completed before a prescribed fire can be implemented. The Agency Administrator's Go/No-Go Pre-Ignition Approval evaluates whether compliance requirements, Prescribed Fire Plan elements, and internal and external notifications have been or will be completed and expresses the Agency Administrator's intent to implement the Prescribed Fire Plan. If ignition of the prescribed fire is not initiated prior to expiration date determined by the Agency Administrator, a new approval will be required.

YES	NO	KEY ELEMENT QUESTIONS
✓		Is the Prescribed Fire Plan up to date? <i>Example: amendments, seasonality.</i>
✓		Will all compliance requirements be completed? <i>Example: cultural, protected species, smoke management, NEPA.</i>
✓		Is risk management in place and the residual risk acceptable? <i>Example: Prescribed Fire Complexity Rating Guide completed with rational and mitigation measures identified and documented.</i>
✓		Will all elements of the Prescribed Fire Plan be met? <i>Example: Preparation work, mitigation, weather, organization, prescription, contingency resources.</i>
✓		Will all internal and external notifications and media releases be completed? <i>Example: Preparedness level restrictions.</i>
✓		Will key agency staff be fully briefed and understand prescribed fire implementation?
	✓	Are there any other extenuating circumstances that would preclude the successful implementation of the plan?
✓		Have you determined if and when you are to be notified that contingency actions are being taken and will this be communicated to the Burn Boss?
		Other:

**RECOMMENDED BY:** Ross M. Garlapow **DATE:** 01/01/09

Printed Name: Ross M. Garlapow  
 Agency: Northeast Forest and Fire Management, LLC  
 Qualification: Firefighter Type 1 (FFT1)

**APPROVED BY:** Kathy Abbott **DATE:** 1/22/09

Printed Name: Kathy Abbott  
 Agency: The Trustees of Reservations  
 Title: Vice President of Field Operations

**DATE APPROVAL EXPIRES:** 1/1/2014

## ELEMENT 2B: PRESCRIBED FIRE GO/NO-GO CHECKLIST

	YES	NO
<b>A.</b> Has the burn unit experienced unusual drought conditions or contain above normal fuel loadings which were not considered in the prescription development? If <b>NO</b> , proceed with checklist; if <b>YES</b> , go to item B.	<input type="checkbox"/>	<input type="checkbox"/>
<b>B.</b> If <b>YES</b> , have appropriate changes been made to the Ignition and Holding plan and the Mop Up and Patrol Plans? If YES, proceed with checklist below; if <b>NO, STOP</b> .	<input type="checkbox"/>	<input type="checkbox"/>

YES	NO	QUESTIONS
<input type="checkbox"/>	<input type="checkbox"/>	Are ALL fire prescription elements met?
<input type="checkbox"/>	<input type="checkbox"/>	Are ALL smoke management specifications met?
<input type="checkbox"/>	<input type="checkbox"/>	Have ALL required current and projected fire weather forecast been obtained and are they favorable?
<input type="checkbox"/>	<input type="checkbox"/>	Are ALL planned operations personnel and equipment on-site, available, and operational?
<input type="checkbox"/>	<input type="checkbox"/>	Has the availability of ALL contingency resources been checked, and are they available?
<input type="checkbox"/>	<input type="checkbox"/>	Have ALL personnel been briefed on the project objectives, their assignment, safety hazards, escape routes, and safety zones?
<input type="checkbox"/>	<input type="checkbox"/>	Have all the pre-burn considerations identified in the Prescribed Fire Plan been completed or addressed?
<input type="checkbox"/>	<input type="checkbox"/>	Have ALL the required notifications been made?
<input type="checkbox"/>	<input type="checkbox"/>	Are ALL permits and clearances obtained?
<input type="checkbox"/>	<input type="checkbox"/>	In your opinion, can the burn be carried out according to the Prescribed Fire Plan and will it meet the planned objective?

**If all the questions were answered "YES" proceed with a test fire. Document the current conditions, location, and results.**

**BURN BOSS:** \_\_\_\_\_ **DATE:** \_\_\_\_\_  
Prescribed Burn Boss's Signature

Printed Name: \_\_\_\_\_

Qualification: \_\_\_\_\_

### ELEMENT 3: FINAL COMPLEXITY ANALYSIS SUMMARY

ADMINISTRATIVE UNIT(S): Wasque

PRESCRIBED FIRE NAME: Wasque

#### COMPLEXITY RATING SUMMARY

OVERALL RATING

RISK: MODERATE

POTENTIAL CONSEQUENCES: MODERATE

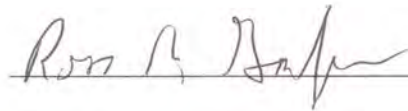
TECHNICAL DIFFICULTY: MODERATE

SUMMARY COMPLEXITY RATING: **MODERATE**

#### RATIONALE:

Burn bosses and local resources are familiar with elements rated 'moderate' or 'high'. If more than half of the resources are not familiar with local fuels, special hazards, social, political, and/or regulatory issues; an option for RXB1 will be considered.

PREPARED BY:



DATE: 01/01/09

Printed Name: Ross M. Garlapow, Northeast Forest and Fire Management LLC

Qualification: Firefighter Type 1 (FFT1)

APPROVED BY:



DATE: 1/22/09

Printed Name: Kathy Abbott

Title: Vice President of Field Operations, The Trustees of Reservations



## ELEMENT 4: DESCRIPTION OF PRESCRIBED FIRE AREA

### A. Physical Description:

1. Location:

Administrative Unit:	Wasque	
Ownership:	The Trustees of Reservations (TTOR)	
Town:	Edgartown	
County:	Dukes	
State:	Massachusetts	
Prescribed Fire Name:	Wasque	
Lat/Long DMS:	41° 21' 09.1" N	70° 27' 37.6" W
Decimal Degrees	41.352528	-70.460444
Elevation:	0' to 30'	

2. Size:

Subunit	Acres	Hectares
1	27	11
2	14	6
3	36	15
4	10	4
<b>TOTALS</b>	<b>87</b>	<b>36</b>

3. Topography:

- Topography is flat.

4. Project Boundaries:

- North - the unit is bound by a dirt road.
- East – the unit is bound by a foot path and coastal shrubs that are immediately adjacent to The Trustees of Reservations Reservation property boundary.
- South - the unit is bound by a dirt road that is adjacent to coastal shrubs.
- West - the unit is bound by a mowed break that separates the unit from coastal shrubs and pitch pine – scrub oak forest immediately adjacent to the Trustees of Reservations Reservation property boundary.

### B. Vegetation/Fuels Description:

1. On-site fuels data:

The unit is classified as a single fuel model: low load, very coarse, humid climate grass (GR3). Grass is the primary carrier of fire through the unit, and is mixed with various low shrubs under 2 feet tall. The grasslands are dominated by *Schizachyrium scoparium*, *Carex pensylvanica*, and other grasses, with <50% *Arctostaphylos uva-ursi*, *Gaylussacia*, and other heathland shrubs. There are several areas throughout the burn unit that have doghair pitch pine growth that is near 4 feet tall. These areas are less than ½ acre in size and do not pose any concerns regarding prescribed fire operations.

2. Adjacent vegetation and fuels data:

- East  
Coastal Shrubs [SH6 (146), Low Load, Humid Climate Shrub] mixed with Pitch Pines for two hundred yards until it reaches the beach of the Atlantic Ocean.

- North  
Pitch Pine – Scrub Oak Forest [SH8 (148), Moderate Load Humid Climate Shrub] mixed with a few houses extends for approximately 200 yards. Beyond 200 yards, the SH8 fuels parallel the coast for ~3/4 of a mile where they reach more homes.
- Northwest  
Pitch Pine – Scrub Oak Forest [SH8 (148), Moderate Load Humid Climate Shrub] mixed with houses extend for ~0.65 miles where the density of homes drops. Perpendicular roads break the fuels approximately every 60 yards in this matrix.
- West  
Pitch Pine – Scrub Oak Forest [SH8 (148), Moderate Load Humid Climate Shrub] mixed with houses extend for ~300 yards where they meet the beach to the Atlantic Ocean. Perpendicular roads break the fuels approximately every 60 yards in this matrix.
- South  
Coastal Shrubs [SH6 (146), Low Load, Humid Climate Shrub] mixed with Pitch Pines for two hundred yards until it reaches the beach of the Atlantic Ocean.

NOTES: Standard fuel models and vegetation types are based on;

- Rothermel, R. C. 1972. A mathematical model for predicting fire spread in wildland fuels. Res. Pap. INT-115. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 40 p.
- Scott, Joe H.; Burgan, Robert E. 2005. Standard fire behavior fuel models: a comprehensive set for use with Rothermel's surface fire spread model. Gen. Tech. Rep. RMRS-GTR-153. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 72 p.

### C. Description of Unique Features:

- There are several areas throughout the burn unit that have doghair pitch pine growth that is near 4 feet tall. These areas are less than ½ acre in size and do not pose any concerns regarding prescribed fire operations.
- Numerous trails bisect the unit.

## ELEMENT 5: GOALS AND OBJECTIVES

### A. Goals:

- Protect public and private property from catastrophic wildfire by using prescribed fire to reduce fuel loads.
- Use prescribed burning to restore and maintain the sandplain habitats, thereby providing habitat for a diverse assemblage of regionally rare and declining plants and animals.
- Use prescribed burns as training exercises for participating agencies in wildland fire behavior, fire suppression principles, and burning techniques.

### B. Objectives:

1. Resource Objectives:
  - Reduce 1 Hour and fine dead fuel loads throughout the unit by 20 to 50%.
  - Expose 25 to 75% of the upper duff layer.
  - Reduce shrub fuel loading by 25 to 35%.
  - Provide training assignments for 1 to 2 fire fighters.
2. Prescribed Fire Objectives:
  - Have no escapes or injuries.
  - Have no smoke impacts to onsite and off site smoke receptors.
  - Complete operations with no injuries and no damage to equipment.
  - Create a reduced fuel area from which to extend future prescribed burns.



## ELEMENT 6: FUNDING

### A. Cost:

All resources used for the burn will be funded from the participating agencies budget centers. No funding source or center has been established for the purpose of this burn.

### B. Funding Source:

Funding sources will vary by position and agency. All resources used for the burn will be funded from the participating agencies' budget centers. No funding source or center has been established for the purpose of this burn.

## ELEMENT 7: PRESCRIPTION

### A. Environmental Prescription:

Parameter	Max.	Min.
Wind Direction(s):	Any except SE	
20' Wind Speed (mph)	22	None
Midflame Wind Speed (mph):	8	None
1-Hour Fuel Moisture (%):	12	6
10-Hour Fuel Moisture (%):	None	8
100-Hour Fuel Moisture (%):	None	10
Live Herbaceous Fuel Moisture (%):	300	None
Live Woody Fuel Moisture (%):	300	None
Air Temperature (F°)	90	35
Relative Humidity (%)	None	30
Days Since Rain:	7	1
KBDI:	299 **	None
Transport Winds (mph):	None	10
Mixing Height (ft):	None	1,500
EPA PM2.5 and Ozone Index:	Good to Moderate	

NOTE: \*\* If burning with a KBDI greater than 199 expect spot fires to burn deeply and persistently, mop-up to be difficult, a need to conduct mop-up over multiple days, and increase frequency of daily unit checks until significant precipitation occurs. An additional Type 6 engine or higher is required when the KBDI is greater than 200 (see Element 11B).

\*\*\* Not all combinations of environmental elements fall within prescription.

\*\*\*\* Prescribed burn operations may continue at the discretion of the Burn Boss if an environmental parameter is outside of prescription limits. However adjustments to parameters, resources, and/or tactics must be documented in the burn plan. Additionally the changed parameter, resources, and/or tactics cannot result in an increase in the complexity level of the burn.

## B. Fire Behavior Prescription:

Parameter	Wasque Grassland GR3 (103)
Max. Head Fire ROS (ch/hr):	145
Min. Head Fire ROS (ch/hr):	2
Max. Head Fire FL (ch/hr):	12
Min. Head Fire FL (ch/hr):	1
Max. Backing Fire ROS (ch/hr):	4
Min. Backing Fire ROS (ch/hr):	2
Max. Backing Fire FL (ch/hr):	2
Min. Backing Fire FL (ch/hr):	1

### NOTES:

Prescribed burn operations may still continue at the discretion of the Burn Boss if observed fire behavior exceeds predictions, given that the observed fire behavior is still within control capabilities of the on-site resources.

Custom fuel models and standard fuel models are based on;

- For all calculations 10-H Fuels at 10%, 100-H Fuels at 12%, 30% Live Fuel Moisture and 0% Slope were held constant.
- Rothermel, R. C. 1972. A mathematical model for predicting fire spread in wildland fuels. Res. Pap. INT-115. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 40 p.
- Scott, Joe H.; Burgan, Robert E. 2005. Standard fire behavior fuel models: a comprehensive set for use with Rothermel's surface fire spread model. Gen. Tech. Rep. RMRS-GTR-153. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 72 p.

## ELEMENT 8: SCHEDULING

### A. Ignition Time Frame/Season(s):

A growing season burn is preferable so that a greater amount of the impact on the shrub layer can be achieved. However, because the primary fuel is grass, a dormant season burn may be the only feasible option due to the availability of burnable fuels. Dormant season burns are still likely to achieve prescribed fire objectives and will be equally effective as a growing season burn if coupled with non-fire treatments.

### B. Projected Duration:

If multiple subunits are burned on the same day, duration should be 10 hours from arrival time to departure. Briefing and setup should be approximately 2 hours, ignition and holding will be approximately 6 hours, mop-up will be approximately 1 hour (assuming low KBDI – below 100), and de-briefing and breakdown will be approximately 1 hour. If the burn is conducted as a series of subunits, duration of ignition and holding operations will vary between 2 and 4 hours. Briefing, setup, and mop-up will remain within the previously mentioned timeframes.

### **C. Constraints:**

- Green-up of grass in the spring may restrict burning to dormant seasons.
- Summer tourists may increase number of sensitive smoke receptors.
- High traffic volume during summer months on ferries may restrict off-island availability of crew and equipment.

## **ELEMENT 9: PRE-BURN CONSIDERATIONS**

### **A. Considerations:**

1. On Site:
  - Fire breaks should be checked prior to the burn day (to be coordinated by The Trustees of Reservations). Mowed breaks should be free of litter and at least 8 feet wide.
  - Burn signs and traffic signs should be placed to help reduce potential of traffic impacts and to make the public aware of burn activities (to be coordinated by The Trustees of Reservations).
  - Confirmation by The Trustees of Reservations that all water sources are accessible and operational.
2. Off Site:
  - Prescribed burn fire equipment should be checked and prepared for burn operations.
  - Coordination with participating agencies to arrange logistics concerning crew and equipment.
  - Contact The Nature Conservancy regarding burn permit use.
  - Contact Fire Chief regarding intent to burn.
  - Compliance with the Massachusetts Endangered Species Act (MESA) from the Division of Fisheries and Wildlife.

### **B. Method and Frequency for Obtaining Weather and Smoke Management Forecast(s):**

- NWS Fire Weather is available at <http://www.erh.noaa.gov/box/firewx.shtml> (use Southern New England – Dukes County), and should be checked the day prior to the burn and the morning of the burn.
- The Weather Channel should be checked leading up to and prior to the burn in addition to the Fire Weather forecast and may need to substitute the Fire Weather forecast if it is not available. The Weather Channel web page can be accessed at <http://www.weather.com> (use Edgartown, MA).
- NWS Marine/General forecast is accessible on frequency 162.550 for on site weather updates.
- Upper air soundings can be accessed at the NWS web page at <http://www.erh.noaa.gov/box/bufkit2.shtml> (use Hyannis - ETA Model (06 UTC, 18 UTC) hourly 48 hrs), and run in the bufkit program (or similar program) to project winds, dispersion conditions, and other variables. If the NWS Fire Weather page is not operating running this model can provide missing smoke management information.
- Spot Weather Forecast Request may be made at <http://www.erh.noaa.gov/box/firewx.shtml> . This forecast is not always available.

- US Environmental Protection Agency AIRNOW Air Quality Index for PM 2.5 and Ozone may be acquired at <http://airnow.gov/index.cfm?action=airnow.showlocal&CityID=38>.

NOTE: Spot weather forecasts are not accessible unless a federal partner organization is participating or the spot weather forecast is essential for public safety.

All weather sites and frequencies are recommendations; the burn boss should adjust frequency and source based on availability of forecasts, needs, and conditions.

**C. Notifications:**

- Day of – Edgartown Fire Department (508) 627-5167
- Day of – Massachusetts DCR District 1 (508) 888-1149
- 24 Hour Advance - DEP Southeastern MA (508) 946-2831 – FAX (508) 946-2865
- 24 Hour Advance – The Nature Conservancy Fire Management Program (508) 732-300
- More than 24 Hours- Radio or newspaper announcement of intent to conduct prescribed burns

**ELEMENT 10: BRIEFING**

**Briefing Checklist:**

<input type="checkbox"/>	Burn Organization
<input type="checkbox"/>	Burn Objectives
<input type="checkbox"/>	Description of Burn Area
<input type="checkbox"/>	Expected Weather & Fire Behavior
<input type="checkbox"/>	Communications
<input type="checkbox"/>	Ignition Plan
<input type="checkbox"/>	Holding Plan
<input type="checkbox"/>	Contingency Plan
<input type="checkbox"/>	Wildfire Conversion plan
<input type="checkbox"/>	Safety

YES / NO (circle one): Alternative Briefing Checklist Attached

NOTE: At the burn boss’ discretion the checklist can be adjusted to meet needs, however a copy of the completed checklist must be included in the burn file and the basic components of the above checklist must be retained. It is recommended that the above checklist is reviewed and checked off after the briefing to ensure adequate documentation and that all components were covered.

## **ELEMENT 11: ORGANIZATION AND EQUIPMENT**

### **A. Positions:**

- (1) One Prescribed Burn Boss Type 2, RxB2
- (1) One Fire Effects Monitor, FEMO
- (2) Two Firefighter Type 1, FFT1 or Single Resource Boss, SRB
- (4) Firefighter Type 2, FFT2

NOTE: Positions and number of staff are suggested based on ease and efficiency. Depending on site conditions, resources, and crew experience the burn boss may adjust the needed positions and number of staff.

### **B. Equipment:**

- 4 drip torches
- 8 Backpack pumps
- 10 hand tools (various types)
- 4 Radios
- 1 First aid kits
- 1 Weather Kit
- 1 Set of PPE/Person
- 2 Prescribed Burn Signs
- 1 type 6 engine
- 1 type 7 engine or similar capacity

NOTE: Equipment type and number of equipment are suggested based on ease and efficiency. Appropriate PPE is required for all crew. When operating pumps ear protection will be worn and when using pressurized water and/or igniting eye protection will be worn.

Based on site conditions, resources, and crew experience the burn boss may adjust the needed equipment.

### **C. Supplies:**

- 20 Gallons of drip torch fuel
- 5 Gallons of pump fuel
- Food and drinks

NOTE: Quantities may be adjusted based on season, conditions, and size of crew.

## ELEMENT 12: COMMUNICATIONS

### A. Radio Frequency(s):

#### 1. Command Frequency(s):

Channel	Receive freq/tone(PL)	Transmit freq/tone(PL)	Notes

#### 2. Tactical Frequency(s):

Channel	Receive freq/tone(PL)	Transmit freq/tone(PL)	Notes

#### 3. Air Operations Frequency(s):

Channel	Receive freq/tone(PL)	Transmit freq/tone(PL)	Notes

NOTE: Frequencies will be identified prior to ignition and will be based on need and attending agencies. At a minimum a tactical frequency will be identified. Command frequencies are for contingencies. Tactical frequencies are for general burn operations and fire ground communications for contingencies.

**B. Telephone Number(s):**

<b>Name and Title</b>	<b>Phone Number</b>	<b>Comments</b>
Edgartown Fire Department	Office: (508) 627-5167	Business Number
Edgartown Police Department	Office: (508) 627-4343	
Martha's Vineyard Emergency Comm. Center	Office: (508) 693-1212	
DEP Southeastern MA	Office: (508) 946-2831 Fax: (508) 946-2865	
Wasque Property Manager	Office: (508) 693-3678 Cell: (508) 395-5384	
The Trustees of Reservations Southeast Regional Director: Chris Kennedy	Office: (508) 693-7662	
The Nature Conservancy Massachusetts Fire Management Program	Office: (508) 732-0300	
DCR Dist. 1	Office: (508) 888-1149 Cell: (508) 889-4094	State Forest Fire Control and Towers
Martha's Vineyard Airport	Control Tower: (508) 693-1170	
Martha's Vineyard Hospital	Office: (508) 693-0410	1 Hospital Rd Vineyard Haven, MA
Brigham - Women's Hospital Burn Center	Office: (617) 732-7715	75 Francis St. Boston, MA
Sumner Redstone Burn Center Massachusetts Gen. Hospital	Office: (617) 726-3354	55 Fruit Street Boston, MA



## **ELEMENT 13: PUBLIC AND PERSONNEL SAFETY, MEDICAL**

### **A. Safety Hazards:**

- Deer ticks and disease.
- Fatigue, heat exhaustion, and dehydration on warm days.
- Falling snags and limbs.
- Holes and depressions in the unit.
- Tripping Hazards (stumps and branches).

### **B. Measures Taken to Reduce Hazards:**

- Tick borne diseases disease prevention will be mentioned during the briefing and all crew will be reminded of deer ticks.
- Food and drinks will be made available to crew. Crew will be briefed on symptoms and treatment of heat exhaustion, dehydration, and fatigue. Additionally supervisors will be reminded to watch for symptoms.
- Danger of tripping will be mentioned in the briefing.
- A minimum of one crew member will be First Aid/CPR certified.
- Supervisors will maintain accountability of staff. Additionally strict accountability will be maintained of any crew who enter the burn unit (location and entry/exit).

### **C. Emergency Medical Procedures:**

- Victim will be stabilized and only moved if directly under threat and threat can not be mitigated.
- The Burn Boss will be notified of the situation.
- The Burn Boss or designee will activate EMS and if possible put the first aid first responder in direct communications with EMS.
- Immediate first aid will be provided by qualified individuals until EMS personnel arrive and relieve the first aid first responder.
- After the incident an accident report will be completed and a copy provided to the burn boss and The Trustees of Reservations.

### **D. Emergency Evacuation Methods:**

- Emergency Services will be contacted at 911 and provided symptom information and location.

### **E. Emergency Facilities:**

- Martha's Vineyard Hospital Emergency Room [12.5 Miles – 50 Minutes drive time via ferry from Chappaquiddick] 1 Hospital Rd, Vineyard Haven, MA – (508) 693-0410
- Brigham - Women's Hospital Burn Center [97 Miles – 3hrs 5 Minutes drive time via ferry from Chappaquiddick and Vineyard Haven to Woods Hole] 75 Francis St. Boston, MA – (617) 732-7715

## **ELEMENT 14: TEST FIRE**

### **A. Planned Location:**

The test fire will be initiated in the unit on the down wind side (unless otherwise determined by the burn boss). The test fire will be in representative fuels and burn will not continue beyond the test fire phase until the burn boss has determined that an accurate representation of expected fire behavior has been demonstrated and that the burn should continue or not.

### **B. Test Fire Documentation:**

- Weather Conditions on Site:  
Weather conditions during the test fire will be recorded and added to the burn report package.
- Test Fire Results:  
Upon completion of the test fire, an announcement to the crew will be made if the burn will continue or be shutdown. The decision should be documented and added to the burn file.

## **ELEMENT 15: IGNITION PLAN**

### **A. Firing Methods:**

Firing methods will be executed in such a manner as to meet burn objectives, resources management objectives, reduce re-burn potential, torching along the edges, and spotting distance. The ignition team will closely coordinate all actions with the holding resources and the burn boss so that operations do not negatively impact one another.

### **B. Devices:**

- Drip Torches
- Fusees
- Other as needed and directed by the Firing or Burn Boss

### **C. Techniques:**

- Backing and/or flanking fire on holding lines.
- Head firing using single or multiple strip or dot fires.
- Circular firing for completion of the unit after down wind portions have been burned out.

### **D. Sequences:**

- Establish black on down wind lines.
- As black is extended on down wind lines, commence interior ignition.
- Continue creating black on the down wind lines and igniting the interior until the majority of the unit is complete.
- Ensure that the upwind line is not ignited until interior ignition crew is out and the downwind holding line is adequately secure.
- Continue until the unit is completed.

### **E. Patterns:**

- On the down wind lines, establish black that is at least 10 feet wide or adequately wide to stop a head fire when used in combination with the hard or soft breaks. Ensure that fire intensity near holding lines is sufficient to reduce the potential of re-burn.
- Extend fire into the unit from the black using appropriate firing techniques.
- Extend black along holding lines and continue igniting interior progressively as holding lines are completed.
- Ensure that interior ignition does not progress faster than blacking the down wind holding lines.
- Complete the unit by ringing the final portion.

### **E. Ignition Staffing:**

- 1 or more Firefighter Type 2s (FFT2)

NOTE: All sub-elements to ignition may be adjusted by the burn boss to meet given conditions. The adjustment must be of a type that will not affect the complexity of the burn.

## **ELEMENT 16: HOLDING PLAN**

### **A. General Procedures for Holding:**

- The development of the downwind holding line will be the base for the speed of the operation.
- Holding teams will coordinate with each other and the ignition team so as to avoid negative impact on adjacent resources.
- Spot fires and slopovers will be suppressed using direct attack.
- The down wind holding line crew will be responsible for establishing black to improve the line.
- The up wind holding line crew will only ignite on their line when it will not negatively impact the other holding team or the ignition team. Careful coordination with the ignition team will be executed whenever igniting.

### **B. Critical Holding Points and Actions:**

- A down wind patrol for possible spots is required.
- When holding on soft breaks, care should be given to ensure that the line does not rekindle or fire does not creep across the line.

### **C. Minimum Organization or Capabilities Needed:**

- 2 Holding Teams
- 1 Firefighter Type 1 or a Single Resource Boss
- 2 or more Firefighter Type 2s per holding team
- Down wind line should have 1 drip torch, 3 backpack pumps, and miscellaneous hand tools
- Up wind line should have a 1 drip torch, 3 backpack pumps, and miscellaneous hand tools

NOTE: All sub-elements to holding may be adjusted by the burn boss to meet given conditions. The adjustment must be of a type that will not affect the complexity of the burn.

## ELEMENT 17: CONTINGENCY PLAN

### A. Trigger Points and Actions Needed:

Trigger Point	Action Needed
Multiple Spot Fires	Adjust ignition and increase down wind patrolling or shutdown.
Slop Over	Adjust ignition and suppress slop over or shutdown burn and suppress slop over.
Minor Injury	Assign first aid first responder to access and address the issue, identify source of injury, and shutdown burn if required.
Significant Injury	Assign first aid - first responder to access and address the issue, identify source of injury, activate EMS, and shutdown burn.
Report of Critical Smoke Sensitive Area Being Impacted	Adjust ignition and monitor results; shutdown burn if required.
Wind Shift	Reevaluate burn and determine if the burn should continue or be shutdown. If the burn continues adjust holding and ignition tactics as needed.
Objectives Not Being Met	Adjust ignition and shutdown burn if required.
Unit is No Longer Within Prescription	Prescribed fire operations will cease and the fire will be suppressed or managed in such a way that hazards will be reduced and/or mitigated.
Escape Fire	Notify the Edgartown Fire Department, shutdown the prescribed burn and suppress the escape.

NOTE: Trigger points and actions should be reevaluated by the burn boss and adjusted based on the burn day's current and expected conditions.

### B. Additional Resources and Maximum Response Time(s):

Resources	Response Time
Edgartown Fire Department – Chappaquiddick Station	5 Minutes
Edgartown Fire Department – Headquarters	15 Minutes
Mutual Aid	Variable

## **ELEMENT 18: WILDFIRE CONVERSION PLAN**

### **A. Wildfire Declared By:**

If the below criteria are met, the prescribed burn conversion will be declared by the Burn Boss.

Fire outside the burn unit will be considered an escape fire under any one or any combination of the following conditions:

- The fire has exceeded or is expected to exceed on-site initial attack capabilities.
- The fire has exceeded The Trustees of Reservations property boundaries or is expected to exceed those boundaries.
- The burn boss declares the prescribed burn an escaped fire.

### **B. IC Assignments (Escaped Fire):**

The Senior Edgartown Fire Department Officer will serve as the incident commander in the event of an escape unless otherwise pre-arranged. If the Edgartown Fire Department is not present then the burn boss will serve as the incident commander until relieved.

### **C. Notifications (Escaped Fire):**

- Edgartown Fire Department at 911 or 508-627-5167
- The Trustees of Reservations Vice President – Field Operations, Kathy Abbot at (617) 784-0567 ext. 7510 (office phone) or (617) 548-6356 (cell phone)

### **D. Extended Attack Actions and Operations to Aid in Fire Suppression:**

- The Edgartown Fire Department will be in charge of all extended attack activities.
- The prescribed burn crew will assist and report to the fire department through a chain of command established during the incident.

## **ELEMENT 19: SMOKE MANAGEMENT AND AIR QUALITY**

### **A. Compliance:**

- Fire Department notification of intent to burn prior to the burn.
- DEP notification of intent to burn prior to ignition.

### **B. Permits to Be Obtained:**

- DEP Northeast Massachusetts Air Quality Permit (Procured by The Massachusetts Chapter of The Nature Conservancy).
- Day of burn verbal authorization from the Fire Chief or senior duty officer of the Edgartown Fire Department.
- Massachusetts Endangered Species Act (MESA) Conservation Permit

### C. Smoke Sensitive Areas:

Smoke Sensitive Area	Distance (miles)	Direction
Residential Area	0.1	NW
Residential Area	3.1	NW
Residential Area	1.2	NNW
Residential Area	1.8	W

### D. Impacted Areas:

Several residences less than 500 yards from the burn unit may be impacted by smoke with PM 2.5 levels in the moderate to unhealthy for sensitive groups range, depending on wind direction.

### E. Mitigation Strategies and Techniques to Reduce Smoke Sensitive Impacts:

- Maintain communications with the Fire Department.
- Burn during a day that has favorable lift and dispersion.
- Dilute smoke by burning only a portion of the unit if lift and dispersion are not favorable for the entire unit.
- Create a strong convective column to lift smoke above surrounding receptors.
- Dispatch smoke patrols in areas that could be impacted.

## ELEMENT 20: MONITORING

### A. Fuels Information (Forecast and Observed) Required and Procedures:

Burn unit fuel sticks (if used) should be weighed prior to ignition and removed from the unit. Downed dead fuel moistures for 1, 10, and 100 hour fuels should be taken using a protimeter (if available) periodically during the burn (in sets of three or more) or as directed by the burn boss.

### B. Weather Monitoring Required and Procedures:

Prior to the test fire, weather will be recorded. Fire weather will be recorded every 60 minutes or as directed by the burn boss. Before the test fire is ignited, probability of ignition should be calculated and should be re-calculated periodically through the burn, if conditions change.

### C. Fire Behavior Monitoring and Procedures:

Flame lengths, rate of spread, and residence time should be estimated hourly and recorded by fuel type. Additionally photos of fire behavior should be taken periodically with the approximate location and direction recorded.

### D. Monitoring Required to Ensure That Prescribed Fire Plan Objectives Are Met:

- Photo points should be taken and fire effects plots should be established.
- Burn day summary should be compiled from burn day records.

### **E. Smoke Dispersal Monitoring Required and Procedures:**

- Communication should be maintained with the Edgartown Fire Department to ascertain if receptors are being impacted by smoke.
- If less than ideal lift is observed and/or concerns of impacts arise, a smoke monitor will be dispatched with a map and cell phone (and/or radio) to check potential problem areas and inform the burn boss and the fire effects monitor of conditions.

NOTE: All sub-elements to monitoring may be adjusted by the burn boss to meet given conditions. However, fire weather needs to be recorded hourly at a minimum.

## **ELEMENT 21: POST-BURN ACTIVITIES**

### **Post Burn Activities to be Completed:**

- An After Actions Review should be conducted with the crew.
- The unit needs to be checked every day between 11:00 and 14:00 by a fire trained person until a rain event and/or the burn boss declares the unit 100% out. If KBDI is greater than 200 or dry conditions occur immediately following or have occurred prior to the burn, the frequency of checks each day should be increased.
- Fire effects monitoring and post burn photos should be completed within 7 days of the burn's completion.
- The burn day summary should be completed.
- The burn file should be assembled and filed.



Appendix A – 1 : Area Map



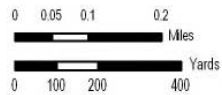
Northeast Forest and Fire Management, LLC

The Trustees of Reservations  
Chappaquiddick Island, Massachusetts

Wasque Grasslands  
Area Map



PRODUCED BY NORTHEAST FOREST AND FIRE MANAGEMENT, LLC  
SANDWICH, MASSACHUSETTS  
MAP DATE: 12/15/2008  
BASEMAP: 2005 1:5000 COLOR ORTHO PHOTOS  
FILE: WASQUE.MXD



- DROP\_POINTS
- Road
- Burn Unit
- TTR Property Boundary





Appendix A – 2 : Unit Map



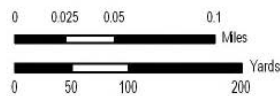
**Northeast Forest and Fire Management, LLC**

**The Trustees of Reservations**  
Chappaquiddick Island, Massachusetts

*Wasque Grasslands  
Unit Map*



PRODUCED BY NORTHEAST FOREST AND FIRE MANAGEMENT, LLC  
SANDWICH, MASSACHUSETTS  
MAP DATE: 12/15/2008  
BASEMAP: 2005 1:5000 COLOR ORTHO PHOTOS  
FILE: WASQUE.MXD



- DROP\_POINTS
- Road
- Burn Unit
- TTOR Property Boundary

STATE PLANE MASSACHUSETTS  
NAD 83



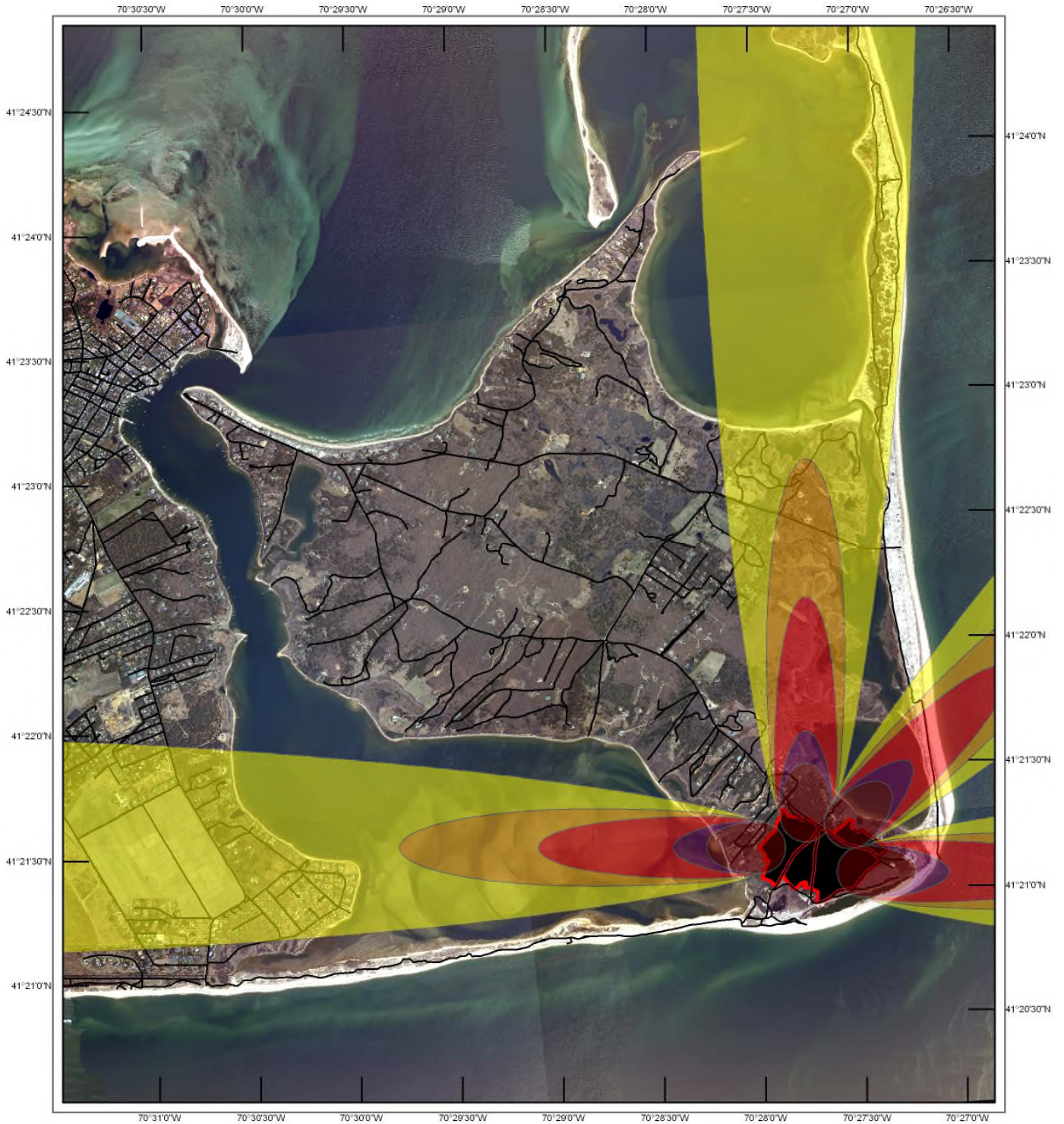
Appendix A – 3: Smoke Screening Map



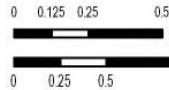
Northeast Forest and Fire Management, LLC

The Trustees of Reservations  
Chappaquiddick Island, Massachusetts

Wasque Grasslands  
Smoke Screening Map



PRODUCED BY NORTHEAST FOREST AND FIRE MANAGEMENT, LLC  
SANDWICH, MASSACHUSETTS  
MAP DATE: 12/15/2008  
BASEMAP: 2005 1:5000 COLOR ORTHO PHOTOS  
FILE: WASQUE.MXD



1-hour Particulate Matter (PM<sub>2.5</sub> µg/m<sup>3</sup>)

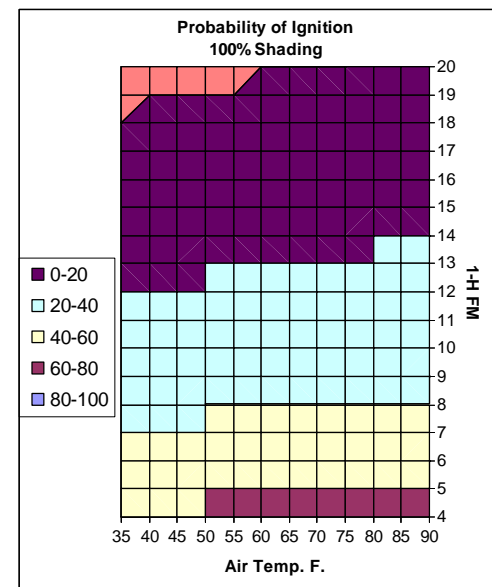
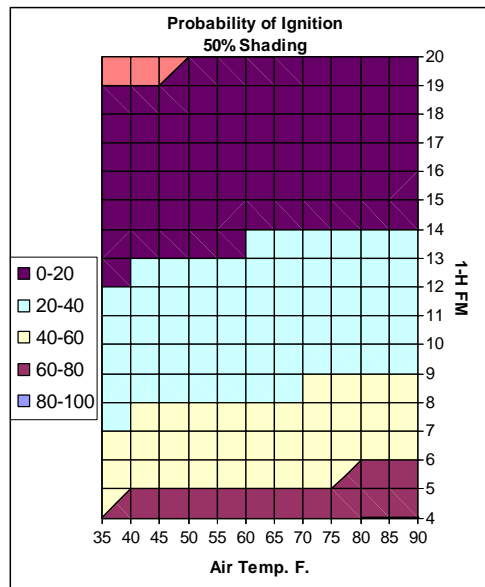
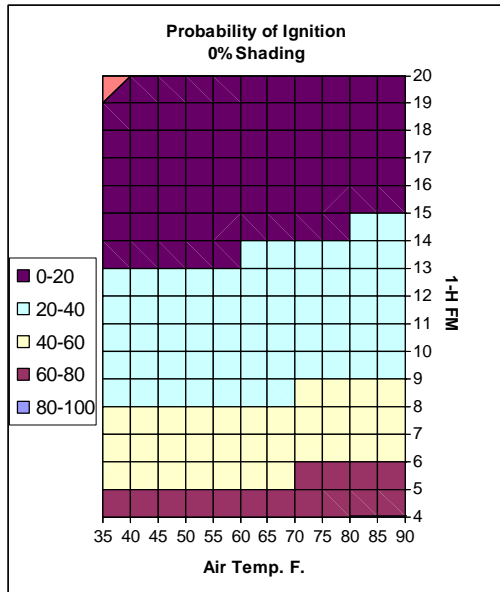
- Good (0-40)
- Moderate (41-80)
- Unhealthy for Sensitive Groups (81-175)
- Unhealthy (176-300)
- Hazardous (500+)

Burn Unit  
Road

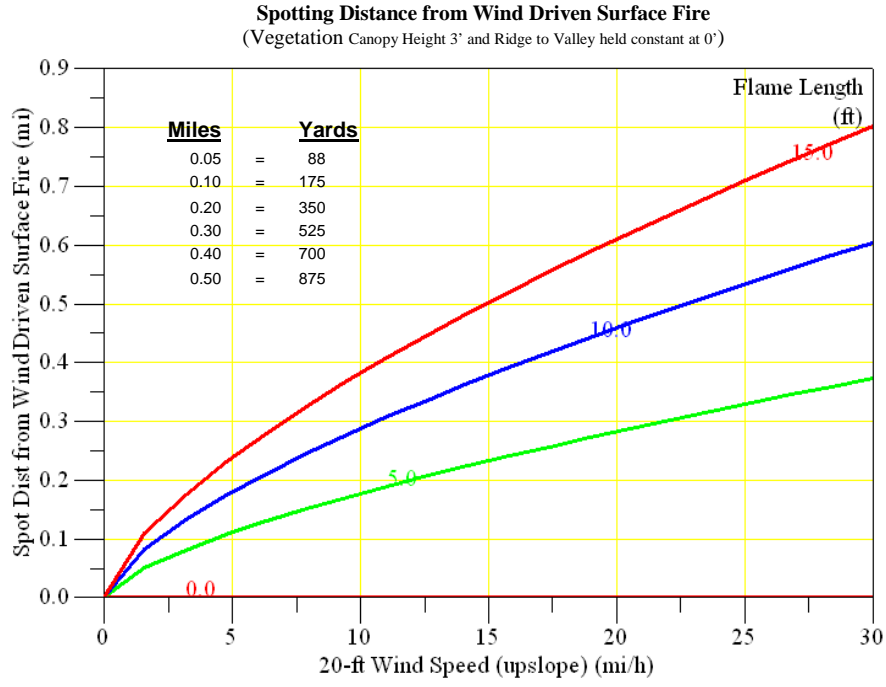
STATE PLANE MASSACHUSETTS  
NAD 83



**APPENDIX B - 2: Probability of Ignition [Run in BEHAVE by Remsoft Professional v. 5.0]:**



**APPENDIX B - 3: Spotting Distance [Run in BEHAVEPLUS v. 3.0.2]:**



**APPENDIX B - 4: Fire Size [Run in BEHAVEPLUS v. 3.0.2]:**



**APPENDIX B – 5: Buoyancy/Air Quality Index Graph and VSmoke Output Summary for Stability Class of 2 (Moderately Unstable), Mixing Height 1,500 ft, 10 mph Transport Wind, 6 mph Surface Winds, and 40% Humidity**

**VSMOKE SUMMARY:**

The smoke dispersion modeling analysis (using VSMOKE and/or VSMOKE-GIS) for this project was performed for 30.0 acres to be burned on 04/15/2009 at the time period of 1500 hours. This time period has daytime dispersion characteristics to disperse the pollutants from the fire. The location of the fire is at approximately 41.35 degrees latitude and -70.461 degrees longitude (1565314.013 meters east and 1976640.94 meters north using US Albers projection). The emission rate of PM2.5 (fine particles) this hour was 126.5 grams/second, and carbon monoxide was 1577.0 grams/second. The heat release rate was 19771.1 megawatts. Both emission rates and the heat release rates were calculated using the Fire Emission Production Simulator (FEPS) model. The estimated background concentration of fine particles and carbon monoxide of the air carried with the winds into the fire are 20 micrograms/cubic meter and 5 parts per million, respectively. The proportion of the smoke subject to plume rise was -0.75 percent, which means 75 percent of the smoke is being dispersed gradually as it rises to the mixing height, and 25 percent is dispersed at ground level.

The meteorological conditions used in this model run were:

- 1.) Mixing height was 1500 feet above ground level (AGL).
- 2.) Transport wind speed, and surface wind speed were 10 and 6 miles per hour, respectively.
- 3.) The sky had 20 percent cloud cover, and the clouds were located 3000 feet above the ground.
- 4.) Surface temperature was 70 degrees Fahrenheit, and the relative humidity was 40 percent.
- 5.) The calculated stability class from VSMOKE was moderately unstable.

The VSMOKE model produces three types of outputs that estimate: a.) The ability of the atmosphere to disperse smoke and the likelihood the smoke will contribute to fog formation, b.) Downwind concentrations of particulate matter and carbon monoxide, and c.) Visibility conditions downwind of the fire.

The Dispersion Index (DI) is an estimate of the ability of the atmosphere to disperse smoke to acceptably low average concentrations downwind of one or more fires. This value could represent an area of approximately 1000 square miles under uniform weather conditions. Typically, the Dispersion Index value should be greater than 30 when igniting a large number of acres within an area. The calculated Dispersion Index value was 19, which predicts the atmosphere has a fair to poor capacity to disperse smoke.

Combining the Dispersion Index and relative humidity values provide an estimate (like is used in insurance actuary tables) of the likelihood of the smoke contributing to fog formation. The Low Visibility Occurrence Risk Index (LVORI) ranges from 1 (lowest risk) to 10 (greatest risk) and usually you want the value to be less than 4. The base line risk of having low visibility as a result of smoke contributing to fog formation is about 1 in 1000 accidents. The Low Visibility Occurrence Risk Index value for this VSMOKE analysis was 2 and this is close to the base line.

High concentrations of particulate matter, especially fine particles (PM2.5), and carbon monoxide can have a negative impact on people's health. The Environmental Protection Agency has developed a color coding system called the Air Quality Index (AQI) to help people understand what concentrations of air pollution may impact their health. When the AQI value is color code orange then people who



are sensitive to air pollutants, or have other health problems, may experience health effects. This means they are likely to be affected at lower levels than the general public. Sensitive groups of people include the elderly, children, and people with either lung disease or heart disease. The general public is not likely to be affected when the AQI is code orange. Everyone may begin to experience health effects when AQI values are color coded as red. People who are sensitive to air pollutants may experience more serious health effects when concentrations reach code red levels. This analysis shows the air quality at downwind distances less than 0.78 miles from the edge of the fire may have a 1-hour particulate matter concentrations predicted to be code red or worse, while distances less than 1.96 miles are predicted to be code orange or worse. At distances less than 823 feet from the edge of the fire the one-hour carbon monoxide concentrations are predicted to be code red or worse, and distances less than 0.31 miles from the fire are predicted to be code orange or worse.

Smoke can also have an impact on how far and how clearly we can see on a highway or in viewing scenery. The fine particles in the smoke are known to be able to scatter and absorb light, which can reduce visibility conditions. The visibility estimates from VSMOKE are valid only when the relative humidity is less than 70 percent. Also, the visibility estimates assume the smoke is passing in front of a person who is looking through the plume of smoke. The visibility thresholds used for this modeling analysis were to maintain a contrast ratio of greater than 0.05 and a visibility distance of 0.25 miles. Visibility conditions may exceed the threshold less than 328 feet from the edge of the fire.

The VSMOKE-GIS model estimates where for the pre-selected fine particulate matter concentrations (39, 89, 139, 352, and 527 micrograms per cubic meter) to be predicted downwind of the fire. If an analysis was conducted then the results (map) will be attached to the last page of this report. The VSMOKE-GIS analysis had daytime dispersion characteristics to disperse the pollutants from the fire and this is the same as the VSMOKE analysis. The downwind spacing interval was set at 0.025 kilometers, and the model ceased making downwind estimates at 30 miles from the edge of the fire. The stability class used for the VSMOKE-GIS analysis was moderately unstable and this is the same as the calculated stability from VSMOKE.

### **Stability, DI, and LVORI**

Analysis period is during the day

Use Time of Day in VSMOKE-GIS

STABILITY CLASS = 2 (Moderately unstable)

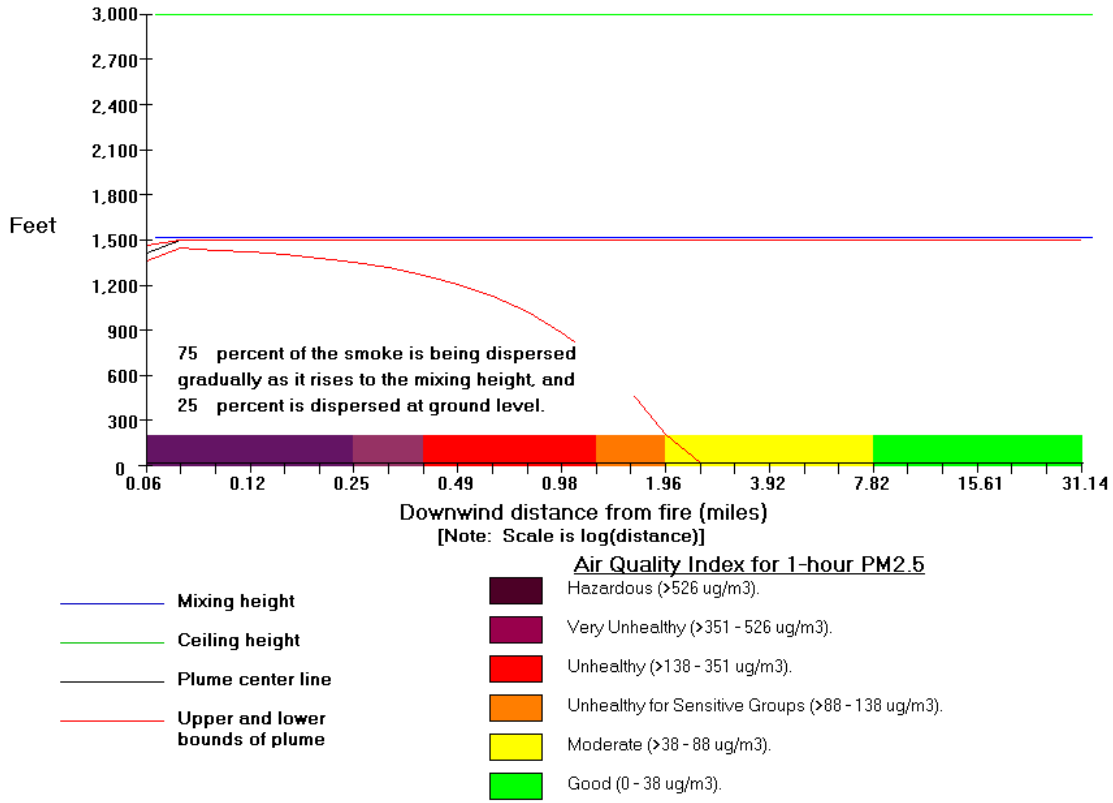
Use Stability in VSMOKE-GIS

Dispersion Index: 19 - fair to poor

Low Visibility Occurrence Risk Index (LVORI): 2 - close to the base line

The base line risk of having low visibility is about 1 in 1000 accidents.

# Plume Height and Concentration



## Concentration Table

<u>Distance from fire</u>	<u>PM2.5 (ug/m3)</u>	<u>CO (ppm)</u>	<u>Distance from fire</u>	<u>PM2.5 (ug/m3)</u>	<u>CO (ppm)</u>
328 ft	1,244.62	17.78	2.47 mi	66.01	5.48
413 ft	1,082.26	16.08	3.11 mi	57.80	5.39
518 ft	941.88	14.62	3.92 mi	51.05	5.32
656 ft	811.34	13.26	4.94 mi	45.49	5.27
823 ft	697.96	12.07	6.21 mi	40.92	5.22
1037 ft	599.79	11.05	7.82 mi	37.17	5.18
0.25 mi	508.67	10.10	9.85 mi	34.09	5.15
0.31 mi	422.89	9.20	12.40 mi	31.58	5.12
0.39 mi	345.73	8.40	15.61 mi	29.52	5.10
0.49 mi	277.98	7.69	19.65 mi	27.83	5.08
0.62 mi	220.96	7.10	24.74 mi	26.45	5.07
0.78 mi	174.94	6.62	31.14 mi	25.32	5.06
0.98 mi	138.96	6.24	39.21 mi	24.40	5.05
1.24 mi	111.44	5.95	49.36 mi	23.64	5.04
1.56 mi	90.98	5.74	62.14 mi	23.01	5.03
1.96 mi	76.45	5.59			

## Visibility Table

<u>Distance from fire</u>	<u>Crossplume Visibility (miles)</u>	<u>Contrast Ratio (miles)</u>	<u>Distance from fire</u>	<u>Crossplume Visibility (miles)</u>	<u>Contrast Ratio (miles)</u>
317 ft	11.97	0.24	2.47 mi	21.22	0.91
422 ft	13.41	0.29	3.11 mi	21.22	0.92
528 ft	14.65	0.34	3.92 mi	21.22	0.93
634 ft	15.80	0.40	4.94 mi	21.22	0.94
845 ft	16.80	0.46	6.21 mi	21.22	0.94
1056 ft	17.66	0.52	7.82 mi	21.22	0.95
0.25 mi	18.41	0.58	9.85 mi	21.22	0.95
0.31 mi	19.07	0.63	12.40 mi	21.22	0.95
0.39 mi	19.60	0.68	15.61 mi	21.22	0.96
0.49 mi	20.03	0.73	19.65 mi	21.22	0.96
0.62 mi	20.37	0.77	24.74 mi	21.22	0.96
0.78 mi	20.64	0.81	31.14 mi	21.22	0.96
0.98 mi	20.85	0.84	39.21 mi	21.23	0.96
1.24 mi	21.02	0.86	49.36 mi	21.24	0.96
1.56 mi	21.14	0.88	62.14 mi	21.28	0.96
1.96 mi	21.20	0.90			

## Plume Table

<u>Distance from fire</u>	<u>Plume Height (feet)</u>	<u>Horizontal Dispersion Coefficient (feet)</u>	<u>Vertical Dispersion Coefficient (feet)</u>	<u>Distance from fire</u>	<u>Plume Height (feet)</u>	<u>Horizontal Dispersion Coefficient (feet)</u>	<u>Vertical Dispersion Coefficient (feet)</u>
317 ft	1,413	76	49	2.47 mi	1,500	1,732	1,653
422 ft	1,500	91	57	3.11 mi	1,500	2,117	2,122
528 ft	1,500	109	67	3.92 mi	1,500	2,588	2,727
634 ft	1,500	131	81	4.94 mi	1,500	3,161	3,505
845 ft	1,500	158	98	6.21 mi	1,500	3,859	4,506
1056 ft	1,500	191	119	7.82 mi	1,500	4,708	5,796
0.25 mi	1,500	233	147	9.85 mi	1,500	5,739	7,455
0.31 mi	1,500	283	185	12.40 mi	1,500	6,989	9,592
0.39 mi	1,500	346	233	15.61 mi	1,500	8,504	12,342
0.49 mi	1,500	422	296	19.65 mi	1,500	10,336	15,883
0.62 mi	1,500	516	376	24.74 mi	1,500	12,549	20,441
0.78 mi	1,500	631	480	31.14 mi	1,500	15,218	26,309
0.98 mi	1,500	772	613	39.21 mi	1,500	18,430	33,863
1.24 mi	1,500	945	784	49.36 mi	1,500	22,287	43,588
1.56 mi	1,500	1,157	1,004	62.14 mi	1,500	26,911	56,107
1.96 mi	1,500	1,415	1,288				

## APPENDIX C: PRESCRIBED FIRE COMPLEXITY RATING

### FINAL COMPEXITY ANALYSIS SUMMARY

ADMINISTRATIVE UNIT(S): Wasque

PRESCRIBED FIRE NAME: Wasque Grasslands

ELEMENT	RISK	POTENTIAL CONSEQUENCES	TECHNICAL DIFFICULTY
1. Potential for Escape:	LOW	MODERATE	LOW
2. Number & Dependence of Activities:	LOW	MODERATE	LOW
3. Off-site Values:	LOW	LOW	LOW
4. On-site Values:	LOW	LOW	LOW
5. Fire Behavior:	LOW	MODERATE	LOW
6. Management Organization:	LOW	LOW	MODERATE
7. Public & Political Interests:	MODERATE	HIGH	MODERATE
8. Fire Treatment Objectives:	LOW	LOW	LOW
9. Constraints:	MODERATE	LOW	MODERATE
10. Safety:	LOW	LOW	LOW
11. Ignition Procedures/Methods:	LOW	LOW	LOW
12. Interagency Coordination:	HIGH	HIGH	HIGH
13. Project Logistics	LOW	LOW	LOW
14. Smoke Management:	MODERATE	MODERATE	MODERATE
<b>OVERALL RATINGS:</b>	<b>MODERATE</b>	<b>MODERATE</b>	<b>MODERATE</b>

<b>FINAL SUMMARY COMPLEXITY DETERMINATION:</b>	<b>MODERATE</b>
------------------------------------------------	-----------------

<b>RATIONALE:</b>	Burn bosses and local resources are familiar with elements rated 'moderate' or 'high'. If the burn boss and/or more than half of the resources are not familiar with local fuels social, political, and regulatory issues; an option for RXB1 will be considered.
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## PRELIMINARY COMPEXITY ANALYSIS SUMMARY

**ADMINISTRATIVE UNIT(S):** Wasque

**PRESCRIBED FIRE NAME:** Wasque Grasslands

ELEMENT	RISK	POTENTIAL CONSEQUENCES	TECHNICAL DIFFICULTY
1. Potential for Escape:	LOW	MODERATE	LOW
2. Number & Dependence of Activities:	LOW	MODERATE	LOW
3. Off-site Values:	HIGH	HIGH	MODERATE
4. On-site Values:	LOW	LOW	LOW
5. Fire Behavior:	MODERATE	MODERATE	LOW
6. Management Organization:	LOW	LOW	MODERATE
7. Public & Political Interests:	MODERATE	HIGH	MODERATE
8. Fire Treatment Objectives:	LOW	LOW	LOW
9. Constraints:	MODERATE	LOW	MODERATE
10. Safety:	LOW	LOW	LOW
11. Ignition Procedures/Methods:	LOW	LOW	LOW
12. Interagency Coordination:	HIGH	HIGH	HIGH
13. Project Logistics	LOW	LOW	LOW
14. Smoke Management:	MODERATE	MODERATE	MODERATE
<b>OVERALL RATINGS:</b>	<b>MODERATE</b>	<b>MODERATE</b>	<b>MODERATE</b>

<b>FINAL SUMMARY COMPLEXITY DETERMINATION:</b>	<b>MODERATE</b>
------------------------------------------------	-----------------

<b>RATIONALE:</b>	<p>Burn bosses and local resources are familiar with elements rated 'moderate' or 'high'. If the burn boss and/or more than half of the resources are not familiar with local fuels social, political, and regulatory issues; an option for RXB1 will be considered.</p>
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# PRESCRIBED FIRE COMPLEXITY RATING SYSTEM WORKSHEET

ADMINISTRATIVE UNIT(S): Wasque

PRESCRIBED FIRE NAME: Wasque Grasslands

1. POTENTIAL FOR ESCAPE		RATING	RATIONALE
RISK	Preliminary Rating:	LOW	Surface fuel loads are low and surrounded by hard breaks, water, and low fuels.
	Final Rating:	LOW	No change.
POTENTIAL CONSEQUENCES	Preliminary Rating:	MODERATE	The fire has the potential to spread quickly in surrounding flashy fuels under the right conditions.
	Final Rating:	MODERATE	Crew members will be diligent in maintaining situational awareness to detect spot fires or slopovers as early as possible.
TECHNICAL DIFFICULTY	Preliminary Rating:	LOW	Low fuel loads and adequate breaks allow this burn to be completed by a crew with a low level of experience.
	Final Rating:	LOW	No change.
2. NUMBER & DEPENDENCY OF ACTIVITIES		RATING	RATIONALE
RISK	Preliminary Rating:	LOW	The relatively low amount of experienced personnel necessary to conduct the burn provide for relatively easy coordination of logistics among agencies/personnel.
	Final Rating:	LOW	No change.
POTENTIAL CONSEQUENCES	Preliminary Rating:	MODERATE	If the minimum number of personnel is used, a lapse in communication is less likely to be identified and remedied by a third party.
	Final Rating:	MODERATE	No change.
TECHNICAL DIFFICULTY	Preliminary Rating:	LOW	Open subunits and low number of personnel allow opportunities for face-to-face communications in many situations. Radios will be available to the majority of crewmembers.
	Final Rating:	LOW	No change.

3. OFF SITE VALUES		RATING	RATIONALE
RISK	Preliminary Rating:	HIGH	Numerous residential structures in the Edgartown community are to the north of the burn unit.
	Final Rating:	HIGH	No change.
POTENTIAL CONSEQUENCES	Preliminary Rating:	HIGH	Impact on the community of Edgartown would result in severe consequences.
	Final Rating:	HIGH	No change.
TECHNICAL DIFFICULTY	Preliminary Rating:	MODERATE	Due to fuel breaks, low fuel load, and the distance from the unit, the technical difficulty is moderate as long as detection, initial attack, and smoke management is effective.
	Final Rating:	MODERATE	No change.
4. ON SITE VALUES		RATING	RATIONALE
RISK	Preliminary Rating:	LOW	No onsite concerns exist.
	Final Rating:	LOW	No change.
POTENTIAL CONSEQUENCES	Preliminary Rating:	LOW	No onsite concerns exist.
	Final Rating:	LOW	No change.
TECHNICAL DIFFICULTY	Preliminary Rating:	LOW	No onsite concerns exist.
	Final Rating:	LOW	No change.

5. FIRE BEHAVIOR		RATING	RATIONALE
RISK	Preliminary Rating:	MODERATE	There are several types of fuel breaks within the unit consisting of dirt roads, foot paths, and mowed breaks. Fire behavior will across these breaks will differ and require different tactics.
	Final Rating:	LOW	Low fuel loads will allow for quick alteration of fuels and fire behavior with relatively little effort.
POTENTIAL CONSEQUENCES	Preliminary Rating:	MODERATE	Fire behavior outside the burn unit will be similar to that within the unit, in some areas the fire behavior could be greater, and could increase difficulty of initial attack.
	Final Rating:	MODERATE	No change.
TECHNICAL DIFFICULTY	Preliminary Rating:	LOW	Low fuel loads will allow for direct attack in most situations. Fuel breaks exist throughout the unit and on the perimeter.
	Final Rating:	LOW	No change.
6. MANAGEMENT ORGANIZATION		RATING	RATIONALE
RISK	Preliminary Rating:	LOW	A minimum amount of highly experienced personnel are needed for this burn. All positions may be supervised by the Burn Boss and one other experienced firefighter (FFT1) without exceeding the span of control.
	Final Rating:	LOW	No change.
POTENTIAL CONSEQUENCES	Preliminary Rating:	LOW	Supervisory and/or communications problems are not expected due to the low number of required personnel and small subunit size.
	Final Rating:	LOW	No change.
TECHNICAL DIFFICULTY	Preliminary Rating:	MODERATE	The number of qualified individuals on the local unit is limited and will create a reliance on other agency staff.
	Final Rating:	MODERATE	No change.



7. PUBLIC & POLITICAL INTEREST		RATING	RATIONALE
RISK	Preliminary Rating:	MODERATE	The public, media, regulators, and political entities have a high level of interest in activities on site and have had interests in the prescribed burns to date. All interests in prescribed burns have been neutral to favorable in the past.
	Final Rating:	MODERATE	No change.
POTENTIAL CONSEQUENCES	Preliminary Rating:	HIGH	Unexpected or adverse events will attract significant public, political, and media attention and may cause a shut-down of the program. Calls for investigations into the unexpected or adverse events should be expected from the public and politicians. Significant consequences should be expected if not addressed appropriately and timely.
	Final Rating:	HIGH	The burn boss, agency administrator, agency public information officer, and other key individuals have been appropriately briefed on the values of the prescribed fire program and measures taken to mitigate risks.
TECHNICAL DIFFICULTY	Preliminary Rating:	MODERATE	A significant amount of time is required by the agency administrator and agency public information officer to communicate activities to interested parties.
	Final Rating:	MODERATE	No change.
8. FIRE TREATMENT OBJECTIVES		RATING	RATIONALE
RISK	Preliminary Rating:	LOW	Objectives are easily met by expected fire behavior.
	Final Rating:	LOW	No change.
POTENTIAL CONSEQUENCES	Preliminary Rating:	LOW	Failure to conduct the burn would result in few to no immediate impacts on target management objectives.
	Final Rating:	LOW	No change.
TECHNICAL DIFFICULTY	Preliminary Rating:	LOW	Measures to achieve the objectives are easily achieved and few or no restrictions on techniques exist. Limited pre-burn monitoring is needed to determine if the unit is in prescription.
	Final Rating:	LOW	No change.

9. CONSTRAINTS		RATING	RATIONALE
RISK	Preliminary Rating:	Moderate	The Trustees of Reservations do not have the capability at this time to supply all of the required crew and equipment. Interagency cooperation is essential.
	Final Rating:	Moderate	No change.
POTENTIAL CONSEQUENCES	Preliminary Rating:	LOW	Alternative management techniques are available.
	Final Rating:	LOW	No change.
TECHNICAL DIFFICULTY	Preliminary Rating:	MODERATE	The environmental parameters required for this burn will allow for burning under a wide range of conditions. Burning is more dependent on crew and equipment availability.
	Final Rating:	MODERATE	No change.
10. SAFETY		RATING	RATIONALE
RISK	Preliminary Rating:	LOW	Low fuel loads, good line-of-sight within the unit, adequate breaks, and large areas suitable for use as safety zones minimize risk associated with this burn. Small subunit size also limits the amount of fatigue/physical stress required to complete the burn.
	Final Rating:	LOW	No change.
POTENTIAL CONSEQUENCES	Preliminary Rating:	LOW	Small unit size and low fuel loads decrease potential for more serious accidents/injuries to firefighters or the public.
	Final Rating:	LOW	No change.
TECHNICAL DIFFICULTY	Preliminary Rating:	LOW	The LCES standards will be employed to maintain safety and situational awareness.
	Final Rating:	LOW	No change.

11. IGNITION PROCEDURE/METHODS		RATING	RATIONALE
RISK	Preliminary Rating:	LOW	Good line-of-site throughout the unit allows the burn boss to supervise all ignition sequences.
	Final Rating:	LOW	No change.
POTENTIAL CONSEQUENCES	Preliminary Rating:	LOW	Hard and soft breaks will likely be sufficient to hold the fire within the unit with minimal suppression activities needed.
	Final Rating:	LOW	No change.
TECHNICAL DIFFICULTY	Preliminary Rating:	LOW	Subunits are small and may be ignited by a single crewmember using a drip torch or fussee.
	Final Rating:	LOW	No change.
12. INTERAGENCY COORDINATION		RATING	RATIONALE
RISK	Preliminary Rating:	HIGH	The project involves other land management agencies or jurisdictions and project completion is dependent on coordinated implementation. Several interagency partners have interest or concerns with the project that may require additional attention. Restrictions related to preparedness levels may cause significant delays in project implementation or project cancellation in a given burn window.
	Final Rating:	HIGH	No change.
POTENTIAL CONSEQUENCES	Preliminary Rating:	HIGH	Interagency coordination issues may cause significant delays in project implementation, may cause project cancellation in a given burn window, or may require major modifications to the project.
	Final Rating:	HIGH	No change.
TECHNICAL DIFFICULTY	Preliminary Rating:	HIGH	Project requires use of several special agreements. Implementation requires special attention to certain interagency details, such as communications and standards for operations. Interagency resources are limited in availability and several restrictions on their use may be present.
	Final Rating:	HIGH	No change.

13. PROJECT LOGISTICS		RATING	RATIONALE
RISK	Preliminary Rating:	LOW	The project duration is limited to one operational period and nor special supplies or equipment are required.
	Final Rating:	LOW	No change.
POTENTIAL CONSEQUENCES	Preliminary Rating:	LOW	Logistical issues will not impact the ability to maintain control of the burn or suppress fire.
	Final Rating:	LOW	No change.
TECHNICAL DIFFICULTY	Preliminary Rating:	LOW	Agencies handle their own logistics and no special logistical needs exist.
	Final Rating:	LOW	No change.
14. SMOKE MANAGEMENT		RATING	RATIONALE
RISK	Preliminary Rating:	MODERATE	Smoke impacts will primarily be associated with nuisance smoke and could potentially be associated with impacts on safety. The impacts are of moderate probability do to distance from unit to receptors.
	Final Rating:	MODERATE	No change.
POTENTIAL CONSEQUENCES	Preliminary Rating:	MODERATE	Vistas, roads, and some residences may experience short-term decreases in visibility. A few health related complaints may occur. Minor smoke intrusions may occur into smoke sensitive areas, but below levels that trigger regulatory concern.
	Final Rating:	MODERATE	No change.
TECHNICAL DIFFICULTY	Preliminary Rating:	MODERATE	Down wind smoke monitoring may be required. Do to limited availability of smoke dispersion information, examination of upper air soundings may be required in order to have an idea of what the smoke column behavior may be like.
	Final Rating:	MODERATE	No change.

## APPENDIX D: JOB HAZARD ANALYSIS

A. Task:				B. Date/Time Group			C. Date Prepared:
Prescribed Burn, Wasque Grasslands				<b>Begin:</b> Date-Variable 06:00 (Start Time May be Variable) <b>End:</b> Date-Variable 18:00 (Start Time May be Variable)	12/15/08		
D. Prepared by: (Rank, Last Name, Duty Position)							
Ross M. Garlapow, Firefighter Type 1 (FFT1)							
E. Task	F. Identify Hazards	Probability	Severity	G. Assess Hazards	H. Develop Controls	I. Determine Residual Risk	J. Implement Controls
TRAVEL TO BURN UNIT	Motor Vehicle Accident (Other Vehicles, Hazardous Road Conditions, Poor Visibility, and Fatigue/Sleepiness)	Unlikely (E)	Critical (II)	Low	1. Adequate rest before travel. 2. Practicing defensive driving. 3. Obeying posted speed limits.	Low	Communicate Motor Vehicle Accident controls to agency contacts/chief of parties/supervisors and drivers.
BURN SETUP	Motor Vehicle Accident (Other Vehicles, Hazardous Road Conditions, Poor Visibility, and Fatigue/Sleepiness)	Seldom (D)	Critical (II)	Medium	1. Practicing defensive driving. 2. Obeying posted speed limits. 3. Post road signs and traffic spotters. 4. Use backup spotters. 5. Use chock blocks and/or emergency brakes when parked.	Low	Communicate Motor Vehicle Accident controls to agency contacts/chief of parties/supervisors and drivers.
	General Accidents (Cuts, abrasion, hearing damage, eye injury, and back/lifting injuries)	Occasional (C)	Negligible (IV)	Low	1. Wear appropriate PPE (gloves, eye protections, and foot protection). 2. Practice appropriate lifting techniques. 3. Make location of first aid kits known to supervisors and crew.	Low	Communicate General Accident controls to supervisors and crew.
	Fuel Mixing and Refueling	Seldom (D)	Marginal (III)	Low	1. Wear eye protection and gloves. 2. Use funnels and secondary containment containers to fill with. 3. Use appropriate fuel mixes. 4. Mark all containers using tags with mix, date, and mixers initials.	Low	Communicate Fuel Mixing and Refueling controls to supervisors and crew.

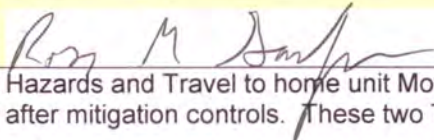
<b>BURN OPERATIONS</b>	Motor Vehicle Accident (Other Vehicles, Hazardous Road Conditions, Poor Visibility, and Fatigue/Sleepiness)	Seldom (D)	Critical (II)	<b>Medium</b>	<ol style="list-style-type: none"> <li>1. Practicing defensive driving.</li> <li>2. Obeying posted speed limits.</li> <li>3. Post road signs and traffic spotters.</li> <li>4. Use backup spotters.</li> <li>5. Use chock blocks and/or emergency brakes when parked.</li> </ol>	<b>Low</b>	Communicate Motor Vehicle Accident controls to agency contacts/chief of parties/supervisors and drivers.
	General Accidents (Cuts, abrasion, hearing damage, eye injury, and back/lifting injuries)	Occasional (C)	Marginal (III)	<b>Medium</b>	<ol style="list-style-type: none"> <li>1. Wear appropriate PPE (gloves, eye protections, and foot protection).</li> <li>2. Practice appropriate lifting techniques.</li> <li>3. Make location of first aid kits known to supervisors and crew.</li> </ol>	<b>Low</b>	Communicate General Accident controls to supervisors and crew.
	Moderate Fire Behavior	Occasional (C)	Marginal (III)	<b>Medium</b>	<ol style="list-style-type: none"> <li>1. Identify escape routes and safety zones.</li> <li>2. Wear full wildland fire PPE, to include fire shelters.</li> </ol>	<b>Low</b>	Communicate Extreme Fire Behavior controls to supervisors and crew.
	Power Line Hazard	Unlikely (E)	Critical (II)	<b>Low</b>	<ol style="list-style-type: none"> <li>1. Avoid working under power lines.</li> <li>2. Do not spray water on or near power lines.</li> <li>3. Minimize heat, direct flame contact, and heavy smoke impacts on power lines.</li> </ol>	<b>Low</b>	Communicate Power Line Hazard controls to supervisors and crew.
	Chain Saw Operation	Unlikely (E)	Critical (II)	<b>Low</b>	<ol style="list-style-type: none"> <li>1. PPE should be worn (eye protection, ear protection, hard hat, chaps, boots, and appropriate clothing).</li> <li>2. Only qualified saw operators will be authorized to operate chain saws.</li> <li>3. Spotters will be provided for sawyers.</li> <li>4. Make location of first aid kits known to supervisors and crew.</li> </ol>	<b>Low</b>	Communicate Chain Saw controls to supervisors and crew.
	Environmental/Environment Hazards (Burns, Poison Ivey, Bees, Lyme Disease, Illness, Tripping/Falling, Snags, Smoke/CO Exposure, Dehydration, Heat Injury, and Cold Injury)	Seldom (D)	Critical (II)	<b>Medium</b>	<ol style="list-style-type: none"> <li>1. Identify First Aid CPR trained crew and first aid kit locations.</li> <li>2. Brief crew on Lyme Disease prevention.</li> <li>3. Brief crew on importance of proper hydration.</li> <li>4. Brief crew on other Environmental/Environment Hazards based on potential exposure.</li> </ol>	<b>Low</b>	Communicate Environmental/Environment Hazards controls to supervisors and crew.

	Fuel Mixing and Refueling	Seldom (D)	Marginal (III)	Low	<ol style="list-style-type: none"> <li>1. Wear eye protection and gloves.</li> <li>2. Use funnels and secondary containment containers to fill with.</li> <li>3. Use appropriate fuel mixes.</li> <li>4. Mark all containers using tags with mix, date, and mixers initials.</li> </ol>	Low	Communicate Fuel Mixing and Refueling controls to supervisors and crew.
	Ignition	Unlikely (E)	Critical (II)	Low	<ol style="list-style-type: none"> <li>1. Wear appropriate PPE (gloves, eye protection, boots, and Nomex with sleeves down).</li> <li>2. Use proper fuel mix.</li> </ol>	Low	Communicate Ignition controls to supervisors and crew.
	Tool Use	Unlikely (E)	Marginal (III)	Low	<ol style="list-style-type: none"> <li>1. Wear appropriate PPE (gloves, boots, clothing, and eye protection).</li> <li>2. Proper spacing should be maintained.</li> <li>3. Proper tool use and foot should be used.</li> </ol>	Low	Communicate Tool Use controls to supervisors and crew.
	Pump Operation	Unlikely (E)	Marginal (III)	Low	<ol style="list-style-type: none"> <li>1. When around an operating pump wear eye and ear protection.</li> <li>2. While operating pressurized water or working around pressurized water operations wear eye protection and gloves.</li> </ol>	Low	Communicate Pump Operation controls to supervisors and crew.
<b>MOP-UP</b>	Environmental/Environment Hazards (Burns, Poison Ivey, Bees, Lyme Disease, Illness, Tripping/Falling, Snags, Smoke/CO Exposure, Dehydration, Heat Injury, and Cold Injury)	Occasional (C)	Critical (II)	High	<ol style="list-style-type: none"> <li>1. Identify First Aid CPR trained crew and first aid kit locations.</li> <li>2. Brief crew on Lyme Disease prevention.</li> <li>3. Brief crew on importance of proper hydration.</li> <li>4. Brief crew on other Environmental/Environment Hazards based on potential exposure.</li> </ol>	Medium	Communicate Environmental/Environment Hazards controls to supervisors and crew.
	Motor Vehicle Accident (Other Vehicles, Hazardous Road Conditions, Poor Visibility, and Fatigue/Sleepiness)	Occasional (C)	Critical (II)	High	<ol style="list-style-type: none"> <li>1. Practicing defensive driving.</li> <li>2. Obeying posted speed limits.</li> <li>3. Post road signs and traffic spotters.</li> <li>4. Use backup spotters.</li> <li>5. Use chock blocks and/or emergency brakes when parked.</li> </ol>	Low	Communicate Motor Vehicle Accident controls to agency contacts/chief of parties/supervisors and drivers.
	Chain Saw Operation	Unlikely (E)	Critical (II)	Low	<ol style="list-style-type: none"> <li>1. PPE should be worn (eye protection, ear protection, hard hat, chaps, boots, and appropriate clothing).</li> <li>2. Only qualified saw operators will be authorized to operate chain saws.</li> <li>3. Spotters will be provided for sawyers.</li> <li>4. Make location of first aid kits known to supervisors and crew.</li> </ol>	Low	Communicate Chain Saw controls to supervisors and crew.

	General Accidents (Cuts, abrasion, hearing damage, eye injury, and back/lifting injuries)	Occasional (C)	Marginal (III)	Medium	<ol style="list-style-type: none"> <li>1. Wear appropriate PPE (gloves, eye protections, and foot protection).</li> <li>2. Practice appropriate lifting techniques.</li> <li>3. Make location of first aid kits known to supervisors and crew.</li> </ol>	Low	Communicate Chain Saw controls to supervisors and crew.
	Tool Use	Seldom (D)	Marginal (III)	Low	<ol style="list-style-type: none"> <li>1. Wear appropriate PPE (gloves, boots, clothing, and eye protection).</li> <li>2. Proper spacing should be maintained.</li> <li>3. Proper tool use and foot should be used.</li> </ol>	Low	Communicate General Accident controls to supervisors and crew.
	Pump Operation	Unlikely (E)	Marginal (III)	Low	<ol style="list-style-type: none"> <li>1. When around an operating pump wear eye and ear protection.</li> <li>2. While operating pressurized water or working around pressurized water operations wear eye protection and gloves.</li> </ol>	Low	Communicate Tool Use controls to supervisors and crew.
<b>BURN BREAK DOWN</b>	Motor Vehicle Accident (Other Vehicles, Hazardous Road Conditions, Poor Visibility, and Fatigue/Sleepiness)	Seldom (D)	Critical (II)	Medium	<ol style="list-style-type: none"> <li>1. Practicing defensive driving.</li> <li>2. Obeying posted speed limits.</li> <li>3. Post road signs and traffic spotters.</li> <li>4. Use backup spotters.</li> <li>5. Use chock blocks and/or emergency brakes when parked.</li> </ol>	Low	Communicate Motor Vehicle Accident controls to agency contacts/chief of parties/supervisors and drivers.
	General Accidents (Cuts, abrasion, hearing damage, eye injury, and back/lifting injuries)	Seldom (D)	Marginal (III)	Low	<ol style="list-style-type: none"> <li>1. Wear appropriate PPE (gloves, eye protections, and foot protection).</li> <li>2. Practice appropriate lifting techniques.</li> <li>3. Make location of first aid kits known to supervisors and crew.</li> </ol>	Low	Communicate General Accident controls to supervisors and crew.
<b>TRAVEL TO HOME UNIT (OR RESIDENCE)</b>	Motor Vehicle Accident (Other Vehicles, Hazardous Road Conditions, Poor Visibility, and Fatigue/Sleepiness)	Seldom (D)	Critical (II)	Medium	<ol style="list-style-type: none"> <li>1. Drivers are hydrated.</li> <li>2. Drivers are paired up with others and/or have the opportunity to rest before driving.</li> <li>3. Practicing defensive driving.</li> <li>4. Obeying posted speed limits.</li> </ol>	Medium	Communicate Motor Vehicle Accident controls to agency contacts/chief of parties/supervisors and drivers.

**K. Determine overall mission/task risk level after controls are implemented**

**Low**

Signature: 

**Remarks:**

Mop-up Environmental/Environment Hazards and Travel to home unit Motor Vehicle Accidents are the only to Tasks/Hazards that the Residual Risk was greater than Low after mitigation controls. These two Tasks/Hazards should be paid special attention to and stressed in briefings.



A. Mission or Task:	B. Date/Time Group				C. Date Prepared:
Prescribed Burn, Wasque Grasslands	Begin: Date-Variable 06:00 (Start Time May be Variable) End: Date-Variable 18:00 (Start Time May be Variable)				12/15/08
D. Control Areas					
Control Options	1. Support	2. Standards	3. Training	4. Leader	5. Individual
Communicate Motor Vehicle Accident controls to agency contacts/chief of parties/supervisors and drivers.	/	- Massachusetts vehicle and traffic laws. -Agency policy on work/rest and vehicle operation.	- Defensive driver training. - NWCG, PMS 419 Engine Operator.	- Set, communicate, and enforce safety controls. - Establish standard operating procedures.	- Know and maintain safety controls.
Communicate General Accident controls to supervisors and crew.		- Provide a supply of disposable hearing protection. - Provide/stage first aid kits.	- First Aid CPR training.	- Set, communicate, and enforce safety controls. - Establish standard operating procedures.	- Know and maintain safety controls.
Communicate HazMat controls to supervisors and crew.		- Provide hazard flagging to crew. - Have binoculars and HazMat Emergency Response Guidebooks available.	- Base policy and operational procedures. - Procedures set in HazMat Guidebook.	- NWCG, S-130 Basic Fire Fighter Training. -HazMat awareness training.	- Set, communicate, and enforce safety controls. - Establish standard operating procedures.

Communicate Fuel Mixing and Refueling controls to supervisors and crew.	- Provide manila tags and sharpies.	- Equipment operational manuals - Fuel mix standard operating procedures. - Only qualified crew will participate in the burn.	- NWCG, S-234 Ignition Operations. - HazMat awareness training.	- Set, communicate, and enforce safety controls. - Establish standard operating procedures.	- Know and maintain safety controls.
Communicate Chain Saw controls to supervisors and crew.	- Provide saw kits with appropriate tools and PPE. - Provide/stage first aid kits.	- Only qualified sawyers will operate chain saws. - Only qualified crew will participate in the burn.	- NWCG, S-212 Wildland Fire Chain Saws.	- Set, communicate, and enforce safety controls. - Establish standard operating procedures.	- Know and maintain safety controls.
Communicate Pump Operation controls to supervisors and crew.	- Provide a supply of disposable hearing protection.	- Only experience pump operators will operate pumps. - Only qualified crew will participate in the burn.	- NWCG, S-211 Pump Operations - NWCG, S-214 Southern Area Engine Academy	- Set, communicate, and enforce safety controls. - Establish standard operating procedures.	- Know and maintain safety controls.
Communicate Ignition controls to supervisors and crew.		- Only experience igniters will conduct interior ignition unless a Firing Boss is designated. - Only qualified crew will participate in the burn.	- NWCG, S-234 Ignition Operations. - NWCG, S-134 Lookouts, Communications, Escape Routes and Safety Zones (LCES).	- Set, communicate, and enforce safety controls. - Establish standard operating procedures.	- Know and maintain safety controls.
Communicate Tool Use controls to supervisors and crew.		- Only qualified crew will participate in the burn.	- NWCG, S-130 Basic Fire Fighter Training.	- Set, communicate, and enforce safety controls. - Establish standard operating procedures.	- Know and maintain safety controls.

<p>Communicate Extreme Fire Behavior controls to supervisors and crew.</p>		<p>- Only qualified crew will participate in the burn.</p>	<p>- NWCG, S-130 Basic Fire Fighter Training. - NWCG, S-134 Lookouts, Communications, Escape Routes and Safety Zones (LCES).</p>	<p>- Set, communicate, and enforce safety controls. - Establish standard operating procedures.</p>	<p>- Know and maintain safety controls.</p>
<p>Communicate Power Line Hazard controls to supervisors and crew.</p>		<p>- Only qualified crew will participate in the burn.</p>	<p>- NWCG, S-215 Fire Operations in the Wildland Urban Interface. - NWCG, S-134 Lookouts, Communications, Escape Routes and Safety Zones (LCES).</p>	<p>- Set, communicate, and enforce safety controls. - Establish standard operating procedures.</p>	<p>- Know and maintain safety controls.</p>
<p>Communicate Environmental/Environment Hazards controls to supervisors and crew.</p>		<p>-Provide/stage first aid kits.</p>		<p>- NWCG, S-134 Lookouts, Communications, Escape Routes and Safety Zones (LCES).</p>	<p>- Set, communicate, and enforce safety controls. - Establish standard operating procedures.</p>

## APPENDIX E: TECHNICAL REVIEWER CHECKLIST

PRESCRIBED FIRE PLAN ELEMENTS:	S/U	COMMENTS
1. Signature Page	S	After initial review and edits all elements meet or exceed standards.
2. Go/No-Go Checklists	S	
3. Complexity Analysis Summary	S	
4. Description of Prescribed Fire Area	S	
5. Goals and Objectives	S	
6. Funding	S	
7. Prescription	S	
8. Scheduling	S	
9. Pre-Burn Considerations	S	
10. Briefing	S	
11. Organization and Equipment	S	
12. Communications	S	
13. Public and Personnel Safety, Medical	S	
14. Test Fire	S	
15. Ignition Plan	S	
16. Holding Plan	S	
17. Contingency Plan	S	
18. Wildfire Conversion	S	
19. Smoke Management and Air Quality	S	
20. Monitoring	S	
21. Post-burn Activities	S	
Appendix A: Maps	S	
Appendix B: Fire Prediction Modeling Runs	S	
Appendix C: Complexity Analysis	S	
Appendix D: Job Hazard Analysis	S	
Appendix E: Technical Reviewer Checklist	S	
Other		

S = Satisfactory and U = Unsatisfactory

Recommended for Approval:  Not Recommended for Approval:

TECHNICAL REVIEW BY: Joel R. Carlson DATE: 01/09/09

Printed Name: Joel R. Carlson  
 Agency: Northeast Forest and Fire Management, LLC  
 Qualification: Prescribed Fire Burn Boss (RxB2)

Approval is recommended subject to the completion of all requirements listed in the comments, or on the Prescribed Fire Plan

## WASQUE PRESCRIBED BURN RESTORATION PROJECT

**To: Rick DeVergilio**  
**From: Lloyd Raleigh**  
**Re: WHIP Funding**  
**September 17, 1998**

### Site Description

Wasque Reservation covers 200 acres at the southern end of Chappaquiddick Island, Edgartown, Massachusetts. The Trustees of Reservations acquired Wasque Reservation in 1967, following fundraising to protect the land from development. In addition to its grasslands and heathlands, the reservation includes coastal beach, sand dunes, pitch pine and oak forests, a coastal pond, and a brackish marsh<sup>1</sup>.

Approximately half of the reservation is covered by sandplain grassland and maritime heathland. These ecological communities support a unique assemblage of species, including several rare and endangered plants and animals. These early successional habitats are located within the heart of Wasque and are threatened with encroaching pitch pine and oak growth. The mosaic of early successional habitats depends on disturbances and stresses such as salt spray, wind, and fire to maintain its early successional characteristics. Salt spray and winds from the ocean stress plants, slow their growth, and impede succession. Fire removes above-ground biomass and can shift the composition of communities over time<sup>2</sup>. More recently, grazing and mowing have affected the communities of Wasque<sup>3</sup>. Along the edges of these heathland-grassland complexes are oak and pine forests. Over the years, succession has increased the duff layer within these communities, and a dense overstory has shaded many sandplain grassland and heathland species to extinction. Now, the connection between these areas is gone, but can be brought back by reversing succession within these late-successional habitats.

### Management Needed

We plan to use prescribed fire as a tool to halt and, where possible, reverse succession at Wasque. The area under management is approximately 100 acres (fig. 1). For our contract, we plan on conducting prescribed burns on 40 acres.

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<sup>1</sup> For details, please see Raleigh, E. L. 1998. *The Ecology of Wasque Reservation*. The Trustees of Reservations. Vineyard Haven, MA.

Buckley, A. and R. Hopping. 1996. *The Flora of Wasque Reservation: Martha's Vineyard Island: A preliminary plant list*. Report to the Trustees of Reservations. Beverly, MA.

<sup>2</sup> Dunwiddie, P. W. and Caljouw, C. 1990. Prescribed Burning and Mowing of Coastal Heathlands and Grasslands in Massachusetts. In: *Ecosystem Management: Rare Species and Significant Habitats*. New York State Museum Bulletin 471. pp. 271-275.

<sup>3</sup> Sheep grazing, fire, and mowing have all been shown to maintain heathlands and grasslands. See Dunwiddie and Caljouw 1990.

Dunwiddie, P. W. 1997. Long-term Effects of Sheep Grazing on Coastal Sandplain Vegetation. *Natural Areas Journal*. 17(3): 261-264.



Figure 1: 1993 color infrared photograph of Wasque Reservation. Habitat Management Units are delineated. Units one through four comprise the sandplain grasslands and maritime heathlands. It is within this 100 acre area that we plan to conduct prescribed burns.

### **Burn Schedule**

We will burn two units: one in 1999 and another in 2000.

### **Budget**

At a cost of \$250 an acre, the total cost of the habitat restoration will be \$10,000.

### **Contact information**

Lloyd Raleigh  
The Trustees of Reservations  
Islands Regional Office  
P. O. Box 2106  
Vineyard Haven, MA 02568  
(508) 693-7662

## WASQUE HAND-CLEARING RESTORATION PROJECT

**To: Rick DeVergilio**  
**From: Lloyd Raleigh**  
**Re: WHIP Funding**  
**September 17, 1998**

### Site Description

Wasque Reservation covers 200 acres at the southern end of Chappaquiddick Island, Edgartown, Massachusetts. The Trustees of Reservations acquired Wasque Reservation in 1967, following fundraising to protect the land from development. In addition to its grasslands and heathlands, the reservation includes coastal beach, sand dunes, pitch pine and oak forests, a coastal pond, and a brackish marsh<sup>1</sup>.

Approximately half of the reservation is covered by sandplain grassland and maritime heathland. These ecological communities support a unique assemblage of species, including several rare and endangered plants and animals. These early successional habitats are located within the heart of Wasque and are threatened with encroaching pitch pine and oak growth. The mosaic of early successional habitats depends on disturbances and stresses such as salt spray, wind, and fire to maintain its early successional characteristics. Salt spray and winds from the ocean stress plants, slow their growth, and impede succession. Fire removes above-ground biomass and can shift the composition of communities over time<sup>2</sup>. More recently, grazing and mowing have affected the communities of Wasque<sup>3</sup>. Along the edges of these heathland-grassland complexes are oak and pine forests. Over the years, succession has increased the duff layer within these communities, and a dense overstory has shaded many sandplain grassland and heathland species to extinction. Now, the connection between these areas is gone, but can be brought back by reversing succession within these late-successional habitats.

### MANAGEMENT NEEDED

Our goal for this restoration project is to minimize the effects of fragmentation thereby maximizing the habitat value of the globally rare heathland grassland complex. By doing so, we will have increased the core area under management by 20%. By removing forested patches we will increase the ecological integrity of Wasque Reservation. Figure

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<sup>1</sup> For details, please see Raleigh, E. L. 1998. *The Ecology of Wasque Reservation*. The Trustees of Reservations. Vineyard Haven, MA.

Buckley, A. and R. Hopping. 1996. *The Flora of Wasque Reservation: Martha's Vineyard Island: A preliminary plant list*. Report to the Trustees of Reservations. Beverly, MA.

<sup>2</sup> Dunwiddie, P. W. and Caljouw, C. 1990. Prescribed Burning and Mowing of Coastal Heathlands and Grasslands in Massachusetts. In: *Ecosystem Management: Rare Species and Significant Habitats*. New York State Museum Bulletin 471. pp. 271-275.

<sup>3</sup> Sheep grazing, fire, and mowing have all been shown to maintain heathlands and grasslands. See Dunwiddie and Caljouw 1990.

Dunwiddie, P. W. 1997. Long-term Effects of Sheep Grazing on Coastal Sandplain Vegetation. *Natural Areas Journal*. 17(3): 261-264.



one is presented for easy reference when determining the location of a particular management action.

### **Hand Clearing**

Several areas totaling 11 acres are to be hand cleared at Wasque. Clearing will be done with chain saws and all woody materials will be removed off-site. These areas are shown in figure 1 as pink, orange, green, yellow, blue and white. Following restoration, these areas will all be incorporated into our core habitat area. Please note, the aerial photograph is from 1993: in some areas of the photo, the pitch pine has already been removed.



Figure 1: 1993 color infrared aerial photograph showing the areas to be restored. All areas noted will be restored

### **Schedule**

Our plan is to begin work removing the pitch pine islands (orange and blue). This will be accomplished in the first year of the contract. By the third year, we plan on having most of the restoration work completed.

### **Budget**

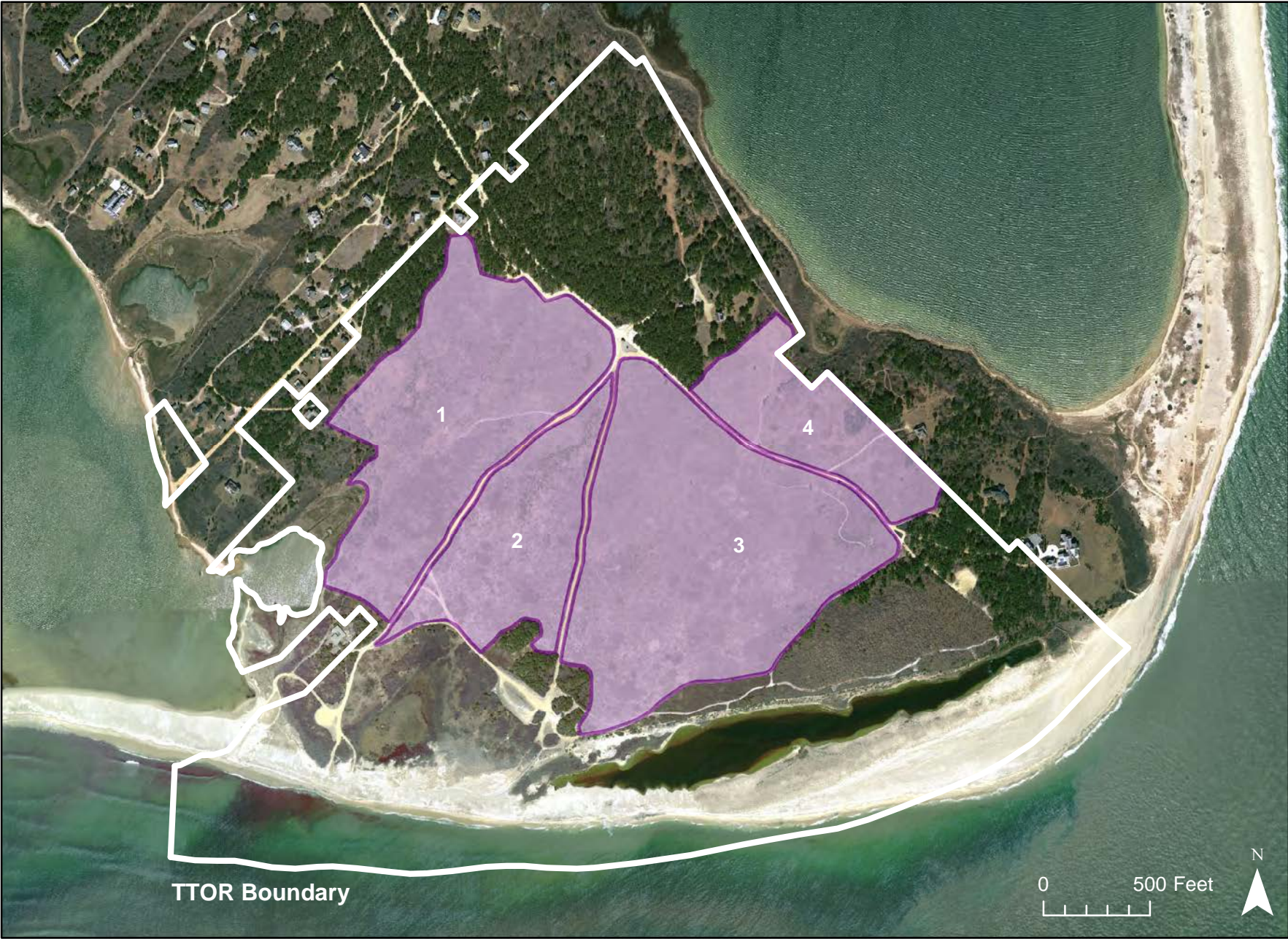
At \$1200 an acre, the projected cost of this restoration is \$13,200. Of this WHIP will cover 75% or \$9900 of the cost.

### **Contact information**



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# Wasque Burn Units



Map produced by The Trustees of Reservations, Aug. 2011.

## Wasque Burn Unit History

Wasque	Units				Notes
Years	1	2	3	4	
1997					No burning
1998			X		
1999	X				
2000			X	X	Small area of Unit 3, near pond
2001					No burning
2002			X		
2003-2005	X	X			
2006	X				Most of Unit 1
2011	X				Most of Unit 1, mowed afterwards

## Wasque Prescribed Fire Schedule

Wasque					
Year	Unit				Notes
	1	2	3	4	
2011	X				
2012		X		X	No burning occurred
2013			X		
2014					No burning
2015	X				
2016		X		X	
2017			X		
2018					No burning
2019	X				
2020		X		X	
2021			X		
2022					No burning
2023	X				