PRESCRIBED FIRE PLAN

ADMINISTRATIVE UNIT: Long Point Wildlife Refuge

PRESCRIBED FIRE NAME: Nahommon's Neck Grassland

COMPLEXITY RATING: **MODERATE**

PREPARED BY: _____ **DATE:** 01/01/09

Printed Name: Ross M. Garlapow

Agency: Northeast Forest and Fire Management, LLC

Qualification: Firefighter Type 1 (FFT1)

TECHNICAL REVIEW BY: _____ **DATE:** 01/09/09

Printed Name: Joel R. Carlson

Agency: Northeast Forest and Fire Management, LLC

Qualification: Prescribed Fire Burn Boss Type 2 (RxB2)

APPROVED BY: _____ **DATE:** 1/22/09

Printed Name: Kathy Abbott

Agency: The Trustees of Reservations

Title: Vice President of Field Operations

TABLE OF CONTENTS

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? *Example: amendments, seasonality*
✓		Will all compliance requirements be completed? *Example: cultural, threatened and endangered species, smoke management, NEPA*
✓		Is risk management in place and the residual risk acceptable? *Example: Prescribed Fire Complexity Rating Guide completed with rational and mitigation measures identified and documented*
✓		Will all elements of the Prescribed Fire Plan be met? *Example: Preparation work, mitigation, weather, organization, prescription, contingency resources*
✓		Will all internal and external notifications and media releases be completed? *Example: Preparedness level restrictions*
✓		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: [signature] **DATE:** 1/22/09

Printed Name: Kathy Abbott

Agency: The Trustees of Reservations

Title: Vice President of Field Operations

DATE APPOVAL EXPIRES: 1/1/2014

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

	YES	NO
A. Has the burn unit experienced unusual drought conditions or contain above normal fuel loadings which were not considered in the prescription development? If **NO** proceed with checklist., if **YES** go to item B.		
B. If **YES** 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 **NO STOP**.		

YES	NO	QUESTIONS
		Are ALL fire prescription elements met?
		Are ALL smoke management specifications met?
		Has ALL required current and projected fire weather forecast been obtained and are they favorable?
		Are ALL planned operations personnel and equipment on-site, available, and operational?
		Has the availability of ALL contingency resources been checked, and are they available?
		Have ALL personnel been briefed on the project objectives, their assignment, safety hazards, escape routes, and safety zones?
		Have all the pre-burn considerations identified in the Prescribed Fire Plan been completed or addressed?
		Have ALL the required notifications been made?
		Are ALL permits and clearances obtained?
		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): Long Point Wildlife Refuge

PRESCRIBED FIRE NAME: Nahommon's Neck Grassland

COMPLEXITY RATING SUMMARY

	OVERALL RATING
RISK:	MODERATE
POTENTIAL CONSEQUENCES:	MODERATE
TECHNICAL DIFFICULTY:	MODERATE
SUMMARY COMPLEXITY RATING:	**MODERATE**

RATIONAL:

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: Ross M Garlapow **DATE:** 5/01/09

Printed Name: Ross M. Garlapow

Agency: Northeast Forest and Fire Management, LLC

Qualification: Firefighter Type 1 (FFT1)

APPROVED BY: [signature] **DATE:** 1/22/09

Printed Name: Kathy Abbott

Agency: The Trustees of Reservations

Title: Vice President of Field Operations

ELEMENT 4: DESCRIPTION OF PRESCRIBED FIRE AREA

A. Physical Description:

1. Location:

Administrative Unit:	Long Point Wildlife Refuge
Ownership:	The Trustees of Reservations
Town:	West Tisbury
County:	Dukes
State:	Massachusetts
Prescribed Fire Name:	Long Point Wildlife Refuge: Nahommon's Neck Grassland Subunits: 1, 2, and 3
Lat/Long (NW Corner):	WGS 84 41.354722 N -70.638139 W
Elevation:	0' to 20'

2. Size:

Subunit	1	2	3	Total
Acres	14	25	25	64
Hectares	6	10	10	26

3. Topography:
   - Topography is flat.

4. Project Boundaries:
   - The north side of the unit is bound by a mowed break.
   - The west side of the unit is bound by a dirt road adjacent to Tisbury Great Pond and the pond itself on the southern portion of the west side.
   - The south side of the unit is bound by the Atlantic Ocean on the south side of Martha's Vineyard.
   - The east side of the unit is bound by Hugh's Thumb Road (dirt surface).

B. Vegetation/Fuels Description:

1. On-site fuels data:

   The unit is classified into 4 fuel models. Fuel models vary by the amount of canopy cover, herbaceous component, shrub component, and previous treatments.

   Sandplain Grasslands – 32 acres (51%)
   Grasslands were classified as 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.

Heath Shrublands – 22 acres (35%)
Shrublands were classified as low load, humid climate timber-shrub (SH4). Although little to no overstory exists, the fire behavior modeled from the shrub component of this fuel model is consistent with existing shrub fuels on the burn unit. Litter and shrubs are the primary carriers of fire in this fuel. Shrubs in this fuel model are primarily huckleberry (*Gaylusaccia spp.*), *Rubus spp.*, bayberry (*Myrica spp.*), and scrub oak (*Quercus spp.*).

Mowed Shrubs – 5 acres (8%)
Mowed shrubs were classified as moderate load, humid climate timber-grass-shrub (TU3). Although little to no overstory exists, the fire behavior modeled from the carriers of this fuel model is consistent with existing fuels on the burn unit. Litter and woody debris from mowed shrubs are the primary carriers of fire in this fuel. Mowed shrubs in this fuel model are primarily huckleberry (*Gaylusaccia spp.*), *Rubus spp.*, bayberry (*Myrica spp.*), and scrub oak (*Quercus spp.*).

Oak Woodland – 4 acres (6%)
Oak woodlands were classified as low load, humid climate shrub (SH6). Oak litter from an overstory of white oak (*Quercus alba*) and understory shrubs (primarily huckleberry and blueberry) are the primary carriers of fire in this fuel model.

2. Adjacent vegetation and fuels data:
   - East
     Oak woodlands with a low shrub understory of huckleberry extend for ~500 feet where they reach Homer Pond. At ~200 feet the fuels are broken by Big Home Rd.
   - South
     No burnable fuels are to the south (Atlantic Ocean).
   - West
     Oak woodlands with huckleberry understory extend ~500 feet where they reach Middle Point Cove of Tisbury Great Pond. The southern portion of the unit is immediately adjacent to Tisbury Great Pond.
   - North
     Relatively continuous fuels extend north of the unit for ~1.25 miles first as a mowed shrubland (TU3) for ~300 yards, and then as a pine-oak woodland with a huckleberry and scrub oak understory (SH8). At ~1.25 miles the fuels are broken by Scrubby Neck Farm Rd (dirt surface) and then transition into a residential area where homes are in a matrix of oak woodland (SH6).

C. Description of Unique Features:

- The unit is bisected by several roads and trails, and a water feature (Homer Pond).

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.
   - Top kill greater than 50% of the shrub layer.
   - Reduce shrub fuel loading by 25 to 35%.
   - Provide training assignments for 1 to 2 fire fighters.

2. Prescribed Fire Objectives:
   - Complete each subunit within one operational period.
   - Have no escapes or injuries.
   - Complete operations with no significant damage to equipment.
   - Have no negative impact on on-site and off-site suppression resource availability for wildfires.
   - Keep smoke impacts to off site receptors below 2.5 ppm (Environmental Protection Agency standard for "Unhealthy for Sensitive Groups") and avoid creating prolonged periods of nuisance smoke.

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. Environnemental Prescription:

Parameter	Max.	Min.
Wind Direction(s):	SW → SE (True)**	
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 (%):	None	None
Live Woody Fuel Moisture (%):	None	None
Air Temperature (F°)	35	90
Relative Humidity (%)	None	30
Days Since Rain:	7	1
KBDI:	299***	None
Transport Winds (mph): S → N wind:	None	10**
Mixing Height (ft): NE → SE wind:	None	1,500**
EPA PM2.5 and Ozone Index:	Good to Moderate**	

NOTE:

******If Wind Direction, Mixing Height, Transport Winds, and/or EPA PM2.5/Ozone Index are out of prescription but atmospheric stability based on upper air soundings and/or on site observations favor good lift and/or only a portion of the unit will be burned; the burn boss may still conduct the burn based on observed conditions.

*******If burning with a KBDI greater than 199 expect spot fires to burn deeply and be persistent (under pitch pines), mop-up to be difficult, a need to conduct mop-up over multiple days, and increase frequency of daily unit checks until significant precipitation. The addition of one engine to the minimum required for the burn unit should be considered.

******** Not all combinations of environmental elements fall within prescription. For fire behavior details see Appendix B – Fire Behavior output tables.

B. Fire Behavior Prescription:

Parameter	Grassland GR3 (103)	Shrubland (SH4) 144	Mowed Shrubs (TU3) 163	Oak Woodland (SH6) 146
Max. Head Fire ROS (ch/hr):	145	130	93	75
Min. Head Fire ROS (ch/hr):	2	3	2	2
Max. Head Fire FL (ch/hr):	12	15	13	16
Min. Head Fire FL (ch/hr):	1	2	2	3
Max. Backing Fire ROS (ch/hr):	4	3	2	2
Min. Backing Fire ROS (ch/hr):	2	2	2	2
Max. Backing Fire FL (ch/hr):	2	3	2	3
Min. Backing Fire FL (ch/hr):	1	2	2	3

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 leas 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 West Tisbury, 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 – West Tisbury Fire Department (508) 693-9555
- Day of - Martha's Vineyard Airport Control Tower (508) 693-1170
- 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 Massachusetts Chapter 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:

☐	Burn Organization
☐	Burn Objectives
☐	Description of Burn Area
☐	Expected Weather & Fire Behavior
☐	Communications
☐	Ignition Plan
☐	Holding Plan
☐	Contingency Plan
☐	Wildfire Conversion plan
☐	Safety

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

NOTE: At the burn bosses discretion the checklist can be adjusted to 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. Based 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. Based on site conditions, resources, and crew experience the burn boss may adjust the needed equipment.

C. Supplies:

- 20 Gallons torch mix
- 5 Gallons 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	Transmit freq/tone	Receive freq/tone	Notes

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

Channel	Transmit freq/tone	Receive freq/tone	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):

Name and Title	Phone Number	Comments
West Tisbury Fire Department	Office: (508) 693-9555	Medical and Fire
West Tisbury Police Department	Office: (508) 693-0020	
Martha's Vineyard Emergency Communications Center	Office: (508) 693-1212	
DEP Southeastern MA	Office: (508) 946-2831 Fax: (508) 946-2865	
Long Point Wildlife Refuge	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 Lyme disease.
- Fence lines and gates.
- Fatigue, heat exhaustion, and dehydration on warm days.
- Holes and depressions in the unit.

B. Measures Taken to Reduce Hazards:

- Lyme disease prevention will be mentioned during the briefing and all crew will be reminded of deer ticks.
- Gates in critical locations near the unit will be unlocked on the burn day and gates and fences will be clearly identified to the crew. Supervisors will be reminded in the briefing to ensure that escape routes in around the fences should be maintained.
- Extra water and food will be made available to crew and 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 holes and tripping will be mentioned in the briefing.
- At a minimum of one fire resource will be First aid CPR certified.
- Supervisors will maintain accountability of staff and strict accountability will be maintained of crew who entire the unit (location and entry/exit).

C. Emergency Medical Procedures:

- Victim will be stabilized and only moved if directly under threat and threat cannot 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.
- Qualified individuals will provide immediate first aid until EMS personnel arrive and relieve the first responder.
- After the incident an accident report will be filled out and a copy provided to The Trustees of Reservations, the Burn Boss, and the individuals home unit.

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 [10 Miles – 25 Minutes drive time] 1 Hospital Rd, Vineyard Haven, MA – (508) 693-0410
- Brigham - Women's Hospital Burn Center [90 Miles – 2hrs 25 Minutes drive time via ferry 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 should be in representative fuels and should continue until the burn boss feels that an accurate representation 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 package.
- Test Fire Results:
  Upon completion of the test fire an announcement 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
- Hand-thrown flares
- Fussees
- Other as needed and directed by the Firing or Burn Boss

C. Techniques:

- Backing 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 downwind lines if not water.
- 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.
- Continue until the unit is completed.

E. Patterns:

- On the down wind lines establish black that is at least 10 feet wide or is based on weather and fire behavior conditions that will be sufficiently wide to stop a head fire in combination with the hard breaks. Ensure that intensities are sufficient enough near holding lines so as 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.
- Insure that interior ignition does not progress faster than blacking the down wind holding lines.
- Complete the unit by ringing the final portion.

F. Ignition Staffing:

- 1 Firefighter Type 2 (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 downwind holding line will be the base for the speed of 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 will be responsible for establishing black to improve the line.
- The up-wind holding line will only light on their line when it will not negatively impact the other holding team or the ignition team. Careful coordination with the ignition team should be executed whenever igniting.

B. Critical Holding Points and Actions:

- A down wind patrol for possible spot fires should be conducted.
- 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 or more Firefighter Type 2s per team
- Down wind line should have a minimum of 2backpack pumps and 1tool

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 asses and address the issue, identify source of injury, activate EMS, and shutdown burn if required.
Report of Critical Smoke Sensitive Area Being Impacted	Adjust ignition and monitor results; shutdown burn if required.
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 West Tisbury Fire Department, shutdown burn, and suppress escape.

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

Resources	Response Time
West Tisbury Fire Department (2 Brush Breakers & various other equipment)	10 Minutes
Edgartown Fire Department (1 Brush Breaker and various equipment)	15 Minutes
DCR District 1 (1 Type 6 Engine)	15 Minutes

ELEMENT 18: WILDFIRE CONVERSION PLAN

A. Wildfire Declared By:

If the criteria outlined below are met the Burn Boss will declare the prescribed burn a wildfire.

Fire outside the burn unit will be considered an escape fire under any one or 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 escape fire.

B. IC Assignments (Escape Fire):

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

C. Notifications (Escape Fire):

- West Tisbury Fire Department at (508) 693-9555
- Long Point Wildlife Refuge at (508) 693-3678
- 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 West Tisbury 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 Southeastern 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 West Tisbury Fire Department.

C. Smoke Sensitive Areas:

Smoke Sensitive Area	Distance (miles)	Direction
Island Montessori School	1.4	NW
Residential Area	2.2	NW
Residential Area	1.6	N
Edgartown-West Tisbury Rd	2	N
Martha's Vineyard Airport	2.3	NE

D. Impacted Areas:

Several homes to the northwest of the unit may be impacted (Moderate PM 2.5 ug/m^3)

E. Mitigation Strategies and Techniques to Reduce Potential for 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 protometer (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 should be taken. Fire weather should be taken 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 West Tisbury 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 should be dispatched with a map and cell phone (and/or radio) to check potential problem areas and keep the burn boss or fire effects monitor informed of conditions.

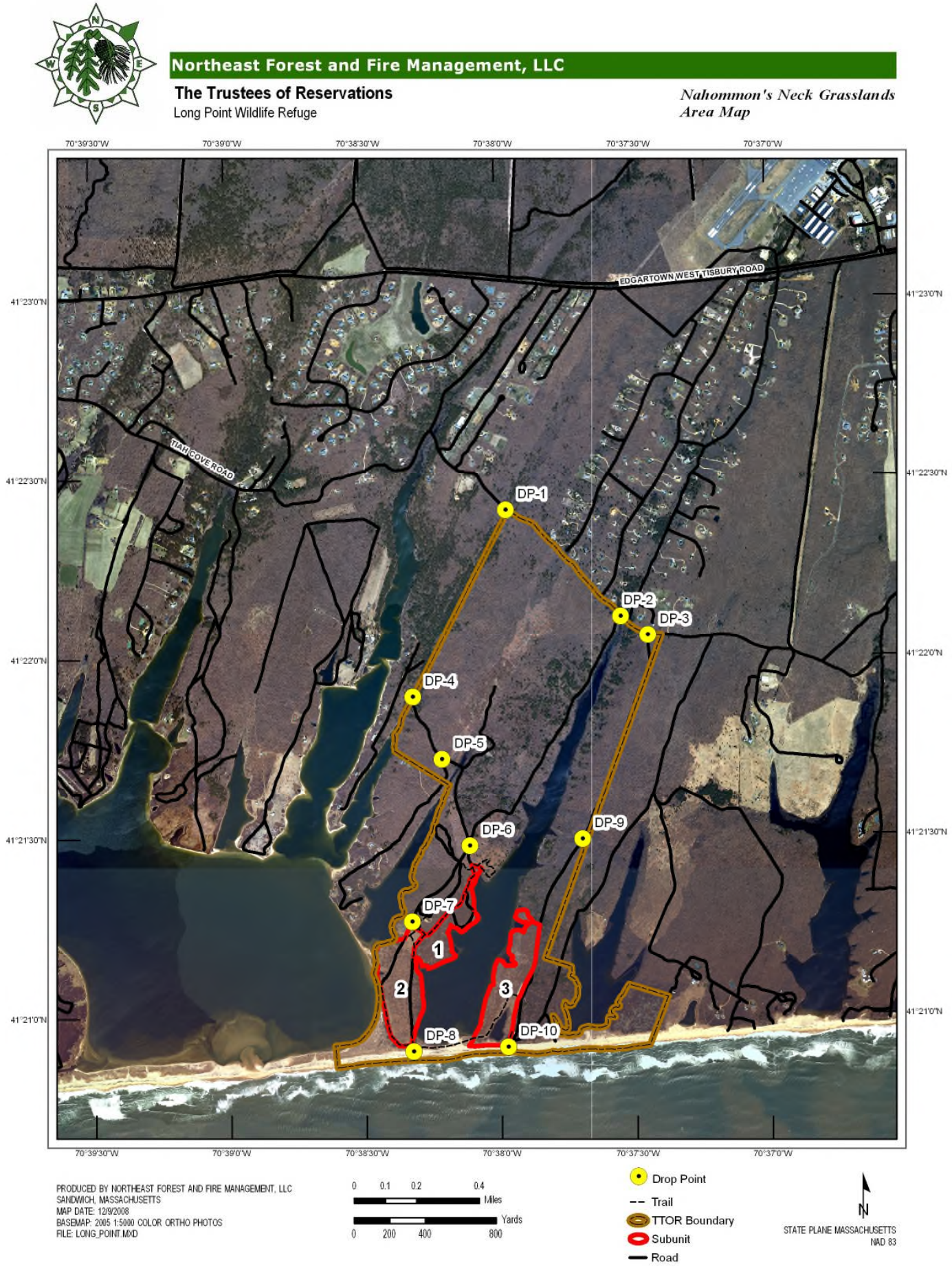
NOTE: All sub-elements to monitoring may be adjusted by the burn boss to meet given conditions. However, fire weather needs to be taken hourly at a minimum.

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 until a rain event and/or the burn boss declares the unit 100% out. If KBDI is greater than 199 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



APPENDIX A-2: Unit Ortho Photo

APPENDIX A-3: Unit Vegetation / Fuels

Northeast Forest and Fire Management, LLC

The Trustees of Reservations
Long Point Wildlife Refuge

Nahaommon's Neck Grasslands
Vegetation / Fuels Map

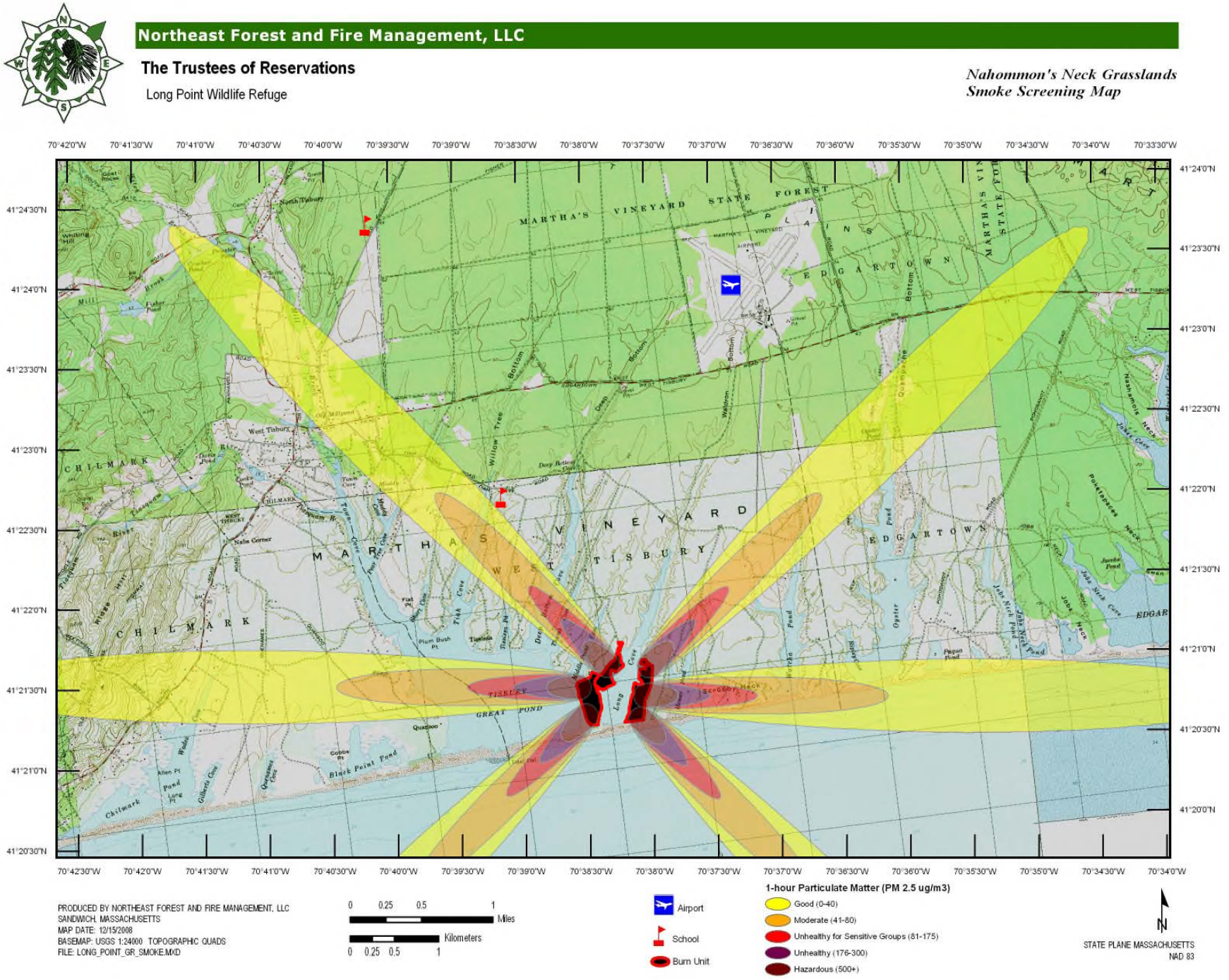
PRODUCED BY NORTHEAST FOREST AND FIRE MANAGEMENT, LLC
SANDWICH, MASSACHUSETTS
MAP DATE: 12/9/2008
BASEMAP: 2005 1:5000 COLOR ORTHO PHOTOS
FILE: LONG_POINT.MXD

0 0.025 0.05 0.1 Miles
0 50 100 200 Yards

Burn Unit
TTOR Boundary
Trail
Road
GRASSLAND
MOWED SHRUBS
OAK WOODLAND
SHRUBLAND

STATE PLANE MASSACHUSETTS
NAD 83

APPENDIX A-4: Smoke Screening Map



APPENDIX B-1A: Fire Behavior Little Bluestem – Grass 3 [FBS FM 103] (Held Constant: 10H Fuels at 10%, 100H Fuels at 12%, 30% Live Fuel Moisture and 0% Slope) [Run in BEHAVEPLUS v. 3.0.2]

Surface Rate of Spread (ch/h) - Head Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	3	14	29	46	64	83	103	124	145	167	189	212	235
5	3	13	27	42	59	76	94	113	132	152	172	193	214
6	2	12	25	39	54	70	86	103	121	139	158	177	196
7	2	11	23	36	50	64	80	96	112	129	146	163	181
8	2	10	21	33	46	60	74	89	104	120	136	152	169
9	2	10	20	31	44	56	70	84	98	113	128	143	159
10	2	9	19	30	41	53	66	79	93	107	121	136	148
11	2	9	18	28	39	51	63	76	89	102	116	129	138
12	2	8	17	27	38	49	60	73	85	98	111	124	131
13	2	8	17	26	36	47	58	70	82	94	107	119	124
14	2	8	16	25	35	45	56	67	79	91	103	115	119

Flame Length (ft) - Head Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	4	6	7	8	9	10	11	12	12	13	14	15
5	2	4	5	6	7	8	9	10	11	12	12	13	14
6	2	4	5	6	7	8	9	9	10	11	12	12	13
7	2	3	5	6	7	7	8	9	10	10	11	11	12
8	2	3	4	5	6	7	8	9	9	10	10	11	11
9	1	3	4	5	6	7	8	8	9	9	10	10	11
10	1	3	4	5	6	7	7	8	9	9	10	10	11
11	1	3	4	5	6	6	7	8	8	9	9	10	10
12	1	3	4	5	6	6	7	7	8	9	9	10	10
13	1	3	4	5	5	6	7	7	8	8	9	9	10
14	1	3	4	5	5	6	7	7	8	8	9	9	9

Surface Rate of Spread (ch/h) - Backing Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	3	4	4	5	5	5	5	4	4	4	4	4	4
5	3	3	4	4	4	4	4	4	4	4	4	4	3
6	2	3	4	4	4	4	4	4	4	4	3	3	3
7	2	3	3	4	4	4	4	3	3	3	3	3	3
8	2	3	3	3	3	3	3	3	3	3	3	3	3
9	2	2	3	3	3	3	3	3	3	3	3	3	3
10	2	2	3	3	3	3	3	3	3	3	3	3	2
11	2	2	3	3	3	3	3	3	3	3	3	2	2
12	2	2	3	3	3	3	3	3	3	2	2	2	2
13	2	2	2	3	3	3	3	3	2	2	2	2	2
14	2	2	2	3	3	3	2	2	2	2	2	2	2

Flame Length (ft) - Backing Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	2	2	2	2	2	2	2	2	2	2	2	2
5	2	2	2	2	2	2	2	2	2	2	2	2	2
6	2	2	2	2	2	2	2	2	2	2	2	2	2
7	2	2	2	2	2	2	2	2	2	2	2	2	2
8	2	2	2	2	2	2	2	2	2	2	2	2	2
9	1	2	2	2	2	2	2	2	2	2	2	2	2
10	1	2	2	2	2	2	2	2	2	2	2	2	2
11	1	2	2	2	2	2	2	2	2	2	2	2	2
12	1	2	2	2	2	2	2	2	2	2	2	2	2
13	1	1	2	2	2	2	2	2	2	2	2	2	2
14	1	1	2	2	2	2	2	2	2	2	2	2	1

APPENDIX B-1B: Fire Behavior Mowed Shrubs – Timber-Understory 3 (TU3) [FBS FM 163] (Held Constant: 10H Fuels at 10%, 100H Fuels at 12%, 30% Live Fuel Moisture and 0% Slope) [Run in BEHAVEPLUS v. 3.0.2]

Surface Rate of Spread (ch/h) - Head Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	8	18	29	42	56	71	87	103	121	139	158	178
5	2	8	17	27	39	53	67	82	98	114	132	150	168
6	2	8	16	26	37	50	64	78	93	109	125	142	160
7	2	7	15	25	36	48	61	74	89	104	120	136	153
8	2	7	15	24	34	46	58	71	85	100	115	130	147
9	2	7	14	23	33	44	56	69	82	96	111	126	141
10	2	6	14	22	32	43	54	66	79	93	107	122	137
11	2	6	13	22	31	41	53	64	77	90	104	118	132
12	2	6	13	21	30	40	51	63	75	88	101	115	129
13	2	6	12	20	29	39	50	61	73	85	98	111	125
14	2	6	12	20	29	38	48	59	71	83	96	109	122

Flame Length (ft) - Head Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	4	6	8	9	11	12	13	14	15	17	18	19
5	2	4	6	7	9	10	11	13	14	15	16	17	18
6	2	4	6	7	9	10	11	12	13	14	15	16	17
7	2	4	5	7	8	10	11	12	13	14	15	16	17
8	2	4	5	7	8	9	10	11	12	13	14	15	16
9	2	4	5	7	8	9	10	11	12	13	14	15	16
10	2	3	5	6	8	9	10	11	12	13	14	14	15
11	2	3	5	6	7	9	10	11	12	12	13	14	15
12	2	3	5	6	7	8	9	10	11	12	13	14	15
13	2	3	5	6	7	8	9	10	11	12	13	14	14
14	2	3	5	6	7	8	9	10	11	12	13	13	14

Surface Rate of Spread (ch/h) - Backing Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	2	2	2	3	3	3	3	3	3	3	2	2
5	2	2	2	2	2	2	2	2	2	2	2	2	2
6	2	2	2	2	2	2	2	2	2	2	2	2	2
7	2	1	2	2	2	2	2	2	2	2	2	2	2
8	2	1	2	2	2	2	2	2	2	2	2	2	2
9	2	1	2	2	2	2	2	2	2	2	2	2	2
10	2	1	2	2	2	2	2	2	2	2	2	2	2
11	2	1	2	2	2	2	2	2	2	2	2	2	2
12	2	1	2	2	2	2	2	2	2	2	2	2	2
13	2	1	1	2	2	2	2	2	2	2	2	2	2
14	2	1	1	2	2	2	2	2	2	2	2	2	2

Flame Length (ft) - Backing Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	2	2	2	2	2	2	2	2	2	2	2	2
5	2	2	2	2	2	2	2	2	2	2	2	2	2
6	2	2	2	2	2	2	2	2	2	2	2	2	2
7	2	2	2	2	2	2	2	2	2	2	2	2	2
8	2	2	2	2	2	2	2	2	2	2	2	2	2
9	2	2	2	2	2	2	2	2	2	2	2	2	2
10	2	2	2	2	2	2	2	2	2	2	2	2	2
11	2	2	2	2	2	2	2	2	2	2	2	2	2
12	2	2	2	2	2	2	2	2	2	2	2	2	2
13	2	2	2	2	2	2	2	2	2	2	2	2	2
14	2	2	2	2	2	2	2	2	2	2	2	2	2

APPENDIX B-1C: Fire Behavior Heath Shrubland – Shrub 4 (SH4) [FBS FM 144] (Held Constant: 10H Fuels at 10%, 100H Fuels at 12%, 30% Live Fuel Moisture and 0% Slope) [Run in BEHAVEPLUS v. 3.0.2]

Surface Rate of Spread (ch/h) - Head Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	3	11	23	38	55	73	94	115	138	162	187	213	240
5	3	10	22	37	53	71	91	112	134	157	182	207	234
6	3	10	22	36	52	69	89	109	130	152	177	202	228
7	3	10	21	35	51	68	87	106	127	150	173	197	222
8	3	10	21	34	49	68	85	104	124	146	169	193	217
9	3	10	20	33	48	65	83	102	122	143	165	189	213
10	3	9	20	33	47	64	81	100	119	140	162	185	208
11	3	9	19	32	47	63	80	98	117	138	159	182	205
12	3	9	19	32	46	62	79	96	115	136	157	179	201
13	3	9	19	31	45	61	77	95	114	134	154	176	198
14	3	9	19	31	45	60	76	93	112	132	152	173	196

Flame Length (ft) - Head Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	4	6	8	10	11	13	14	15	17	18	19	20
5	2	4	6	8	10	11	12	14	15	16	17	18	19
6	2	4	6	8	9	11	12	13	15	16	17	18	19
7	2	4	6	8	9	11	12	13	14	15	17	18	19
8	2	4	6	8	9	10	12	13	14	15	16	17	18
9	2	4	6	7	9	10	11	13	14	15	16	17	18
10	2	4	6	7	9	10	11	13	14	15	16	17	18
11	2	4	6	7	9	10	11	12	13	15	16	17	17
12	2	4	6	7	9	10	11	12	13	14	15	16	17
13	2	4	5	7	8	10	11	12	13	14	15	16	17
14	2	4	5	7	8	10	11	12	13	14	15	16	17

Surface Rate of Spread (ch/h) - Backing Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	3	2	3	3	3	4	4	4	4	4	3	3	3
5	3	2	3	3	3	3	4	4	4	3	3	3	3
6	3	2	3	3	3	3	3	3	3	3	3	3	3
7	3	2	3	3	3	3	3	3	3	3	3	3	3
8	3	2	3	3	3	3	3	3	3	3	3	3	3
9	2	2	2	3	3	3	3	3	3	3	3	3	3
10	2	2	2	3	3	3	3	3	3	3	3	3	3
11	2	2	2	3	3	3	3	3	3	3	3	3	3
12	2	2	2	3	3	3	3	3	3	3	3	3	3
13	2	2	2	3	3	3	3	3	3	3	3	3	3
14	2	2	2	3	3	3	3	3	3	3	3	3	3

Flame Length (ft) - Backing Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	2	2	3	3	3	3	3	3	3	3	3	3
5	2	2	2	2	3	3	3	3	3	3	3	3	3
6	2	2	2	2	2	3	3	3	3	3	3	2	2
7	2	2	2	2	2	2	2	2	2	2	2	2	2
8	2	2	2	2	2	2	2	2	2	2	2	2	2
9	2	2	2	2	2	2	2	2	2	2	2	2	2
10	2	2	2	2	2	2	2	2	2	2	2	2	2
11	2	2	2	2	2	2	2	2	2	2	2	2	2
12	2	2	2	2	2	2	2	2	2	2	2	2	2
13	2	2	2	2	2	2	2	2	2	2	2	2	2
14	2	2	2	2	2	2	2	2	2	2	2	2	2

APPENDIX B-1D: Fire Behavior Oak Woodland – Shrub 6 (SH6) [FBS FM 146] (Held Constant: 10H Fuels at 10%, 100H Fuels at 12%, 30% Live Fuel Moisture and 0% Slope) [Run in BEHAVEPLUS v. 3.0.2]

Surface Rate of Spread (ch/h) - Head Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	10	19	29	39	49	60	71	82	93	104	116	128
5	2	10	18	27	37	47	57	67	78	89	100	111	122
6	2	9	17	26	35	45	55	65	75	85	96	106	117
7	2	9	17	25	34	43	53	62	72	82	92	103	113
8	2	9	16	24	33	42	51	60	70	79	89	99	109
9	2	8	16	24	32	41	50	59	68	77	87	96	106
10	2	8	15	23	31	40	48	57	66	75	84	94	103
11	2	8	15	23	31	39	47	56	65	73	83	92	101
12	2	8	15	22	30	38	46	55	63	72	81	90	99
13	2	8	14	22	29	37	45	54	62	71	79	88	97
14	2	7	14	21	29	37	44	53	61	69	78	87	95

Flame Length (ft) - Head Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	3	7	9	11	12	14	15	16	17	18	19	20	21
5	3	6	9	10	12	13	14	16	17	18	19	20	21
6	3	6	8	10	11	13	14	15	16	17	18	19	20
7	3	6	8	10	11	12	14	15	16	17	18	18	19
8	3	6	8	9	11	12	13	14	15	16	17	18	19
9	3	6	8	9	11	12	13	14	15	16	17	18	18
10	3	6	8	9	10	12	13	14	15	16	16	17	18
11	3	6	7	9	10	11	13	14	14	15	16	17	18
12	3	5	7	9	10	11	12	13	14	15	16	17	18
13	3	5	7	9	10	11	12	13	14	15	16	17	17
14	3	5	7	9	10	11	12	13	14	15	16	16	17

Surface Rate of Spread (ch/h) - Backing Fire

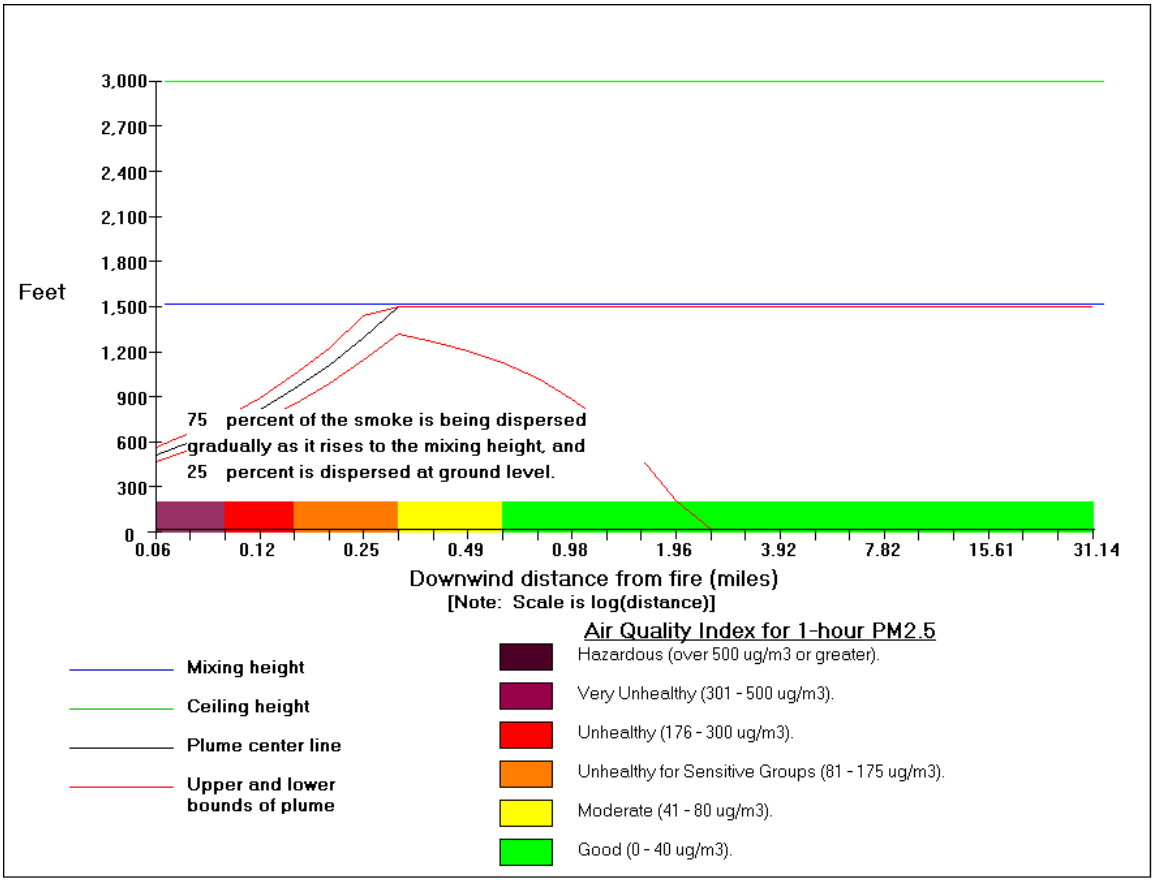
	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	3	3	3	3	3	3	3	2	2	2	2	2
5	2	2	3	3	3	3	3	2	2	2	2	2	2
6	2	2	3	3	3	3	2	2	2	2	2	2	2
7	2	2	2	3	2	2	2	2	2	2	2	2	2
8	2	2	2	2	2	2	2	2	2	2	2	2	2
9	2	2	2	2	2	2	2	2	2	2	2	2	2
10	2	2	2	2	2	2	2	2	2	2	2	2	2
11	2	2	2	2	2	2	2	2	2	2	2	2	2
12	2	2	2	2	2	2	2	2	2	2	2	2	2
13	2	2	2	2	2	2	2	2	2	2	2	2	2
14	2	2	2	2	2	2	2	2	2	2	2	2	2

Flame Length (ft) - Backing Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	3	4	4	4	4	4	4	4	3	3	3	3	3
5	3	3	4	4	4	4	3	3	3	3	3	3	3
6	3	3	3	3	3	3	3	3	3	3	3	3	3
7	3	3	3	3	3	3	3	3	3	3	3	3	3
8	3	3	3	3	3	3	3	3	3	3	3	3	3
9	3	3	3	3	3	3	3	3	3	3	3	3	3
10	3	3	3	3	3	3	3	3	3	3	3	3	3
11	3	3	3	3	3	3	3	3	3	3	3	3	3
12	3	3	3	3	3	3	3	3	3	3	3	3	3
13	3	3	3	3	3	3	3	3	3	3	3	3	3
14	3	3	3	3	3	3	3	3	3	3	3	3	3

APPENDIX B-2: 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

Plume Height Graph



Stability, DI, and LVORI Table

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.

Concentration Table

APPENDIX B-2: 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

Distance from fire	PM2.5 (ug/m3)	CO (ppm)	Distance from fire	PM2.5 (ug/m3)	CO (ppm)
328 ft	884.30	13.98	2.47 mi	43.33	5.24
413 ft	761.31	12.70	3.11 mi	39.11	5.20
518 ft	654.58	11.59	3.92 mi	35.67	5.16
656 ft	564.03	10.65	4.94 mi	32.85	5.13
823 ft	483.05	9.81	6.21 mi	30.53	5.11
1037 ft	408.62	9.04	7.82 mi	28.64	5.09
0.25 mi	336.40	8.29	9.85 mi	27.09	5.07
0.31 mi	269.25	7.59	12.40 mi	25.82	5.06
0.39 mi	212.19	7.00	15.61 mi	24.79	5.05
0.49 mi	165.93	6.52	19.65 mi	23.94	5.04
0.62 mi	129.90	6.14	24.74 mi	23.25	5.03
0.78 mi	102.60	5.86	31.14 mi	22.68	5.03
0.98 mi	82.27	5.65	39.21 mi	22.21	5.02
1.24 mi	67.25	5.49	49.36 mi	21.83	5.02
1.56 mi	56.35	5.38	62.14 mi	21.51	5.02
1.96 mi	48.74	5.30			

Visibility Table

Distance from fire	Crossplume Visibility (miles)	Contrast Ratio (miles)	Distance from fire	Crossplume Visibility (miles)	Contrast Ratio (miles)
317 ft	17.22	0.46	2.47 mi	22.00	0.94
422 ft	18.01	0.52	3.11 mi	22.00	0.94
528 ft	18.70	0.57	3.92 mi	22.00	0.95
634 ft	19.28	0.61	4.94 mi	22.00	0.95
845 ft	19.78	0.65	6.21 mi	22.00	0.95
1056 ft	20.21	0.69	7.82 mi	22.00	0.96
0.25 mi	20.59	0.73	9.85 mi	22.00	0.96
0.31 mi	20.92	0.77	12.40 mi	22.00	0.96
0.39 mi	21.19	0.80	15.61 mi	22.00	0.96
0.49 mi	21.40	0.83	19.65 mi	22.00	0.96
0.62 mi	21.57	0.86	24.74 mi	22.00	0.96
0.78 mi	21.71	0.88	31.14 mi	22.00	0.96
0.98 mi	21.82	0.90	39.21 mi	22.01	0.96
1.24 mi	21.90	0.91	49.36 mi	22.01	0.97
1.56 mi	21.96	0.92	62.14 mi	22.03	0.97
1.96 mi	21.99	0.93			

APPENDIX B-2: 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

Plume Table

Distance from fire	Plume Height (feet)	Horizontal Dispersion Coefficient (feet)	Vertical Dispersion Coefficient (feet)	Distance from fire	Plume Height (feet)	Horizontal Dispersion Coefficient (feet)	Vertical Dispersion Coefficient (feet)
317 ft	1,160	76	49	2.47 mi	1,500	1,732	1,653
422 ft	1,352	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				

Nahommon's Neck Grassland VSMOKE Report
Prepared by: Ross M. Garlapow
Date: 12/12/2008

The smoke dispersion modeling analysis (using VSmoke and/or VSmoke-GIS) for this project was performed for 16.0 acres to be burned on 04/15/2009 at the time period of 1400 hours. This time period has daytime dispersion characteristics to disperse the pollutants from the fire. The location of the fire is at approximately 41.349 degrees latitude and -70.633 degrees longitude (1550541.89 meters east and 1974870.47 meters north using US Albers projection). The emission rate of PM2.5 (fine particles) this hour was 63.6 grams/second, and carbon monoxide was 789.4 grams/second. The heat release rate was 10946.9 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).

APPENDIX B-2: 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

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 0.49 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 1.24 miles are predicted to be code orange or worse. At distances less than 518 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 1037 feet 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

APPENDIX B-2: 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

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 (41, 81, 176, 301, and 501 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 slightly unstable and this is different than the calculated stability class in Vsmoke.

APPENDIX C: PRESCRIBED FIRE COMPLEXITY RATING

FINAL COMPEXITY ANALYSIS SUMMARY

ADMINSTRATIVE UNIT(S): Long Point Wildlife Refuge

PRESCRIBED FIRE NAME: Nahommon's Neck 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	HIGH	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	MODERATE	MODERATE	MODERATE
14. Smoke Management:	MODERATE	MODERATE	MODERATE
OVERALL RATINGS:	**MODERATE**	**MODERATE**	**MODERATE**

FINAL SUMMARY COMPLEXITY DETERMINATION:	**MODERATE**

RATIONALE:	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.

PRELIMINARY COMPEXITY ANALYSIS SUMMARY

ADMINSTRATIVE UNIT(S): Long Point Wildlife Refuge

PRESCRIBED FIRE NAME: Nahommon's Neck 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	HIGH	LOW
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	MODERATE	MODERATE	MODERATE
14. Smoke Management:	MODERATE	MODERATE	MODERATE
OVERALL RATINGS:	**MODERATE**	**MODERATE**	**MODERATE**

FINAL SUMMARY COMPLEXITY DETERMINATION:	**MODERATE**

RATIONALE:	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.

PRESCRIBED FIRE COMPLEXITY RATING SYSTEM WORKSHEET

ADMINISTRATIVE UNIT(S): Long Point Wildlife Refuge

PRESCRIBED FIRE NAME: Nahommon's Neck 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:	LOW	A residence and several other structures are approximately 100 yards west of the unit. Numerous residential structures in the West Tisbury community are to the north of the burn unit. However, due to light and/or non-burnable fuels surrounding these structures, and/or their distance from the unit, the risk of ignition is low.
	Final Rating:	LOW	No change.
POTENTIAL CONSEQUENCES	Preliminary Rating:	HIGH	Impact on the community of West Tisbury would result in severe consequences.
	Final Rating:	HIGH	No change.
TECHNICAL DIFFICULTY	Preliminary Rating:	LOW	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:	LOW	No change.
4. ON SITE VALUES		**RATING**	**RATIONALE**
RISK	Preliminary Rating:	LOW	Several wildlife habitat structures are within the unit on the perimeter. Light fuels will be easily pre-treated to minimize impact of fire.
	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 hade 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	Resource 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 resources 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:	MODERATE	Some area will need initial mechanical treatment before they can be burned. Most areas will need to be maintained on a regular basis using mechanical treatments between burn treatments.

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 dependant 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 his 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	Low potential for serious injury while conducting this burn.
	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**	Coordination among agencies will likely be needed to procure the required crew and equipment.
	Final Rating:	**HIGH**	No change.
POTENTIAL CONSEQUENCES	**Preliminary Rating:**	**HIGH**	Availability of other agency staff and equipment will affect the ability to accomplish the burn.
	Final Rating:	**HIGH**	No change.
TECHNICAL DIFFICULTY	**Preliminary Rating:**	**HIGH**	Coordination with at least one agency is expected to be necessary to complete the burn.
	Final Rating:	**HIGH**	No change.

13. PROJECT LOGISTICS		RATING	RATIONALE
RISK	Preliminary Rating:	MODERATE	Coordination of crew and equipment travel to Martha's Vineyard is essential for completion of burn operations.
	Final Rating:	MODERATE	No change.
POTENTIAL CONSEQUENCES	Preliminary Rating:	MODERATE	Failure to execute travel coordination of crew and equipment will affect the ability to conduct burn operations.
	Final Rating:	MODERATE	No change.
TECHNICAL DIFFICULTY	Preliminary Rating:	MODERATE	Agencies handle their own logistics, ferries readily available during non-summer months.
	Final Rating:	MODERATE	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	Project personnel will be subjected to smoke on the holding lines. Smoke is unlikely to trigger any regulatory issues. However public perception of smoke has low tolerance levels.
	Final Rating:	HIGH	Regulatory agency and public tolerance of any smoke impact is minimal.
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, Nahommon's Neck Grasslands	Begin:	Date-Variable 06:00 (Start Time May be Variable)	12/15/08
	End:	Date-Variable 18:00 (Start Time May be Variable)	

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.

BURN OPERATIONS	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)	Marginal (III)	**Medium**	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.
	Moderate Fire Behavior	Occasional (C)	Marginal (III)	**Medium**	1. Identify escape routes and safety zones. 2. Wear full wildland fire PPE, to include fire shelters.	**Low**	Communicate Extreme Fire Behavior controls to supervisors and crew.
	Power Line Hazard	Unlikely (E)	Critical (II)	**Low**	1. Avoid working under power lines. 2. Do not spray water on or near power lines. 3. Minimize heat, direct flame contact, and heavy smoke impacts on power lines.	**Low**	Communicate Power Line Hazard controls to supervisors and crew.
	Chain Saw Operation	Unlikely (E)	Critical (II)	**Low**	1. PPE should be worn (eye protection, ear protection, hard hat, chaps, boots, and appropriate clothing). 2. Only qualified saw operators will be authorized to operate chain saws. 3. Spotters will be provided for sawyers. 4. Make location of first aid kits known to supervisors and crew.	**Low**	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)	**Medium**	1. Identify First Aid CPR trained crew and first aid kit locations. 2. Brief crew on Lyme Disease prevention. 3. Brief crew on importance of proper hydration. 4. Brief crew on other Environmental/Environment Hazards based on potential exposure.	**Low**	Communicate Environmental/Environment Hazards 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.
	Ignition	Unlikely (E)	Critical (II)	**Low**	1. Wear appropriate PPE (gloves, eye protection, boots, and Nomex with sleeves down). 2. Use proper fuel mix.	**Low**	Communicate Ignition controls to supervisors and crew.
	Tool Use	Unlikely (E)	Marginal (III)	**Low**	1. Wear appropriate PPE (gloves, boots, clothing, and eye protection). 2. Proper spacing should be maintained. 3. Proper tool use and foot should be used.	**Low**	Communicate Tool Use controls to supervisors and crew.
	Pump Operation	Unlikely (E)	Marginal (III)	**Low**	1. When around an operating pump wear eye and ear protection. 2. While operating pressurized water or working around pressurized water operations wear eye protection and gloves.	**Low**	Communicate Pump Operation controls to supervisors and crew.
MOP-UP	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**	1. Identify First Aid CPR trained crew and first aid kit locations. 2. Brief crew on Lyme Disease prevention. 3. Brief crew on importance of proper hydration. 4. Brief crew on other Environmental/Environment Hazards based on potential exposure.	**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**	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.
	Chain Saw Operation	Unlikely (E)	Critical (II)	**Low**	1. PPE should be worn (eye protection, ear protection, hard hat, chaps, boots, and appropriate clothing). 2. Only qualified saw operators will be authorized to operate chain saws. 3. Spotters will be provided for sawyers. 4. Make location of first aid kits known to supervisors and crew.	**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**	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 Chain Saw controls to supervisors and crew.
	Tool Use	Seldom (D)	Marginal (III)	Low	1. Wear appropriate PPE (gloves, boots, clothing, and eye protection). 2. Proper spacing should be maintained. 3. Proper tool use and foot should be used.	Low	Communicate General Accident controls to supervisors and crew.
	Pump Operation	Unlikely (E)	Marginal (III)	Low	1. When around an operating pump wear eye and ear protection. 2. While operating pressurized water or working around pressurized water operations wear eye protection and gloves.	Low	Communicate Tool Use controls to supervisors and crew.
BURN BREAK DOWN	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)	Seldom (D)	Marginal (III)	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.
TRAVEL TO HOME UNIT (OR RESIDENCE)	Motor Vehicle Accident (Other Vehicles, Hazardous Road Conditions, Poor Visibility, and Fatigue/Sleepiness)	Seldom (D)	Critical (II)	**Medium**	1. Drivers are hydrated. 2. Drivers are paired up with others and/or have the opportunity to rest before driving. 3. Practicing defensive driving. 4. Obeying posted speed limits.	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:** Ron M. Dan

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, Nahommon's Neck Grasslands	**Begin:**	Date-Variable 06:00 (Start Time May be Variable)	12/15/08
	End:	Date-Variable 18:00 (Start Time May be Variable)	

	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.	- Know and maintain safety controls.

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.

Communicate Extreme Fire Behavior controls to supervisors and crew.		- Only qualified crew will participate in the burn.	- NWCG, S-130 Basic Fire Fighter Training. - 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 Power Line Hazard controls to supervisors and crew.		- Only qualified crew will participate in the burn.	- NWCG, S-215 Fire Operations in the Wildland Urban Interface. - 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 Environmental/Environment Hazards controls to supervisors and crew.	-Provide/stage first aid kits.		- 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.

APPENDIX E: TECHNICAL REVIEWER CHECKLIST

PRESCRIBED FIRE PLAN ELEMENTS:	S/U	COMMENTS
1. Signature Page	S	All elements after review and edits 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: [X] **Not Recommended for Approval:** [ ]

TECHNICAL REVIEW BY: _____ **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

PRESCRIBED FIRE PLAN

ADMINISTRATIVE UNIT(S): Long Point Wildlife Refuge

PRESCRIBED FIRE NAME: Nahommon's Neck Shrublands

COMPLEXITY RATING: MODERATE

PREPARED BY: _____ **DATE:** 1/01/09

Printed Name: Ross M. Garlapow

Agency: Northeast Forest and Fire Management, LLC

Qualification: Firefighter Type 1 (FFT1)

TECHNICAL REVIEW BY: _____ **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: _____ **DATE:** 1/22/09

Printed Name: Kathy Abbott

Agency: The Trustees of Reservations

Title: Vice President of Field Operations

TABLE OF CONTENTS

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? *Example: amendments, seasonality.*
✓		Will all compliance requirements be completed? *Example: cultural, protected species, smoke management, NEPA.*
✓		Is risk management in place and the residual risk acceptable? *Example: Prescribed Fire Complexity Rating Guide completed with rational and mitigation measures identified and documented.*
✓		Will all elements of the Prescribed Fire Plan be met? *Example: Preparation work, mitigation, weather, organization, prescription, contingency resources.*
✓		Will all internal and external notifications and media releases be completed? *Example: Preparedness level restriction .*
✓		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: [signature] **DATE:** 01/22/09

Printed Name: Kathy Abbott

Agency: The Trustees of Reservations

Title: Vice President of Field Operations

DATE APPOVAL EXPIRES: 1/1/2014

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

	YES	NO
A. Has the burn unit experienced unusual drought conditions or contain above normal fuel loadings which were not considered in the prescription development? If **NO,** proceed with checklist; if **YES,** go to item B.		
B. If **YES,** 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 **NO, STOP**.		

YES	NO	QUESTIONS
		Are ALL fire prescription elements met?
		Are ALL smoke management specifications met?
		Have ALL required current and projected fire weather forecast been obtained and are they favorable?
		Are ALL planned operations personnel and equipment on-site, available, and operational?
		Has the availability of ALL contingency resources been checked, and are they available?
		Have ALL personnel been briefed on the project objectives, their assignment, safety hazards, escape routes, and safety zones?
		Have all the pre-burn considerations identified in the Prescribed Fire Plan been completed or addressed?
		Have ALL the required notifications been made?
		Are ALL permits and clearances obtained?
		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): Long Point Wildlife Refuge

PRESCRIBED FIRE NAME: Nahommon's Neck Shrublands

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

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

Qualification: Firefighter Type 1 (FFT1)

APPROVED BY: [signature] **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:	Long Point Wildlife Refuge	
Ownership:	The Trustees of Reservations (TTOR)	
Town:	West Tisbury	
County:	Dukes	
State:	Massachusetts	
Prescribed Fire Name:	Nahommon's Neck Shrublands	
Lat/Long DMS:	41° 21' 33.6" N	70° 37' 59.0" W
Decimal Degrees	41.359333	-70.633056
Elevation:	0' to 30'	

2. Size:

Subunit	Acres	Hectares
1	26	11
2	18	7
3	23	10
4	13	5
TOTALS	**80**	**33**

3. Topography:
   - Topography is flat.

4. Project Boundaries:
   - North - the unit is bound by a mowed break.
   - East – the unit is bound by a mowed break on the TTOR property boundary.
   - South – subunits 1, 3, and 4 are bound by mowed breaks, and subunit 2 is bound by a trail and water.
   - West - the unit is bound by water on the southern portion and a dirt road on the northern portion.

B. Vegetation/Fuels Description:

1. On-site fuels data:

The unit is classified as a single fuel model: mowed scrub oak - heath shrubland. Standard fire behavior fuel model 163 (TU3 – moderate load, humid climate timber-grass-shrub) was chosen to model fire behavior in these fuels based on experience and research in this fuel type. Litter from shrubs and woody debris from mowed shrubs are the main carriers of fire in this fuel. Litter and woody debris is primarily from huckleberry (*Gaylusaccia spp.*), blueberry (*Vaccinium spp.*), and scrub oak (*Quercus illicifolia*) to a lesser extent. White Oak (*Quercus alba*) is the dominant tree species and covers 20-50% of the unit.

2. Adjacent vegetation and fuels data:
   - <u>East</u>

     The east line is on the TTOR property boundary. Pitch Pine – Scrub Oak Forest [SH8 (148), Moderate Load Humid Climate Shrub] extends for 170 yards where they are broken by a dirt road. The same fuels extend for 120 yards beyond the road where they reach water. The fuels transition to oak woodland [SH6 (146), Low Load, Humid Climate Shrub] east of the water.

- North
  Pitch Pine – Scrub Oak Forest [SH8 (148), Moderate Load Humid Climate Shrub] extend for 1100 yards on the east side of the unit where they reach a dirt road. Houses exist in a matrix of pitch pine – scrub oak forest and oak woodland beyond the dirt road. Pitch pine – scrub oak forest, mowed shrubland, and oak woodland exist as linear fuel features to the north on the western portion of the unit
- West
  The west side is bound by water. Beyond the water is oak woodland (SH6) that extends for 50 yards where the fuels are broken by a dirt road. The oak woodlands continue for 300 yards beyond the road where they reach another water feature. A residence exists in the oak woodlands approximately 250 yards west of the burn unit. .
- South
  Oak woodland (SH6) extends 400 yards on the west side of the unit. Several structures with defensible space exist between 400 and 500 yards south of the unit. At 400 yards south of the unit, fuels start to transition to mowed shrub (TU3) and grassland (GR3) fuels and continue for another 300 yards where they reach the ocean. South of the east side of the unit are coastal shrubs (SH4) that extend for 600 yards where they reach the 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:

- The unit is bisected by several roads and trails, and a water feature (Long Cove Pond).
- Portions of the east and west side of the unit are on the property boundary.

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*	
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: *Subunits 3 and 4 may not be burned with a south wind if mixing height is below 2,000 feet.

** 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	Mowed Shrubs TU3 (163)
Max. Head Fire ROS (ch/hr):	93
Min. Head Fire ROS (ch/hr):	2
Max. Head Fire FL (ch/hr):	13
Min. Head Fire FL (ch/hr):	2
Max. Backing Fire ROS (ch/hr):	2
Min. Backing Fire ROS (ch/hr):	2
Max. Backing Fire FL (ch/hr):	2
Min. Backing Fire FL (ch/hr):	2

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, a dormant season burn may be the only feasible option due to the availability of burnable fuels and/or logistical constraints. 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 leas 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 West Tisbury, 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 – West Tisbury Fire Department (508) 693-9555
- Day of – Massachusetts DCR District 1 (508) 888-1149
- Day of - Martha's Vineyard Airport (508) 693-1170
- 24 Hour Advance - DEP Southeastern MA (508) 946-2831 – FAX (508) 946-2865
- 24 Hour Advance – The Nature Conservancy Massachusetts Chapter 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:

- [ ] Burn Organization
- [ ] Burn Objectives
- [ ] Description of Burn Area
- [ ] Expected Weather & Fire Behavior
- [ ] Communications
- [ ] Ignition Plan
- [ ] Holding Plan
- [ ] Contingency Plan
- [ ] Wildfire Conversion plan
- [ ] 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. 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.

Telephone Number(s):

Name and Title	Phone Number	Comments
West Tisbury Fire Department	Office: (508) 693-9555	Medical and Fire
West Tisbury Police Department	Office: (508) 693-0020	
Martha's Vineyard Emergency Communications Center	Office: (508) 693-1212	
DEP Southeastern MA	Office: (508) 946-2831 Fax: (508) 946-2865	
Long Point Wildlife Refuge	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.

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 [10 Miles – 25 Minutes drive time] 1 Hospital Rd, Vineyard Haven, MA – (508) 693-0410
- Brigham - Women's Hospital Burn Center [90 Miles – 2hrs 25 Minutes drive time via ferry 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 West Tisbury 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
West Tisbury Fire Department (2 Brush Breakers & various other equipment)	10 Minutes
Edgartown Fire Department (1 Brush Breaker and various equipment)	15 Minutes
DCR District 1 (1 Type 6 Engine)	15 Minutes

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

C. Notifications (Escaped Fire):

- West Tisbury Fire Department at (508) 693-9555
- Long Point Wildlife Refuge at (508) 693-3678
- 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 West Tisbury 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 West Tisbury Fire Department.
- Massachusetts Endangered Species Act (MESA) Conservation Permit

C. Smoke Sensitive Areas:

Smoke Sensitive Area	Distance (miles)	Direction
Island Montessori School	1.4	NW
Residential Area	2.2	NW
Residential Area	1.5	N
Edgartown-West Tisbury Rd	2	N
Martha's Vineyard Airport	2.2	NE

D. Impacted Areas:

Several homes to the north and northwest of the unit may be impacted (Moderate PM 2.5 ug/m^3).

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 West Tisbury 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.

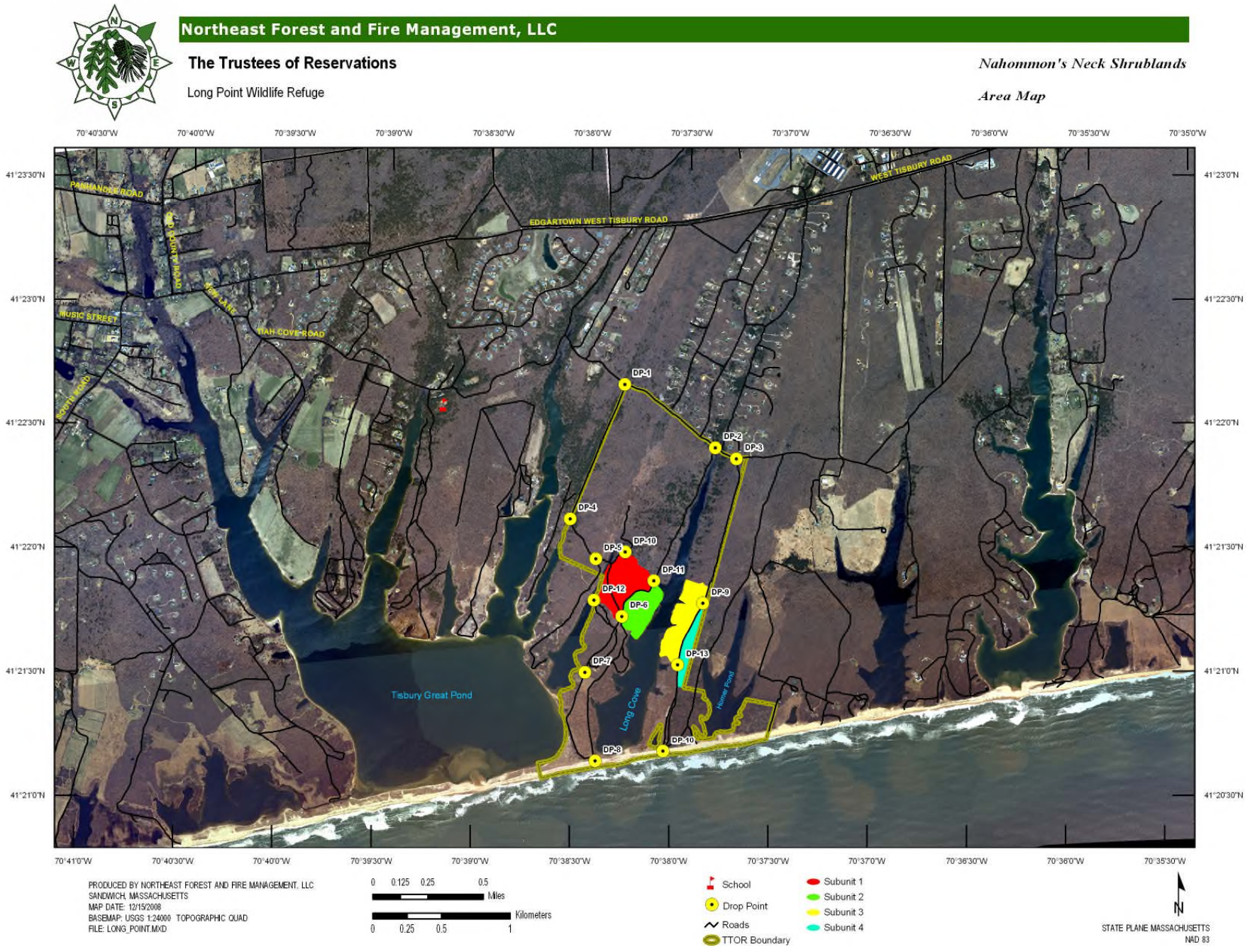
NOTE: All sub-elements to monitoring may be adjusted by the burn boss to meet given conditions. However, fire weather needs to be recorded hourly at a minimum.

ELEMENT 21: POST-BURN ACTIVITIES

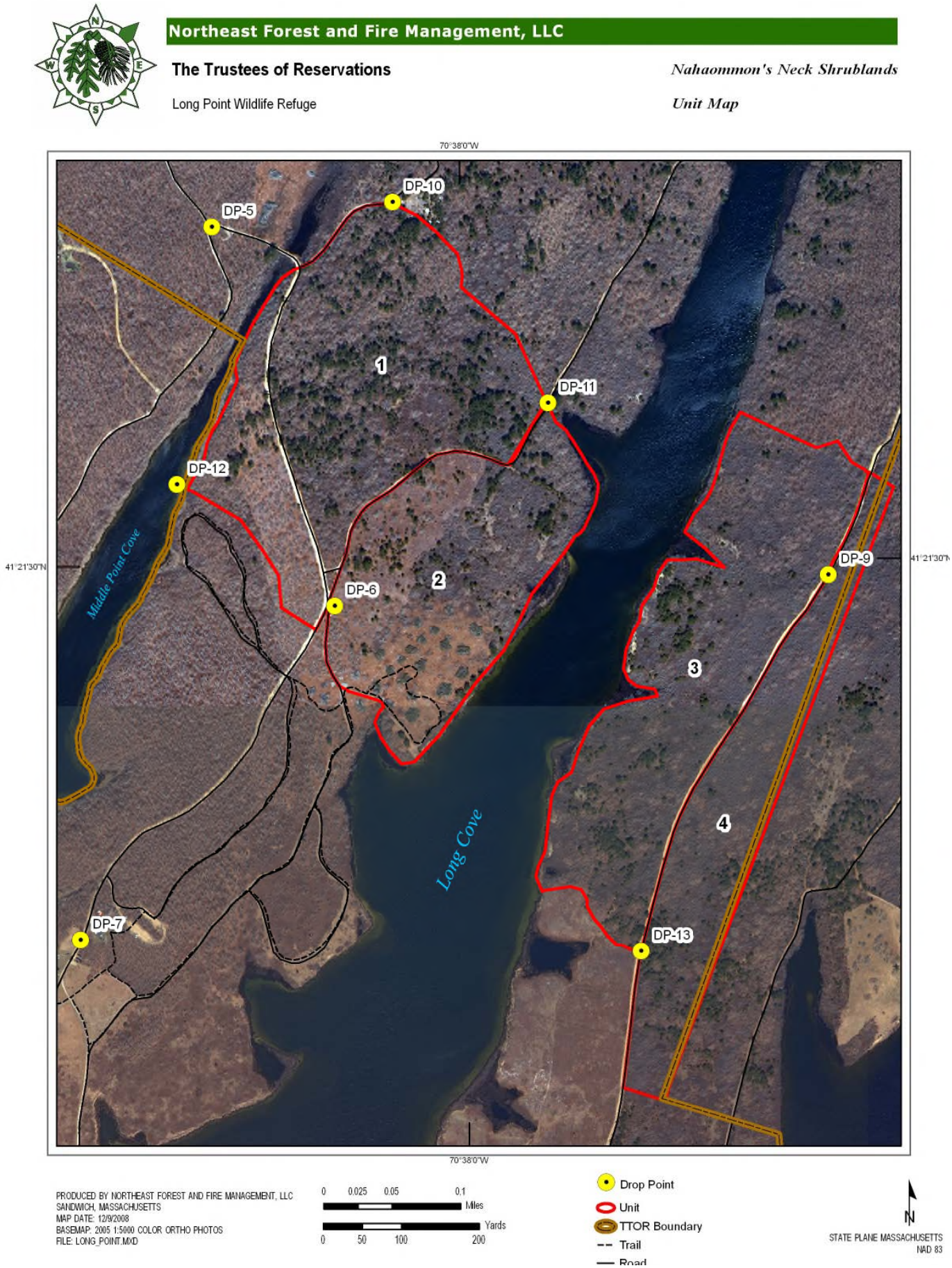
Post Burn Activities to be Completed:

- 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.

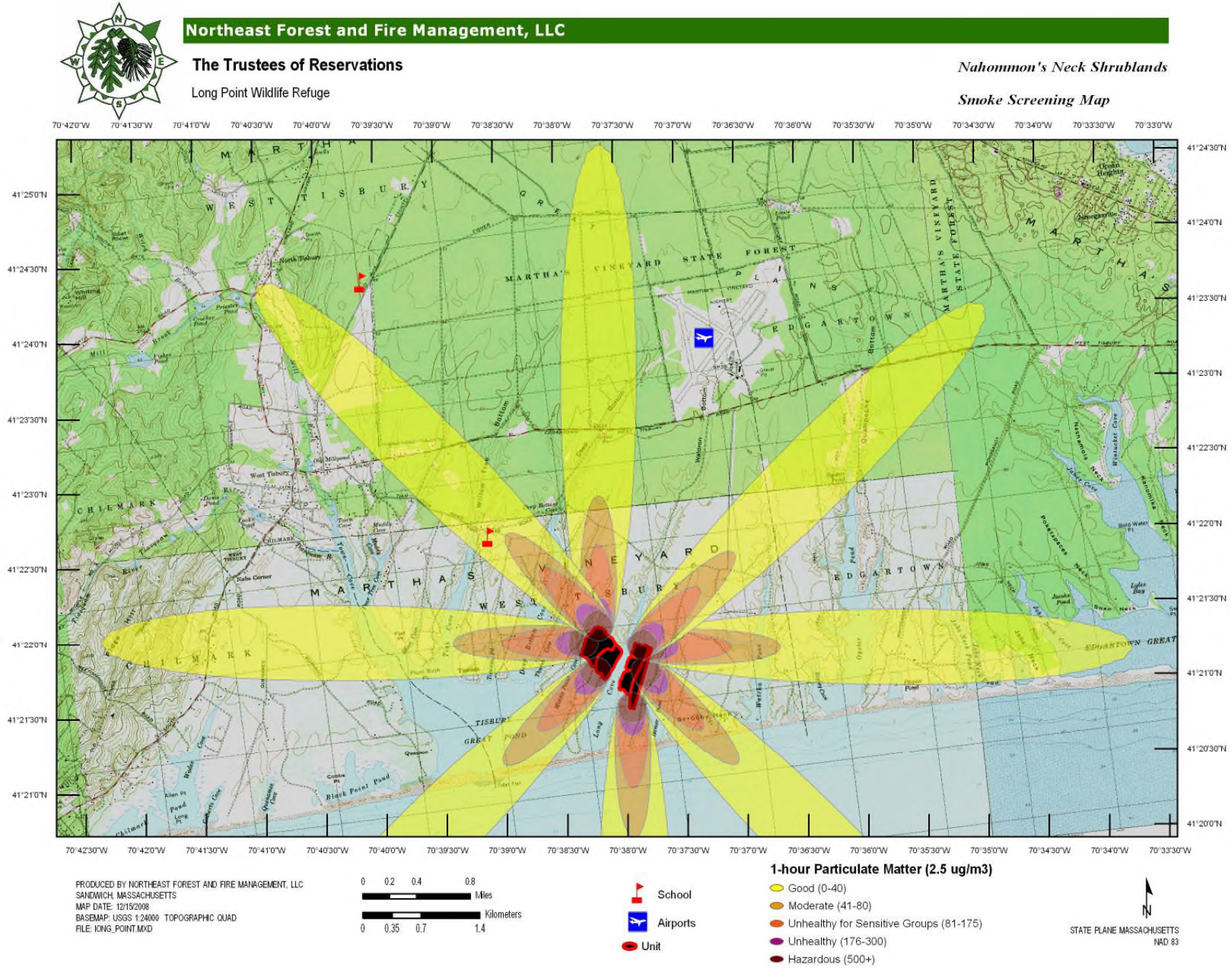
Appendix A – 1 : Area Map



Appendix A – 2 : Unit Map



Appendix A – 3: Smoke Screening Map



APPENDIX B - 1: Fire Behavior Mowed Shrubs – Timber-Grass-Shrub 3 [FBS FM 163] (Held Constant: 10H Fuels at 10%, 100H Fuels at 12%, 30% Live Fuel Moisture and 0% Slope) [Run in BEHAVEPLUS v. 3.0.2]:

Surface Rate of Spread (ch/h) - Head Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	8	18	29	42	56	71	87	103	121	139	158	178
5	2	8	17	27	39	53	67	82	98	114	132	150	168
6	2	8	16	26	37	50	64	78	93	109	125	142	160
7	2	7	15	25	36	48	61	74	89	104	120	136	153
8	2	7	15	24	34	46	58	71	85	100	115	130	147
9	2	7	14	23	33	44	56	69	82	96	111	126	141
10	2	6	14	22	32	43	54	66	79	93	107	122	137
11	2	6	13	22	31	41	53	64	77	90	104	118	132
12	2	6	13	21	30	40	51	63	75	88	101	115	129
13	2	6	12	20	29	39	50	61	73	85	98	111	125
14	2	6	12	20	29	38	48	59	71	83	96	109	122

Flame Length (ft) - Head Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	4	6	8	9	11	12	13	14	15	17	18	19
5	2	4	6	7	9	10	11	13	14	15	16	17	18
6	2	4	6	7	9	10	11	12	13	14	15	16	17
7	2	4	5	7	8	10	11	12	13	14	15	16	17
8	2	4	5	7	8	9	10	11	12	13	14	15	16
9	2	4	5	7	8	9	10	11	12	13	14	15	16
10	2	3	5	6	8	9	10	11	12	13	14	14	15
11	2	3	5	6	7	9	10	11	12	12	13	14	15
12	2	3	5	6	7	8	9	10	11	12	13	14	15
13	2	3	5	6	7	8	9	10	11	12	13	14	14
14	2	3	5	6	7	8	9	10	11	12	13	13	14

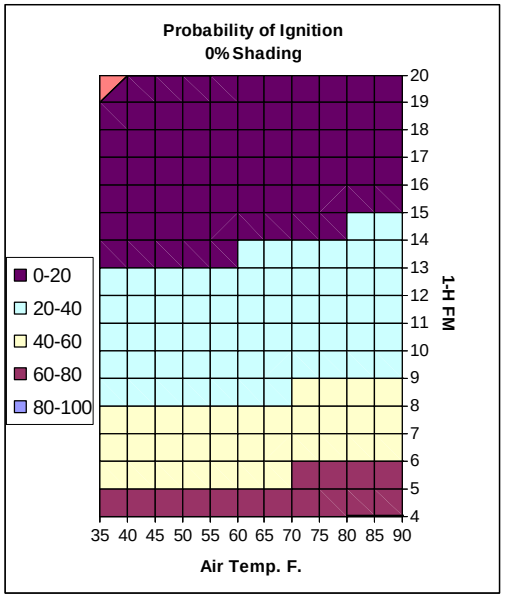
Surface Rate of Spread (ch/h) - Backing Fire

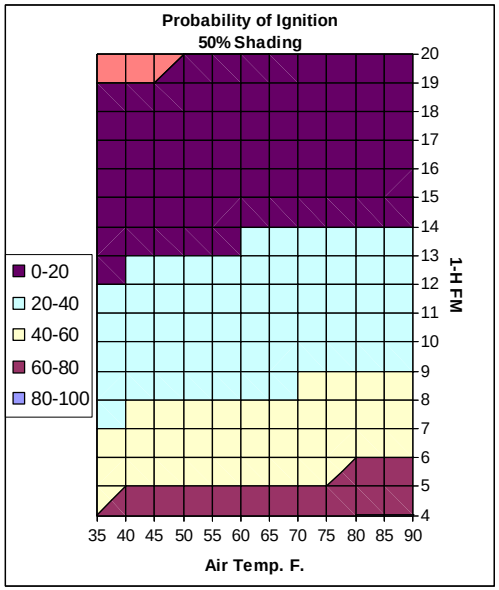
	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	2	2	2	3	3	3	3	3	3	3	2	2
5	2	2	2	2	2	2	2	2	2	2	2	2	2
6	2	2	2	2	2	2	2	2	2	2	2	2	2
7	2	1	2	2	2	2	2	2	2	2	2	2	2
8	2	1	2	2	2	2	2	2	2	2	2	2	2
9	2	1	2	2	2	2	2	2	2	2	2	2	2
10	2	1	2	2	2	2	2	2	2	2	2	2	2
11	2	1	2	2	2	2	2	2	2	2	2	2	2
12	2	1	2	2	2	2	2	2	2	2	2	2	2
13	2	1	1	2	2	2	2	2	2	2	2	2	2
14	2	1	1	2	2	2	2	2	2	2	2	2	2

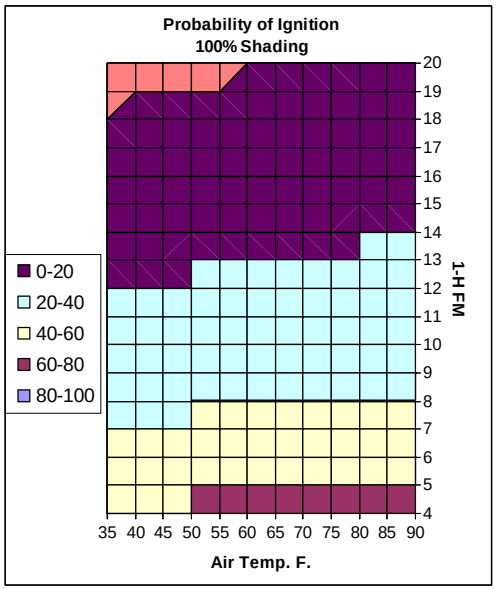
Flame Length (ft) - Backing Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	2	2	2	2	2	2	2	2	2	2	2	2
5	2	2	2	2	2	2	2	2	2	2	2	2	2
6	2	2	2	2	2	2	2	2	2	2	2	2	2
7	2	2	2	2	2	2	2	2	2	2	2	2	2
8	2	2	2	2	2	2	2	2	2	2	2	2	2
9	2	2	2	2	2	2	2	2	2	2	2	2	2
10	2	2	2	2	2	2	2	2	2	2	2	2	2
11	2	2	2	2	2	2	2	2	2	2	2	2	2
12	2	2	2	2	2	2	2	2	2	2	2	2	2
13	2	2	2	2	2	2	2	2	2	2	2	2	2
14	2	2	2	2	2	2	2	2	2	2	2	2	2

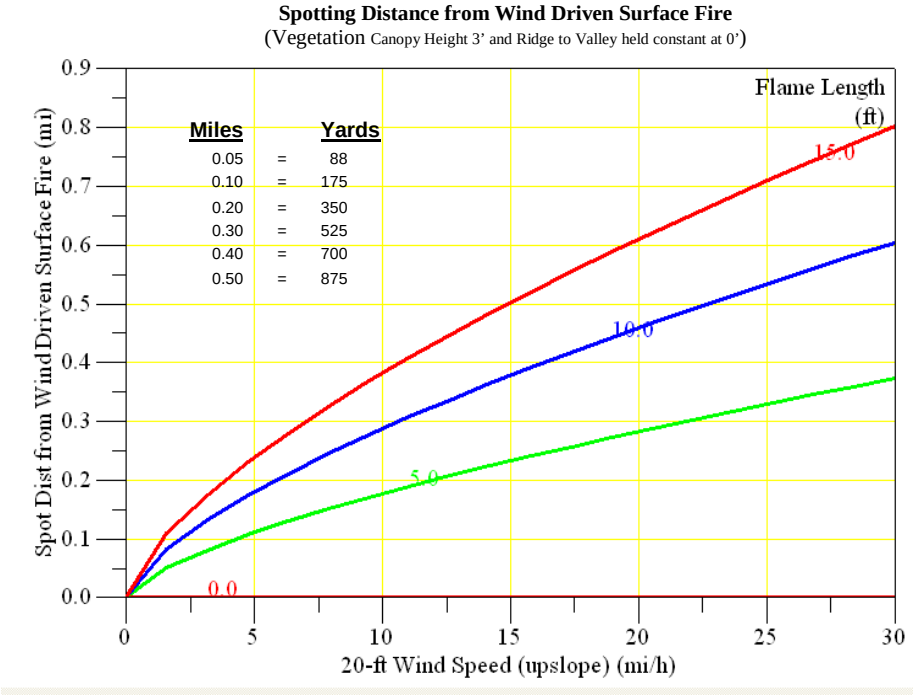
APPENDIX B - 2: Probability of Ignition [Run in BEHAVE by Remsoft Professional v. 5.0]:



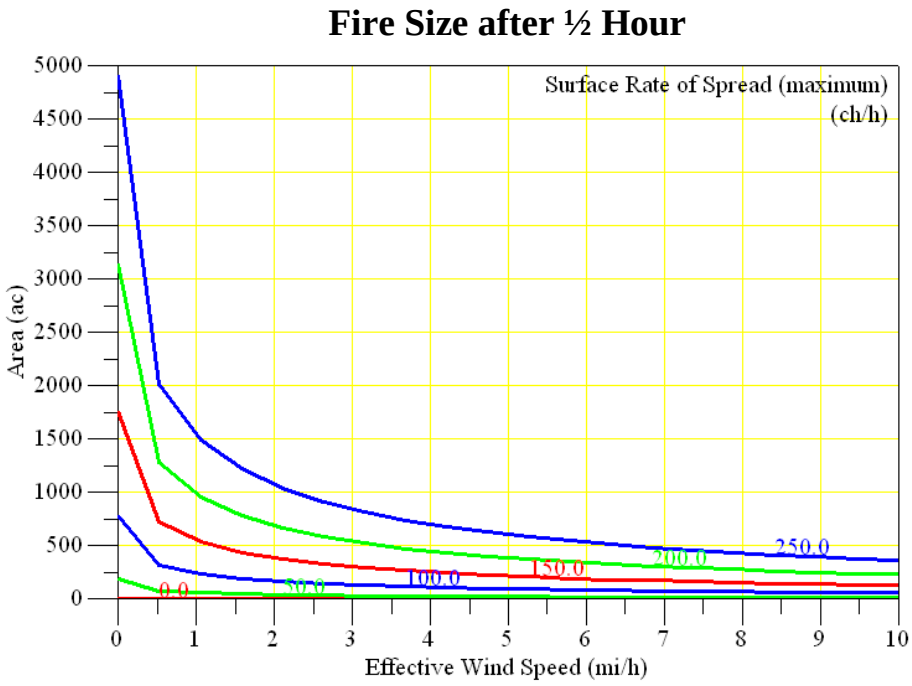




APPENDIX B - 3: Spotting Distance [Run in BEHAVEPLUS v. 3.0.2]:



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 50% Humidity

VSMOKE SUMMARY:

The smoke dispersion modeling analysis (using VSMOKE and/or VSMOKE-GIS) for this project was performed for 26.0 acres to be burned on 04/15/2009 at the time period of 1400 hours. This time period has daytime dispersion characteristics to disperse the pollutants from the fire. The location of the fire is at approximately 41.362 degrees latitude and -70.634 degrees longitude (1550288.551 meters east and 1976302.228 meters north using US Albers projection). The emission rate of PM2.5 (fine particles) this hour was 71.9 grams/second, and carbon monoxide was 869.2 grams/second. The heat release rate was 26610.7 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 50 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 0.49 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 1.24 miles are predicted to be code orange or worse. At distances less than 413 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 823 feet 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)**

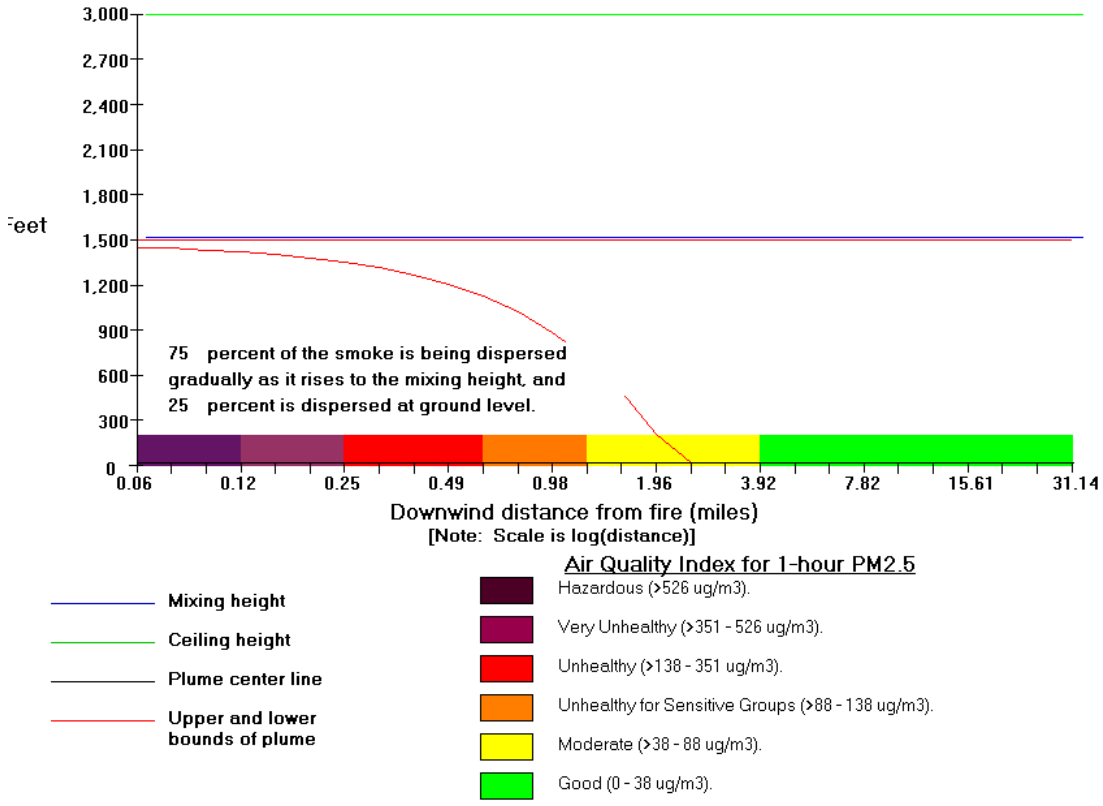
Use Stability in VSMOKE-GIS

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

Distance from fire	PM2.5 (ug/m3)	CO (ppm)	Distance from fire	PM2.5 (ug/m3)	CO (ppm)
328 ft	762.64	12.52	2.47 mi	46.21	5.27
413 ft	668.55	11.57	3.11 mi	41.52	5.22
518 ft	582.84	10.70	3.92 mi	37.67	5.18
656 ft	503.12	9.89	4.94 mi	34.50	5.15
823 ft	433.73	9.19	6.21 mi	31.89	5.12
1037 ft	373.06	8.58	7.82 mi	29.76	5.10
0.25 mi	315.88	8.00	9.85 mi	28.01	5.08
0.31 mi	261.68	7.45	12.40 mi	26.58	5.07
0.39 mi	213.25	6.96	15.61 mi	25.41	5.05
0.49 mi	171.44	6.53	19.65 mi	24.45	5.05
0.62 mi	136.92	6.18	24.74 mi	23.67	5.04
0.78 mi	109.52	5.91	31.14 mi	23.03	5.03
0.98 mi	88.39	5.69	39.21 mi	22.50	5.03
1.24 mi	72.38	5.53	49.36 mi	22.07	5.02
1.56 mi	60.56	5.41	62.14 mi	21.71	5.02
1.96 mi	52.20	5.33			

Visibility Table

Distance from fire	Crossplume Visibility (miles)	Contrast Ratio (miles)	Distance from fire	Crossplume Visibility (miles)	Contrast Ratio (miles)
317 ft	16.68	0.43	2.47 mi	21.90	0.94
422 ft	17.46	0.48	3.11 mi	21.90	0.94
528 ft	18.16	0.53	3.92 mi	21.90	0.95
634 ft	18.82	0.58	4.94 mi	21.90	0.95
845 ft	19.39	0.63	6.21 mi	21.90	0.95
1056 ft	19.87	0.67	7.82 mi	21.90	0.96
0.25 mi	20.30	0.72	9.85 mi	21.90	0.96
0.31 mi	20.68	0.76	12.40 mi	21.90	0.96
0.39 mi	20.98	0.79	15.61 mi	21.90	0.96
0.49 mi	21.22	0.82	19.65 mi	21.90	0.96
0.62 mi	21.41	0.85	24.74 mi	21.90	0.96
0.78 mi	21.57	0.87	31.14 mi	21.90	0.96
0.98 mi	21.69	0.89	39.21 mi	21.90	0.96
1.24 mi	21.78	0.91	49.36 mi	21.91	0.96
1.56 mi	21.85	0.92	62.14 mi	21.93	0.97
1.96 mi	21.89	0.93			

Plume Table

Distance from fire	Plume Height (feet)	Horizontal Dispersion Coefficient (feet)	Vertical Dispersion Coefficient (feet)	Distance from fire	Plume Height (feet)	Horizontal Dispersion Coefficient (feet)	Vertical Dispersion Coefficient (feet)
317 ft	1,500	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

ADMINSTRATIVE UNIT(S): Long Point Wildlife Refuge

PRESCRIBED FIRE NAME: Nahommon's Neck Shrublands

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	HIGH	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	MODERATE	MODERATE	MODERATE
14. Smoke Management:	MODERATE	MODERATE	MODERATE
OVERALL RATINGS:	**MODERATE**	**MODERATE**	**MODERATE**

FINAL SUMMARY COMPLEXITY DETERMINATION:	**MODERATE**

RATIONALE:	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.

PRELIMINARY COMPEXITY ANALYSIS SUMMARY

ADMINSTRATIVE UNIT(S): Long Point Wildlife Refuge

PRESCRIBED FIRE NAME: Nahommon's Neck Shrublands

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	HIGH	LOW
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	MODERATE	MODERATE	MODERATE
14. Smoke Management:	MODERATE	MODERATE	MODERATE
OVERALL RATINGS:	**MODERATE**	**MODERATE**	**MODERATE**

FINAL SUMMARY COMPLEXITY DETERMINATION:	**MODERATE**

RATIONALE:	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.

PRESCRIBED FIRE COMPLEXITY RATING SYSTEM WORKSHEET

ADMINISTRATIVE UNIT(S): Long Point Wildlife Refuge

PRESCRIBED FIRE NAME: Nahommon's Neck Shrublands

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:	LOW	A residence and several other structures are approximately 100 yards west of the unit. Numerous residential structures in the West Tisbury community are to the north of the burn unit. However, due to light and/or non-burnable fuels surrounding these structures, and/or their distance from the unit, the risk of ignition is low.
	Final Rating:	LOW	No change.
POTENTIAL CONSEQUENCES	Preliminary Rating:	HIGH	Impact on the community of West Tisbury would result in severe consequences.
	Final Rating:	HIGH	No change.
TECHNICAL DIFFICULTY	Preliminary Rating:	LOW	Due to fuel breaks, low fuel load, and the distance from the unit, the technical difficulty is low as long as detection, initial attack, and smoke management is effective.
	Final Rating:	LOW	No change.
4. ON SITE VALUES		**RATING**	**RATIONALE**
RISK	Preliminary Rating:	LOW	Several wildlife habitat structures are within the unit on the perimeter. Light fuels will be easily pre-treated to minimize impact of fire.
	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 hade 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	Resource 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 resources 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:	MODERATE	Some area will need initial mechanical treatment before they can be burned. Most areas will need to be maintained on a regular basis using mechanical treatments between burn treatments.

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 dependant 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 his 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	Low potential for serious injury while conducting this burn.
	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	Coordination among agencies will likely be needed to procure the required crew and equipment.
	Final Rating:	HIGH	No change.
POTENTIAL CONSEQUENCES	Preliminary Rating:	HIGH	Availability of other agency staff and equipment will affect the ability to accomplish the burn.
	Final Rating:	HIGH	No change.
TECHNICAL DIFFICULTY	Preliminary Rating:	HIGH	Coordination with at least one agency is expected to be necessary to complete the burn.
	Final Rating:	HIGH	No change.

13. PROJECT LOGISTICS		RATING	RATIONALE
RISK	Preliminary Rating:	MODERATE	Coordination of crew and equipment travel to Martha's Vineyard is essential for completion of burn operations.
	Final Rating:	MODERATE	No change.
POTENTIAL CONSEQUENCES	Preliminary Rating:	MODERATE	Failure to execute travel coordination of crew and equipment will affect the ability to conduct burn operations.
	Final Rating:	MODERATE	No change.
TECHNICAL DIFFICULTY	Preliminary Rating:	MODERATE	Agencies handle their own logistics, ferries readily available during non-summer months.
	Final Rating:	MODERATE	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	Project personnel will be subjected to smoke on the holding lines. Smoke is unlikely to trigger any regulatory issues. However public perception of smoke has low tolerance levels.
	Final Rating:	HIGH	Regulatory agency and public tolerance of any smoke impact is minimal.
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, Nahommon's Neck Shrublands	Begin:	Date-Variable 06:00 (Start Time May be Variable)	12/15/08
	End:	Date-Variable 18:00 (Start Time May be Variable)	

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.

BURN OPERATIONS	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)	Marginal (III)	**Medium**	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.
	Moderate Fire Behavior	Occasional (C)	Marginal (III)	**Medium**	1. Identify escape routes and safety zones. 2. Wear full wildland fire PPE, to include fire shelters.	**Low**	Communicate Extreme Fire Behavior controls to supervisors and crew.
	Power Line Hazard	Unlikely (E)	Critical (II)	**Low**	1. Avoid working under power lines. 2. Do not spray water on or near power lines. 3. Minimize heat, direct flame contact, and heavy smoke impacts on power lines.	**Low**	Communicate Power Line Hazard controls to supervisors and crew.
	Chain Saw Operation	Unlikely (E)	Critical (II)	**Low**	1. PPE should be worn (eye protection, ear protection, hard hat, chaps, boots, and appropriate clothing). 2. Only qualified saw operators will be authorized to operate chain saws. 3. Spotters will be provided for sawyers. 4. Make location of first aid kits known to supervisors and crew.	**Low**	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)	**Medium**	1. Identify First Aid CPR trained crew and first aid kit locations. 2. Brief crew on Lyme Disease prevention. 3. Brief crew on importance of proper hydration. 4. Brief crew on other Environmental/Environment Hazards based on potential exposure.	**Low**	Communicate Environmental/Environment Hazards 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.
	Ignition	Unlikely (E)	Critical (II)	**Low**	1. Wear appropriate PPE (gloves, eye protection, boots, and Nomex with sleeves down). 2. Use proper fuel mix.	**Low**	Communicate Ignition controls to supervisors and crew.
	Tool Use	Unlikely (E)	Marginal (III)	**Low**	1. Wear appropriate PPE (gloves, boots, clothing, and eye protection). 2. Proper spacing should be maintained. 3. Proper tool use and foot should be used.	**Low**	Communicate Tool Use controls to supervisors and crew.
	Pump Operation	Unlikely (E)	Marginal (III)	**Low**	1. When around an operating pump wear eye and ear protection. 2. While operating pressurized water or working around pressurized water operations wear eye protection and gloves.	**Low**	Communicate Pump Operation controls to supervisors and crew.
MOP-UP	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**	1. Identify First Aid CPR trained crew and first aid kit locations. 2. Brief crew on Lyme Disease prevention. 3. Brief crew on importance of proper hydration. 4. Brief crew on other Environmental/Environment Hazards based on potential exposure.	**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**	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.
	Chain Saw Operation	Unlikely (E)	Critical (II)	**Low**	1. PPE should be worn (eye protection, ear protection, hard hat, chaps, boots, and appropriate clothing). 2. Only qualified saw operators will be authorized to operate chain saws. 3. Spotters will be provided for sawyers. 4. Make location of first aid kits known to supervisors and crew.	**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**	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 Chain Saw controls to supervisors and crew.
	Tool Use	Seldom (D)	Marginal (III)	Low	1. Wear appropriate PPE (gloves, boots, clothing, and eye protection). 2. Proper spacing should be maintained. 3. Proper tool use and foot should be used.	Low	Communicate General Accident controls to supervisors and crew.
	Pump Operation	Unlikely (E)	Marginal (III)	Low	1. When around an operating pump wear eye and ear protection. 2. While operating pressurized water or working around pressurized water operations wear eye protection and gloves.	Low	Communicate Tool Use controls to supervisors and crew.
BURN BREAK DOWN	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)	Seldom (D)	Marginal (III)	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.
TRAVEL TO HOME UNIT (OR RESIDENCE)	Motor Vehicle Accident (Other Vehicles, Hazardous Road Conditions, Poor Visibility, and Fatigue/Sleepiness)	Seldom (D)	Critical (II)	**Medium**	1. Drivers are hydrated. 2. Drivers are paired up with others and/or have the opportunity to rest before driving. 3. Practicing defensive driving. 4. Obeying posted speed limits.	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, Nahommon's Neck Shrublands	Begin:	Date-Variable 06:00 (Start Time May be Variable)	12/15/08
	End:	Date-Variable 18:00 (Start Time May be Variable)	

Control Options	D. Control Areas				
	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.	- Know and maintain safety controls.

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.

Communicate Extreme Fire Behavior controls to supervisors and crew.		- Only qualified crew will participate in the burn.	- NWCG, S-130 Basic Fire Fighter Training. - 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 Power Line Hazard controls to supervisors and crew.		- Only qualified crew will participate in the burn.	- NWCG, S-215 Fire Operations in the Wildland Urban Interface. - 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 Environmental/Environment Hazards controls to supervisors and crew.	-Provide/stage first aid kits.		- 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.

APPENDIX E: TECHNICAL REVIEWER CHECKLIST

PRESCRIBED FIRE PLAN ELEMENTS:	S/U	COMMENTS
1. Signature Page	S	All elements are reviewed and adequately 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: [X] **Not Recommended for Approval:** [ ]

TECHNICAL REVIEW BY: _____ **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

To: Don Liptack
From: Lloyd Raleigh
Date: August 25, 2003
Re: Sandplain Habitat Restoration and Maintenance

The Trustees of Reservations respecfully requests funding from the Wildlife Habitat Incentive Program to restore and maintain rare native sandplain habitats over the next year. This memo will outline The Trustees' future desired condition for habitats and action steps that will help us to reach our objectives. We anticipate that these actions will greatly improve the habitats at Long Point and Wasque.

Desired Future Condition of Habitats
At Long Point, our desired future condition of habitats as described in the Long Point Management Plan is as follows:

- 116 acres of Scrub Oak-heath shrublands and savannas existing in a shifting mosaic
- 156 acres of dry oak woodland
- 118 acres of barrens habitats (pine, oak, and mixed)
- 86 acres of sandplain grasslands and coastal heathlands

At Wasque, our desired future condition of habitats as described in the draft Cape Poge and Wasque Management Plan is as follows:

- 104 acres of sandplain grasslands, coastal heathlands, and shrublands in a shifting mosaic

Proposed Action Steps
To accomplish this, a number of restoration and maintenance actions are needed. These include grazing, burning, clearing, thinning, mowing, and road removal. Over the next ten years, we are proposing to burn 638 acres, clear 22.9 acres, thin 24.1 acres, mow 156.7 acres, and grazing 40 acres at Long Point Wildlife Refuge. At Wasque, we plan to burn 104 acres, clear 12 acres, and mow 208 acres. In addition, we plan to close a roadway at Wasque. This road currently bisects critical grassland and heathland habitat. We plan on rehabilitating this road with native soils. The total proposal cost is $253,519.50.

In some cases, we plan on revisiting an area more than once. At Wasque, we plan on mowing each unit twice and burning once (for 104 total acres of habitat). At Long Point, we plan on mowing a 22 acre area five times, as we are restoring it to sandplain grassland habitat. In addition, we plan on burning 346.5 acres twice and 23.7 acres three times over the ten year period (see table 1).

Table 1: Proposed Action Steps: 10-year Plan

Location	Acres	Action	Habitat	Cost/Ac.	Total WHIP
Long Point	784	Burning	Various	$250.00	$196,000.00
Long Point	22.9	Clearing	Woodland/Forest	$900.00	$20,610.00
Long Point	24.1	Thinning	Woodland/Forest	$450.00	$10,845.00
Long Point	156.7	Mowing	Grassland/Heathland	$35.00	$5,484.50
Long Point	40	Grazing	Various	$200.00	$8,000.00
Wasque	104	Burning	Grassland/Heathland	$250.00	$26,000.00
Wasque	208	Mowing	Grassland/Heathland	$35.00	$7,280.00
Wasque	12	Clearing	Forest	$900.00	$10,800.00
Wasque	n/a	Road Rehab.	Grassland/Heathland	$5,000.00	$5,000.00
	1351.7				$290,019.50

PRESCRIBED FIRE PLAN

ADMINISTRATIVE UNIT(S): Long Point Wildlife Refuge

PRESCRIBED FIRE NAME: Middle Point

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: [signature] **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: [signature] **DATE:** 1/22/09

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

TABLE OF CONTENTS

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? *Example: amendments, seasonality.*
✓		Will all compliance requirements be completed? *Example: cultural, protected species, smoke management, NEPA.*
✓		Is risk management in place and the residual risk acceptable? *Example: Prescribed Fire Complexity Rating Guide completed with rational and mitigation measures identified and documented.*
✓		Will all elements of the Prescribed Fire Plan be met? *Example: Preparation work, mitigation, weather, organization, prescription, contingency resources.*
✓		Will all internal and external notifications and media releases be completed? *Example: Preparedness level restrictions.*
✓		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: [signature] **DATE:** 1/22/09

Printed Name: Kathy Abbott

Agency: The Trustees of Reservations

Title: Vice President of Field Operations

DATE APPOVAL EXPIRES: 1/1/2014

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

	YES	NO
A. Has the burn unit experienced unusual drought conditions or contain above normal fuel loadings which were not considered in the prescription development? If **NO,** proceed with checklist; if **YES,** go to item B.		
B. If **YES,** 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 **NO, STOP**.		

YES	NO	QUESTIONS
		Are ALL fire prescription elements met?
		Are ALL smoke management specifications met?
		Have ALL required current and projected fire weather forecast been obtained and are they favorable?
		Are ALL planned operations personnel and equipment on-site, available, and operational?
		Has the availability of ALL contingency resources been checked, and are they available?
		Have ALL personnel been briefed on the project objectives, their assignment, safety hazards, escape routes, and safety zones?
		Have all the pre-burn considerations identified in the Prescribed Fire Plan been completed or addressed?
		Have ALL the required notifications been made?
		Are ALL permits and clearances obtained?
		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): Long Point Wildlife Refuge

PRESCRIBED FIRE NAME: Middle Point

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: Ross M. Garlapow **DATE:** 1/22/09

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

Qualification: Firefighter Type 1 (FFT1)

APPROVED BY: [signature] **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:	Long Point Wildlife Refuge	
Ownership:	The Trustees of Reservations (TTOR)	
Town:	West Tisbury	
County:	Dukes	
State:	Massachusetts	
Prescribed Fire Name:	Middle Point	
Lat/Long DMS:	41° 22’ 4.3” N	70° 38’ 3.6” W
Decimal Degrees	41.367861	-70.634333
Elevation:	0’ to 30’	

2. Size:

Subunit	Acres	Hectares	Fuel Type
1	2	1	Mowed Shrubs
2	25	10	Oak Woodland
3	7	3	Mowed Shrubs
4	6	2	Oak Woodland
5	25	10	Oak Woodland
6	9	4	Mowed Shrubs
7	19	8	Oak Woodland
8	18	7	Mowed Shrubs
9	17	7	Oak Woodland
10	14	6	Oak Woodland
TOTALS	**142**	**59**	

3. Topography:
   - Topography is flat.

4. Project Boundaries:
   - North - the unit is bound by a dirt road on the TTOR property boundary.
   - East – the unit is bound by a mowed break.
   - South – the unit is bound by a mowed break on the TTOR property boundary.
   - West - the unit is bound by water on the most southern subunit and a dirt road on the TTOR property boundary on the northern subunits.

B. Vegetation/Fuels Description:

1. On-site fuels data:

   The unit is classified into 4 fuel models. Fuel models vary by the amount of canopy cover, herbaceous component, shrub component, and previous treatments.

<u>*Mowed Shrubs*</u> – 24 acres (17%)
Mowed shrubs were classified as moderate load, humid climate timber-grass-shrub (TU3). Although little to no overstory exists, the fire behavior modeled from the carriers of this fuel model is consistent with existing fuels on the burn unit. Litter and woody debris from mowed shrubs are the primary carriers of fire in this fuel and is mostly from huckleberry (*Gaylusaccia spp.*), *Rubus spp.*, bayberry (*Myrica spp.*), and scrub oak (*Quercus illicifolia.*).

Oak Woodland – 105 acres (74%)
Oak woodlands were classified as low load, humid climate shrub (SH6). Oak litter from an overstory of white oak (*Quercus alba*) and understory shrubs (primarily huckleberry and blueberry) are the primary carriers of fire in this fuel model.

Scrub Oak – 9 acres (6%)
Scrub oak shrublands were classified as very high load, humid climate shrub (SH9). These shrublands have a nearly continuous canopy of shrubs averaging 4-6 feet tall. Scrub oak shrubs contain volatile oils and are capable of producing extreme fire behavior.

Pitch Pine – Scrub Oak Forest – 2 acres (2%)
The Pitch Pine – Scrub Oak Forest was classified as a high load, humid climate shrub (SH8). This fuel type has 25-50% canopy cover of pitch pine with scrub oak and huckleberry dominating the understory. Surface fire is likely to ignite ladder and aerial fuels under most environmental conditions.

Wetland Shrubs – 1 acre (1%)
Wetland shrubs were classified as high load, humid climate shrub (SH3). The fuel loadings in the wetlands are similar to this fuel model. However, the wetland shrub fuels are likely to be unavailable due to high moisture content under prescribed burning conditions.

2. Adjacent vegetation and fuels data:
   - East
     Pitch Pine – Scrub Oak Forest [SH8 (148), Moderate Load Humid Climate Shrub] extends for 170 yards where they are broken by a dirt road. The same fuels extend for 120 yards beyond the road where they reach water (Long Cove Pond). The fuels transition to oak woodland [SH6 (146), Low Load, Humid Climate Shrub] east of the water.
   - North
     Houses exist in a matrix of pitch pine – scrub oak forest and oak woodland beyond the dirt road boundary.
   - West
     The southern-most subunit is bound by water. Beyond the water is oak woodland (SH6) that extends for 50 yards where the fuels are broken by a dirt road, and then another 50 yards beyond the dirt road by water. Pitch pine – scrub oak forest (SH8) is west of the northern subunits and extends for 270 yards where the fuels reach water. The most northern subunits (1 and 2) are adjacent to oak woodland (SH6) that extends 470 yards to water. There are structures within the fuel matrix at 270 and 425 yards.
   - South
     One structure is immediately adjacent to the south boundary. Oak woodland (SH6) extends 450 yards where there are several structures within the fuels. At this point the fuels transition to coastal shrubs (SH4) and also have homes dispersed throughout. A dirt road bisects the coastal shrub fuels. The shrub fuels with homes extend for 375 yards where they reach Tisbury Great Pond.

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:

- The unit is bisected by several roads and trails.
- Several slash piles may exist in subunits 6 and 8.
- The north and west side of the unit are on the property boundary.

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.

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*	
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: *Some subunits may only be burned with specified wind directions. See A-1 below for specifications.

** 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.

A-1. Wind Direction Prescription

Subunits / Wind	N	NE	E	SE	S	SW	W	NW
1 & 8	X	X	X	X	X	X	X	X
3, 4, 6	X	X	X	X				X
7, 9, 10	X	X	X				X	X
5	X	X					X	X
2	X	X					X	

B. Fire Behavior Prescription:

Parameter	Oak Woodland (SH6) 146	Mowed Shrubs (TU3) 163	Scrub Oak Shrubland SH9 (149)	Pitch Pine-Scrub Oak (SH8) 148
Max. Head Fire ROS (ch/hr):	75	93	176	97
Min. Head Fire ROS (ch/hr):	2	2	5	3
Max. Head Fire FL (ch/hr):	16	13	36	22
Min. Head Fire FL (ch/hr):	3	2	7	4
Max. Backing Fire ROS (ch/hr):	2	2	5	3
Min. Backing Fire ROS (ch/hr):	2	2	5	3
Max. Backing Fire FL (ch/hr):	3	2	7	4
Min. Backing Fire FL (ch/hr):	3	2	7	4

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.

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 for the shrub subunits so that a greater amount of the impact on the shrub layer can be achieved. However, a dormant season burn may be the only feasible option due to the availability of burnable fuels and/or logistical constraints. 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:

- 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:
    - Scrub Oak subunits (1 and 3) have to be mowed within 2 years prior to being burned.
    - Fire breaks and mowing requirements 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 leas 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 West Tisbury, 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 – West Tisbury Fire Department (508) 693-9555
- Day of - Martha's Vineyard Airport Control Tower (508) 693-1170
- 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 Massachusetts Chapter 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:

- ☐ Burn Organization
- ☐ Burn Objectives
- ☐ Description of Burn Area
- ☐ Expected Weather & Fire Behavior
- ☐ Communications
- ☐ Ignition Plan
- ☐ Holding Plan
- ☐ Contingency Plan
- ☐ Wildfire Conversion plan
- ☐ 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
- (6) 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. 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.

Telephone Number(s):

Name and Title	Phone Number	Comments
West Tisbury Fire Department	Office: (508) 693-9555	Medical and Fire
West Tisbury Police Department	Office: (508) 693-0020	
Martha's Vineyard Emergency Communications Center	Office: (508) 693-1212	
DEP Southeastern MA	Office: (508) 946-2831 Fax: (508) 946-2865	
Long Point Wildlife Refuge	Office: (508) 693-3678 Cell: (508) 395-5384	
Trustees of Reservations Islands 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.

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 [10 Miles – 25 Minutes drive time] 1 Hospital Rd, Vineyard Haven, MA – (508) 693-0410
- Brigham - Women's Hospital Burn Center [90 Miles – 2hrs 25 Minutes drive time via ferry 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 West Tisbury 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
West Tisbury Fire Department (2 Brush Breakers & various other equipment)	10 Minutes
Edgartown Fire Department (1 Brush Breaker and various equipment)	15 Minutes
DCR District 1 (1 Type 6 Engine)	15 Minutes

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

C. Notifications (Escaped Fire):

- West Tisbury Fire Department at (508) 693-9555
- Long Point Wildlife Refuge at (508) 693-3678
- 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 West Tisbury 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 West Tisbury Fire Department.
- Massachusetts Endangered Species Act (MESA) Conservation Permit

C. Smoke Sensitive Areas:

Smoke Sensitive Area	Distance (miles)	Direction
Island Montessori School	0.7	W
Residential Area	0.3	NW
Residential Area	0.05	N
Edgartown-West Tisbury Rd	0.7	N
Martha's Vineyard Airport	1.0	NE

D. Impacted Areas:

Several homes to the north and northwest of the unit may be impacted (Moderate PM 2.5 ug/m^3).

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 West Tisbury 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.

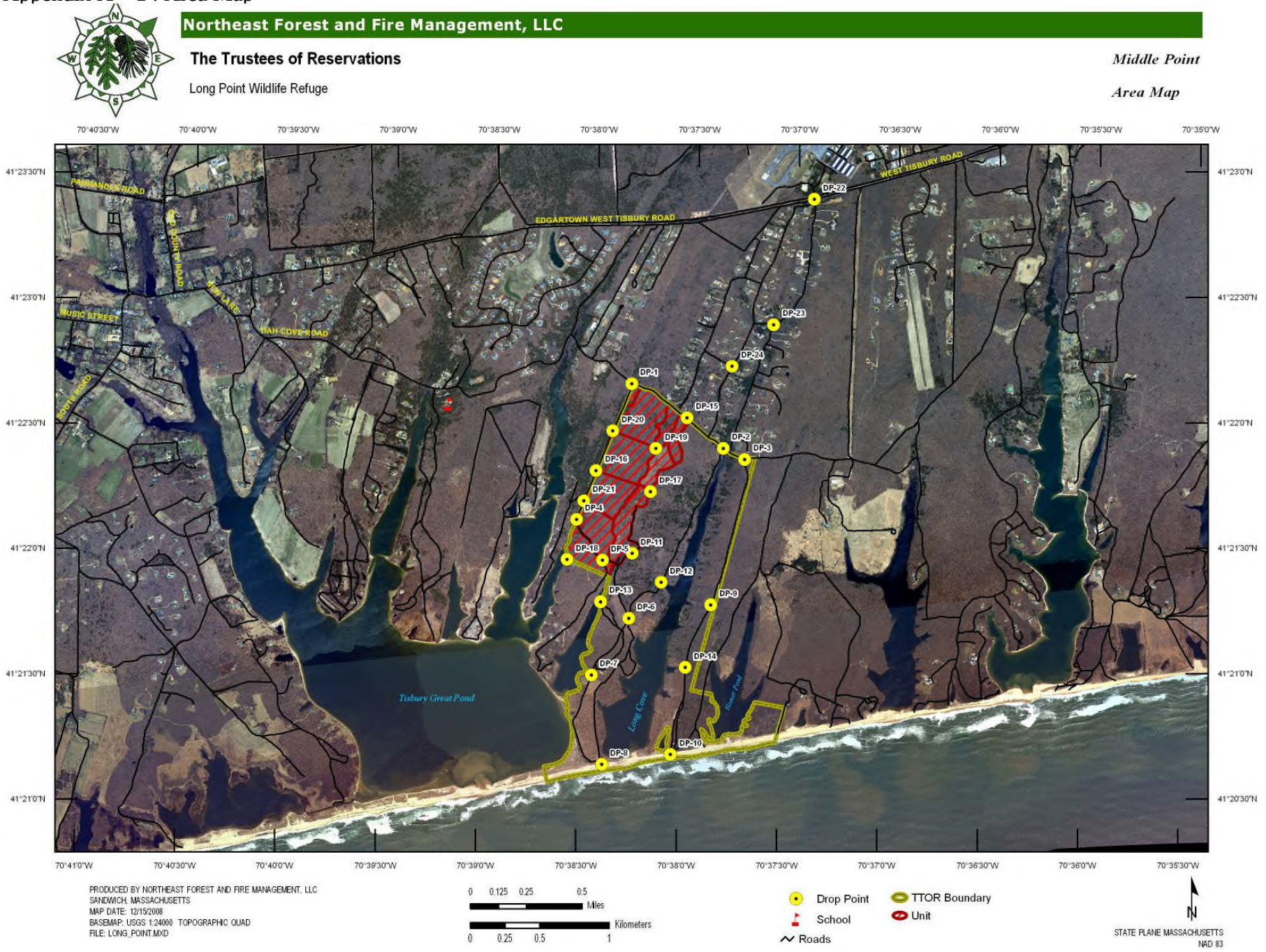
NOTE: All sub-elements to monitoring may be adjusted by the burn boss to meet given conditions. However, fire weather needs to be recorded hourly at a minimum.

ELEMENT 21: POST-BURN ACTIVITIES

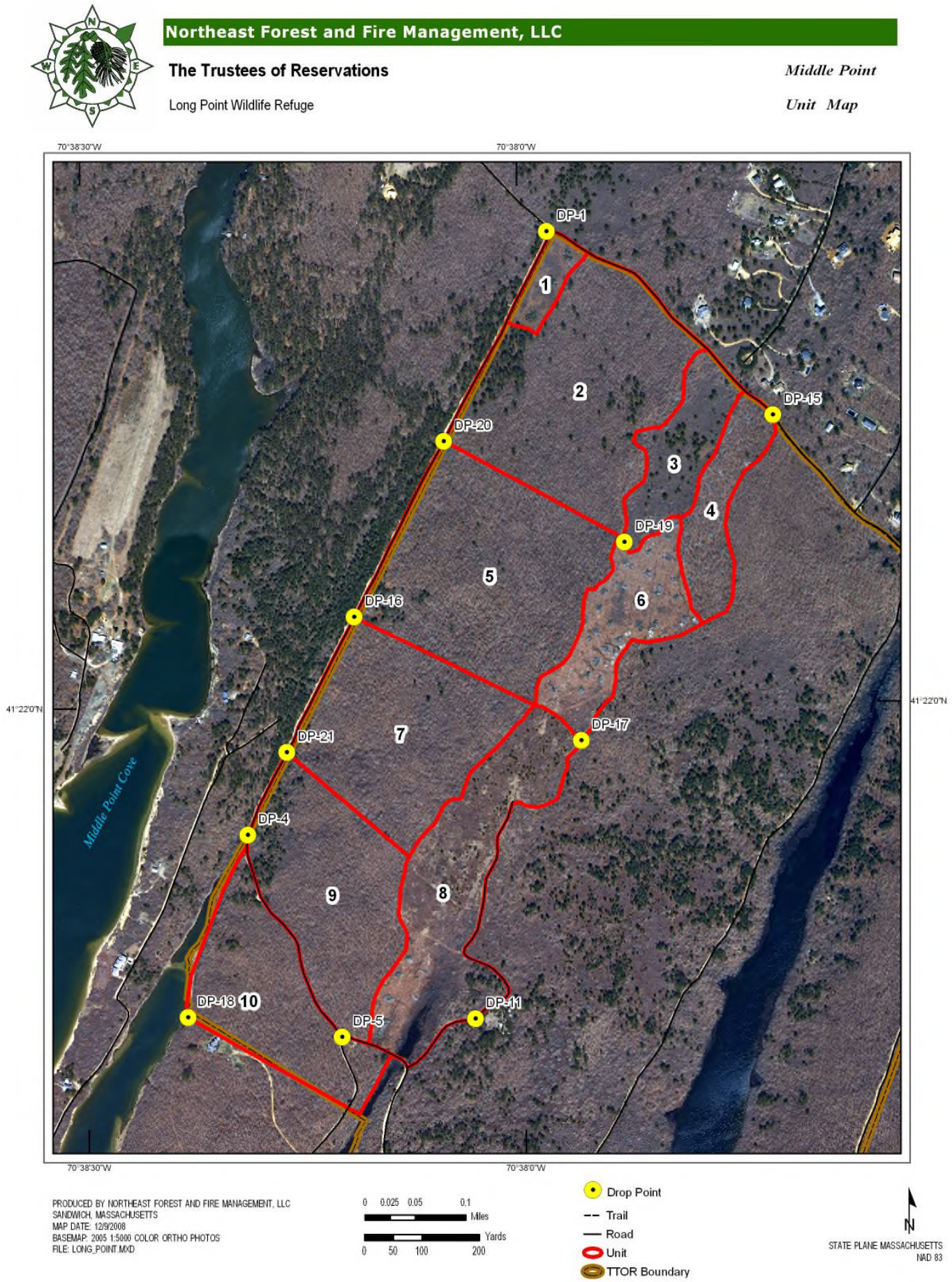
Post Burn Activities to be Completed:

- 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.

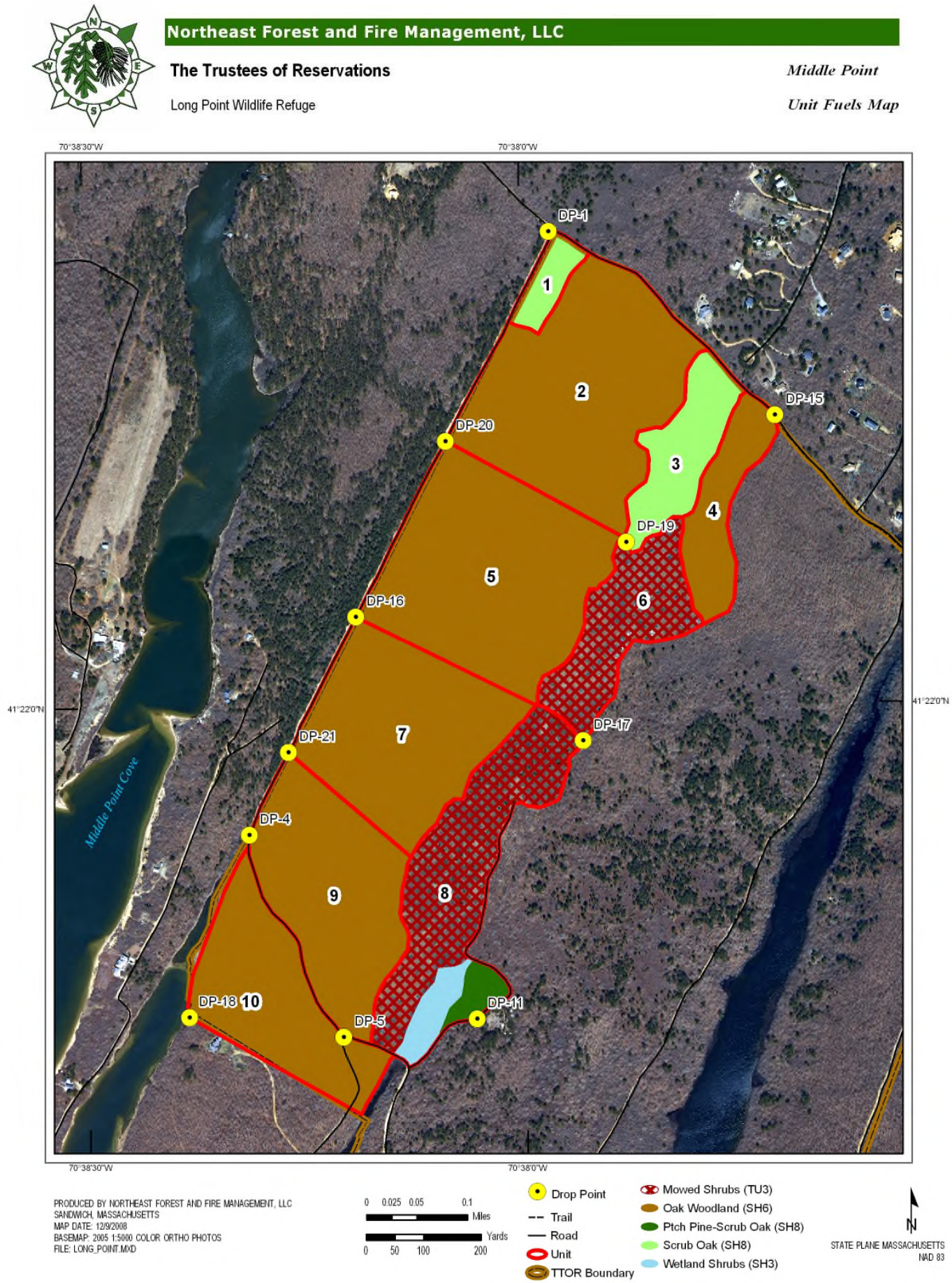
Appendix A – 1 : Area Map



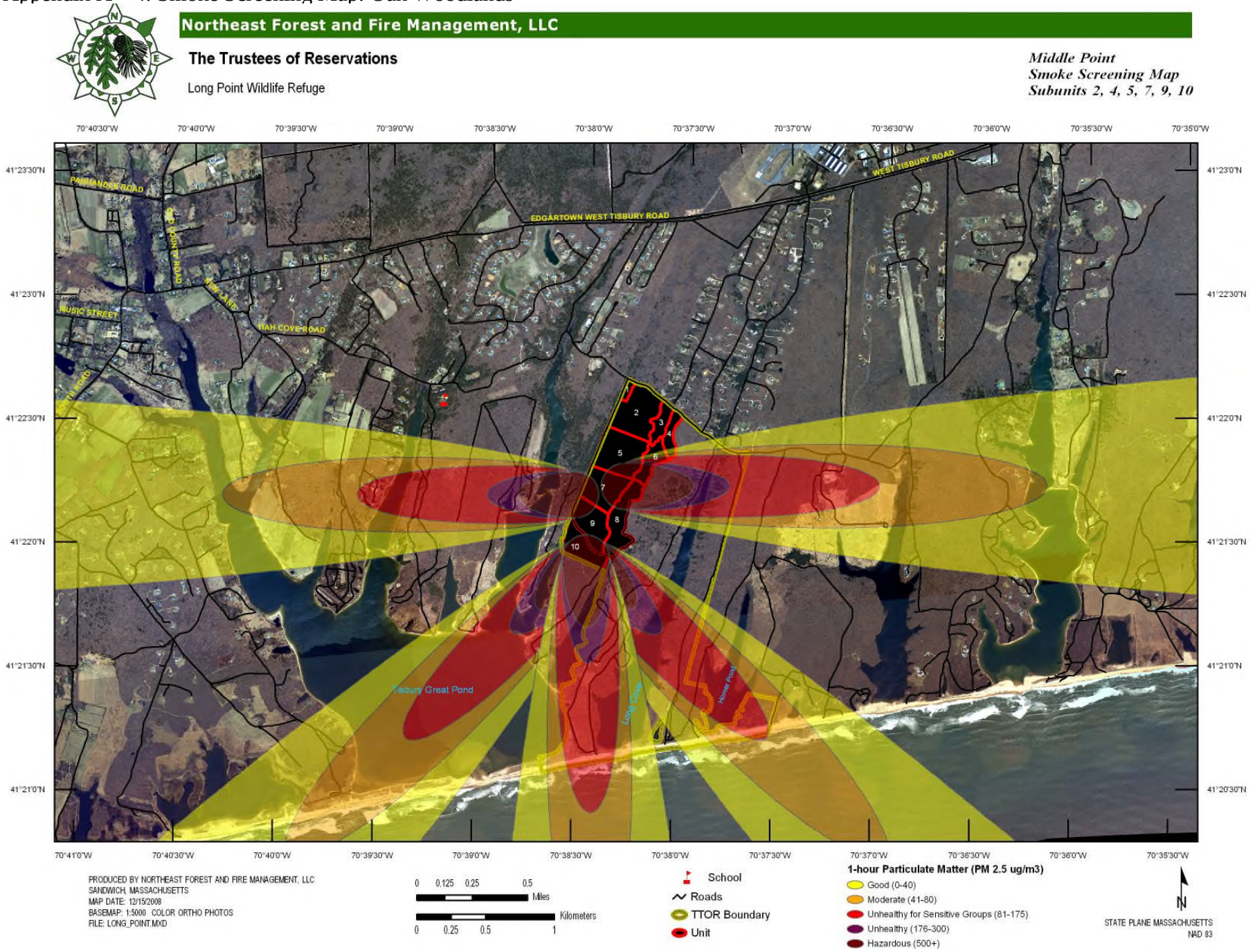
Appendix A – 2 : Unit Map



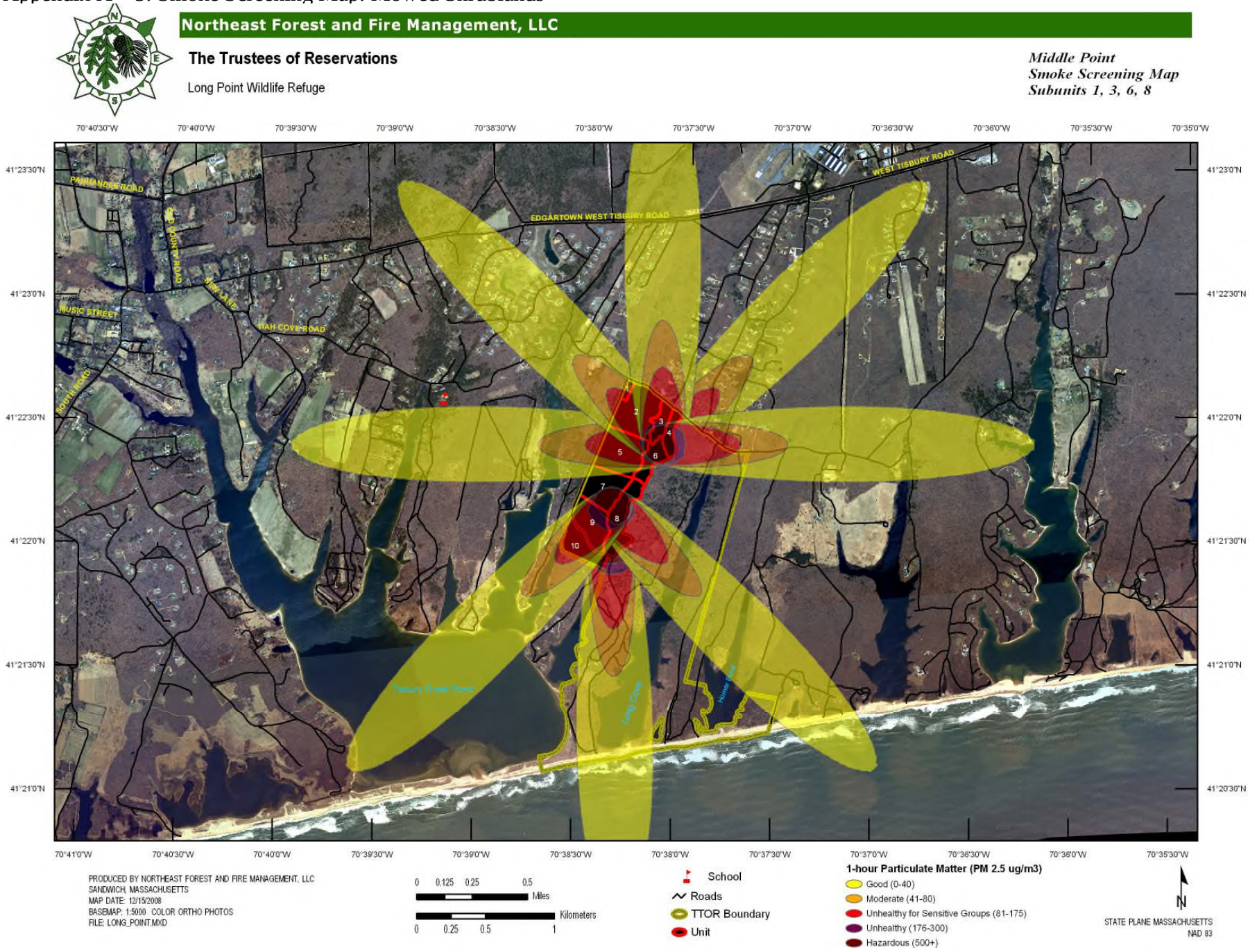
Appendix A – 3 : Unit Fuels Map



Appendix A – 4: Smoke Screening Map: Oak Woodlands



Appendix A – 5: Smoke Screening Map: Mowed Shrublands



APPENDIX B – 1A: Fire Behavior Oak Woodland– Shrub 6 [FBS FM 146] (Held Constant: 10H Fuels at 10%, 100H Fuels at 12%, 30% Live Fuel Moisture and 0% Slope) [Run in BEHAVEPLUS v. 3.0.2]:

Surface Rate of Spread (ch/h) - Head Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	10	19	29	39	49	60	71	82	93	104	116	128
5	2	10	18	27	37	47	57	67	78	89	100	111	122
6	2	9	17	26	35	45	55	65	75	85	96	106	117
7	2	9	17	25	34	43	53	62	72	82	92	103	113
8	2	9	16	24	33	42	51	60	70	79	89	99	109
9	2	8	16	24	32	41	50	59	68	77	87	96	106
10	2	8	15	23	31	40	48	57	66	75	84	94	103
11	2	8	15	23	31	39	47	56	65	73	83	92	101
12	2	8	15	22	30	38	46	55	63	72	81	90	99
13	2	8	14	22	29	37	45	54	62	71	79	88	97
14	2	7	14	21	29	37	44	53	61	69	78	87	95

Flame Length (ft) - Head Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	3	7	9	11	12	14	15	16	17	18	19	20	21
5	3	6	9	10	12	13	14	16	17	18	19	20	21
6	3	6	8	10	11	13	14	15	16	17	18	19	20
7	3	6	8	10	11	12	14	15	16	17	18	18	19
8	3	6	8	9	11	12	13	14	15	16	17	18	19
9	3	6	8	9	11	12	13	14	15	16	17	18	18
10	3	6	8	9	10	12	13	14	15	16	16	17	18
11	3	6	7	9	10	11	13	14	14	15	16	17	18
12	3	5	7	9	10	11	12	13	14	15	16	17	18
13	3	5	7	9	10	11	12	13	14	15	16	17	17
14	3	5	7	9	10	11	12	13	14	15	16	16	17

Surface Rate of Spread (ch/h) - Backing Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	3	3	3	3	3	3	3	2	2	2	2	2
5	2	2	3	3	3	3	3	2	2	2	2	2	2
6	2	2	3	3	3	3	2	2	2	2	2	2	2
7	2	2	2	3	2	2	2	2	2	2	2	2	2
8	2	2	2	2	2	2	2	2	2	2	2	2	2
9	2	2	2	2	2	2	2	2	2	2	2	2	2
10	2	2	2	2	2	2	2	2	2	2	2	2	2
11	2	2	2	2	2	2	2	2	2	2	2	2	2
12	2	2	2	2	2	2	2	2	2	2	2	2	2
13	2	2	2	2	2	2	2	2	2	2	2	2	2
14	2	2	2	2	2	2	2	2	2	2	2	2	2

Flame Length (ft) - Backing Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	3	4	4	4	4	4	4	4	3	3	3	3	3
5	3	3	4	4	4	4	3	3	3	3	3	3	3
6	3	3	3	3	3	3	3	3	3	3	3	3	3
7	3	3	3	3	3	3	3	3	3	3	3	3	3
8	3	3	3	3	3	3	3	3	3	3	3	3	3
9	3	3	3	3	3	3	3	3	3	3	3	3	3
10	3	3	3	3	3	3	3	3	3	3	3	3	3
11	3	3	3	3	3	3	3	3	3	3	3	3	3
12	3	3	3	3	3	3	3	3	3	3	3	3	3
13	3	3	3	3	3	3	3	3	3	3	3	3	3
14	3	3	3	3	3	3	3	3	3	3	3	3	3

APPENDIX B – 1B: Fire Behavior Scrub Oak – Shrub 9 [FBS FM 149] (Held Constant: 10H Fuels at 10%, 100H Fuels at 12%, 30% Live Fuel Moisture and 0% Slope) [Run in BEHAVEPLUS v. 3.0.2]:

Surface Rate of Spread (ch/h) - Head Fire													
	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	6	18	36	56	77	100	124	150	176	203	231	259	288
5	6	18	35	54	75	98	121	146	171	197	225	252	281
6	6	17	34	53	73	95	118	142	167	192	219	246	273
7	5	17	33	51	71	93	115	138	163	188	213	240	267
8	5	17	32	50	70	91	112	135	159	183	208	234	260
9	5	16	32	49	68	89	110	132	155	179	204	229	255
10	5	16	31	48	67	87	108	129	152	175	199	224	249
11	5	16	30	47	65	85	105	127	149	172	195	219	244
12	5	15	30	46	64	83	103	124	146	168	191	215	239
13	5	15	29	45	63	82	101	122	143	165	188	211	235
14	5	15	29	44	62	80	99	120	140	162	184	207	230

Flame Length (ft) - Head Fire													
	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	8	13	17	21	25	28	31	34	36	39	41	43	46
5	7	13	17	21	24	27	30	33	36	38	40	42	45
6	7	12	17	21	24	27	30	32	35	37	39	42	44
7	7	12	16	20	23	26	29	32	34	37	39	41	43
8	7	12	16	20	23	26	29	31	34	36	38	40	42
9	7	12	16	19	23	25	28	31	33	35	37	39	41
10	7	12	16	19	22	25	28	30	32	35	37	39	41
11	7	11	15	19	22	25	27	30	32	34	36	38	40
12	7	11	15	19	22	24	27	29	32	34	36	38	40
13	6	11	15	18	21	24	27	29	31	33	35	37	39
14	6	11	15	18	21	24	26	28	31	33	35	37	38

Surface Rate of Spread (ch/h) - Backing Fire													
	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	6	5	5	6	6	6	5	5	5	5	5	5	5
5	6	5	5	5	5	5	5	5	5	5	5	5	5
6	6	4	5	5	5	5	5	5	5	5	5	5	4
7	5	4	5	5	5	5	5	5	5	5	5	4	4
8	5	4	5	5	5	5	5	5	5	5	4	4	4
9	5	4	5	5	5	5	5	5	5	5	4	4	4
10	5	4	5	5	5	5	5	5	5	4	4	4	4
11	5	4	4	5	5	5	5	5	4	4	4	4	4
12	5	4	4	5	5	5	5	4	4	4	4	4	4
13	5	4	4	5	5	5	4	4	4	4	4	4	4
14	5	4	4	4	4	4	4	4	4	4	4	4	4

Flame Length (ft) - Backing Fire													
	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	8	7	7	7	7	7	7	7	7	7	7	7	7
5	7	7	7	7	7	7	7	7	7	7	7	7	7
6	7	7	7	7	7	7	7	7	7	7	7	7	7
7	7	6	7	7	7	7	7	7	7	7	7	7	6
8	7	6	7	7	7	7	7	7	7	7	7	6	6
9	7	6	7	7	7	7	7	7	7	6	6	6	6
10	7	6	6	7	7	7	7	7	6	6	6	6	6
11	7	6	6	7	7	7	6	6	6	6	6	6	6
12	7	6	6	6	6	6	6	6	6	6	6	6	6
13	6	6	6	6	6	6	6	6	6	6	6	6	6
14	6	6	6	6	6	6	6	6	6	6	6	6	6

APPENDIX B – 1C: Fire Behavior Pitch Pine - Scrub Oak – Shrub 8 [FBS FM 148] (Held Constant: 10H Fuels at 10%, 100H Fuels at 12%, 30% Live Fuel Moisture and 0% Slope) [Run in BEHAVEPLUS v. 3.0.2]:

Surface Rate of Spread (ch/h) - Head Fire

Midflame Wind Speed (mph)

1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	3	10	20	30	42	55	68	82	97	111	127	142	159
5	3	10	19	30	41	54	67	80	95	109	124	140	155
6	3	10	19	29	41	53	66	79	93	107	122	137	152
7	3	10	18	29	40	52	64	77	91	105	120	134	150
8	3	9	18	28	39	51	63	76	89	103	117	132	147
9	3	9	18	28	39	50	62	75	88	102	116	130	145
10	3	9	18	27	38	49	61	74	87	100	114	128	142
11	3	9	17	27	37	49	60	73	85	98	112	126	140
12	3	9	17	27	37	48	59	72	84	97	110	124	138
13	3	9	17	26	36	47	59	71	83	96	109	122	136
14	3	9	17	26	36	47	58	70	82	95	108	121	134

Flame Length (ft) - Head Fire

Midflame Wind Speed (mph)

1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	5	8	10	13	15	17	19	20	22	23	25	26	27
5	4	8	10	13	15	17	18	20	21	23	24	26	27
6	4	7	10	12	14	16	18	20	21	23	24	25	26
7	4	7	10	12	14	16	18	19	21	22	24	25	26
8	4	7	10	12	14	16	17	19	20	22	23	24	26
9	4	7	10	12	14	16	17	19	20	22	23	24	25
10	4	7	10	12	14	15	17	19	20	21	23	24	25
11	4	7	9	12	13	15	17	18	20	21	22	24	25
12	4	7	9	11	13	15	17	18	19	21	22	23	24
13	4	7	9	11	13	15	16	18	19	21	22	23	24
14	4	7	9	11	13	15	16	18	19	20	22	23	24

Surface Rate of Spread (ch/h) - Backing Fire

Midflame Wind Speed (mph)

1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	3	3	3	3	3	3	3	3	3	3	3	3	3
5	3	3	3	3	3	3	3	3	3	3	3	3	3
6	3	2	3	3	3	3	3	3	3	3	3	3	3
7	3	2	3	3	3	3	3	3	3	3	3	3	2
8	3	2	3	3	3	3	3	3	3	3	3	2	2
9	3	2	3	3	3	3	3	3	3	3	3	2	2
10	3	2	3	3	3	3	3	3	3	3	2	2	2
11	3	2	3	3	3	3	3	3	3	2	2	2	2
12	3	2	3	3	3	3	3	3	3	2	2	2	2
13	3	2	2	3	3	3	3	3	2	2	2	2	2
14	3	2	2	3	3	3	3	3	2	2	2	2	2

Flame Length (ft) - Backing Fire

Midflame Wind Speed (mph)

1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	5	4	4	4	4	4	4	4	4	4	4	4	4
5	4	4	4	4	4	4	4	4	4	4	4	4	4
6	4	4	4	4	4	4	4	4	4	4	4	4	4
7	4	4	4	4	4	4	4	4	4	4	4	4	4
8	4	4	4	4	4	4	4	4	4	4	4	4	4
9	4	4	4	4	4	4	4	4	4	4	4	4	4
10	4	4	4	4	4	4	4	4	4	4	4	4	4
11	4	4	4	4	4	4	4	4	4	4	4	4	4
12	4	4	4	4	4	4	4	4	4	4	4	4	4
13	4	4	4	4	4	4	4	4	4	4	4	4	4
14	4	4	4	4	4	4	4	4	4	4	4	4	4

APPENDIX B – 1D: Fire Behavior Mowed Shrubs – Timber-Grass-Shrub 3 [FBS FM 163] (Held Constant: 10H Fuels at 10%, 100H Fuels at 12%, 30% Live Fuel Moisture and 0% Slope) [Run in BEHAVEPLUS v. 3.0.2]:

Surface Rate of Spread (ch/h) - Head Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	8	18	29	42	56	71	87	103	121	139	158	178
5	2	8	17	27	39	53	67	82	98	114	132	150	168
6	2	8	16	26	37	50	64	78	93	109	125	142	160
7	2	7	15	25	36	48	61	74	89	104	120	136	153
8	2	7	15	24	34	46	58	71	85	100	115	130	147
9	2	7	14	23	33	44	56	69	82	96	111	126	141
10	2	6	14	22	32	43	54	66	79	93	107	122	137
11	2	6	13	22	31	41	53	64	77	90	104	118	132
12	2	6	13	21	30	40	51	63	75	88	101	115	129
13	2	6	12	20	29	39	50	61	73	85	98	111	125
14	2	6	12	20	29	38	48	59	71	83	96	109	122

Flame Length (ft) - Head Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	4	6	8	9	11	12	13	14	15	17	18	19
5	2	4	6	7	9	10	11	13	14	15	16	17	18
6	2	4	6	7	9	10	11	12	13	14	15	16	17
7	2	4	5	7	8	10	11	12	13	14	15	16	17
8	2	4	5	7	8	9	10	11	12	13	14	15	16
9	2	4	5	7	8	9	10	11	12	13	14	15	16
10	2	3	5	6	8	9	10	11	12	13	14	14	15
11	2	3	5	6	7	9	10	11	12	12	13	14	15
12	2	3	5	6	7	8	9	10	11	12	13	14	15
13	2	3	5	6	7	8	9	10	11	12	13	14	14
14	2	3	5	6	7	8	9	10	11	12	13	13	14

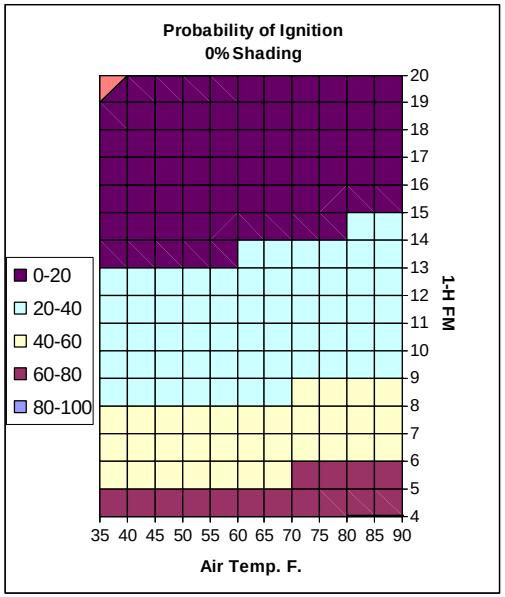
Surface Rate of Spread (ch/h) - Backing Fire

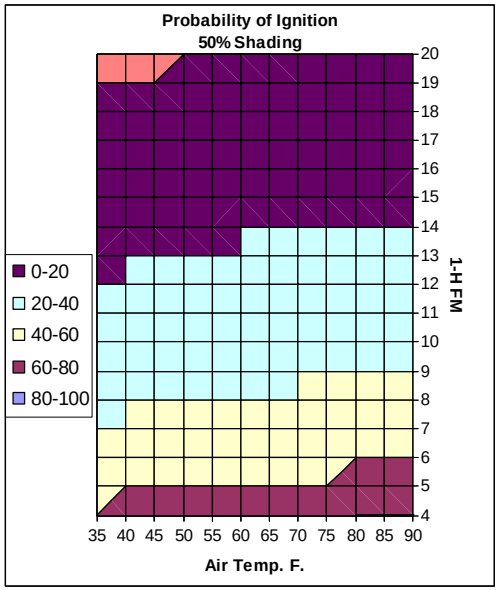
	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	2	2	2	3	3	3	3	3	3	3	2	2
5	2	2	2	2	2	2	2	2	2	2	2	2	2
6	2	2	2	2	2	2	2	2	2	2	2	2	2
7	2	1	2	2	2	2	2	2	2	2	2	2	2
8	2	1	2	2	2	2	2	2	2	2	2	2	2
9	2	1	2	2	2	2	2	2	2	2	2	2	2
10	2	1	2	2	2	2	2	2	2	2	2	2	2
11	2	1	2	2	2	2	2	2	2	2	2	2	2
12	2	1	2	2	2	2	2	2	2	2	2	2	2
13	2	1	1	2	2	2	2	2	2	2	2	2	2
14	2	1	1	2	2	2	2	2	2	2	2	2	2

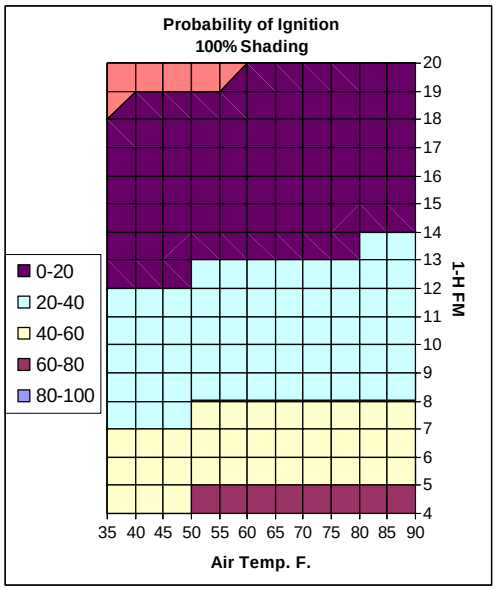
Flame Length (ft) - Backing Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	2	2	2	2	2	2	2	2	2	2	2	2
5	2	2	2	2	2	2	2	2	2	2	2	2	2
6	2	2	2	2	2	2	2	2	2	2	2	2	2
7	2	2	2	2	2	2	2	2	2	2	2	2	2
8	2	2	2	2	2	2	2	2	2	2	2	2	2
9	2	2	2	2	2	2	2	2	2	2	2	2	2
10	2	2	2	2	2	2	2	2	2	2	2	2	2
11	2	2	2	2	2	2	2	2	2	2	2	2	2
12	2	2	2	2	2	2	2	2	2	2	2	2	2
13	2	2	2	2	2	2	2	2	2	2	2	2	2
14	2	2	2	2	2	2	2	2	2	2	2	2	2

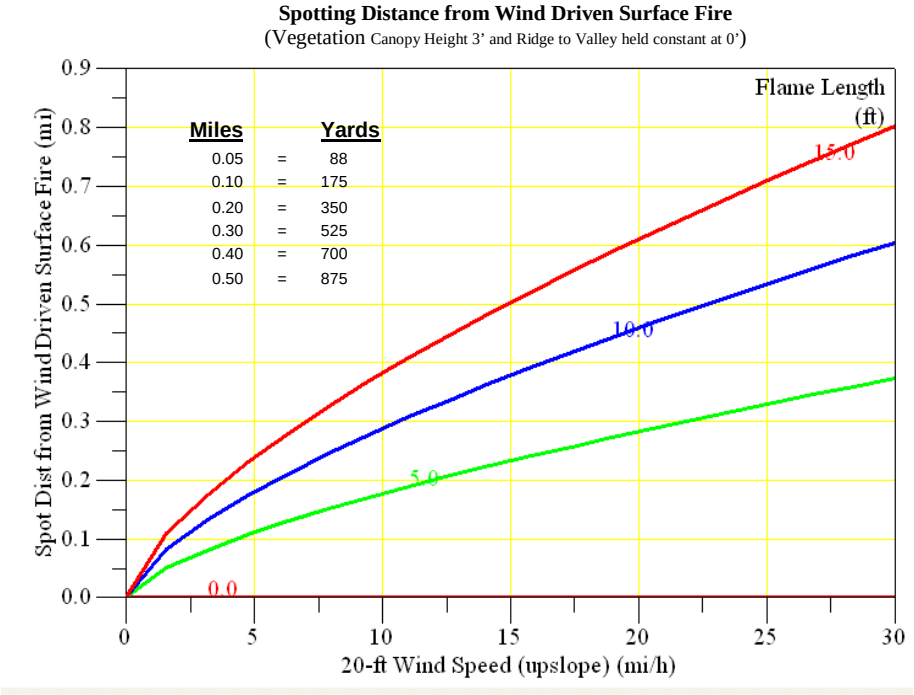
APPENDIX B - 2: Probability of Ignition [Run in BEHAVE by Remsoft Professional v. 5.0]:



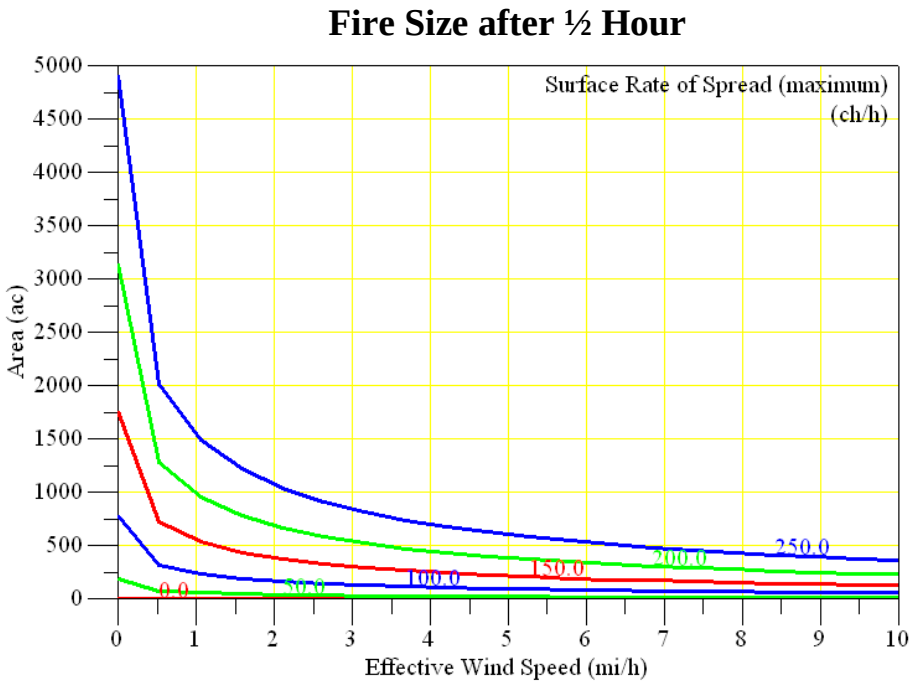




APPENDIX B - 3: Spotting Distance [Run in BEHAVEPLUS v. 3.0.2]:



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



APPENDIX B – 5A: 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 50% Humidity (Subunits 1, 3, 6, 8)

VSMOKE SUMMARY:

The smoke dispersion modeling analysis (using VSMOKE and/or VSMOKE-GIS) for this project was performed for 18.0 acres to be burned on 04/15/2009 at the time period of 1400 hours. This time period has daytime dispersion characteristics to disperse the pollutants from the fire. The location of the fire is at approximately 41.362 degrees latitude and -70.634 degrees longitude (1550288.551 meters east and 1976302.228 meters north using US Albers projection). The emission rate of PM2.5 (fine particles) this hour was 71.9 grams/second, and carbon monoxide was 869.2 grams/second. The heat release rate was 26610.7 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 50 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 0.49 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 1.24 miles are predicted to be code orange or worse. At distances less than 413 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 823 feet 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)**

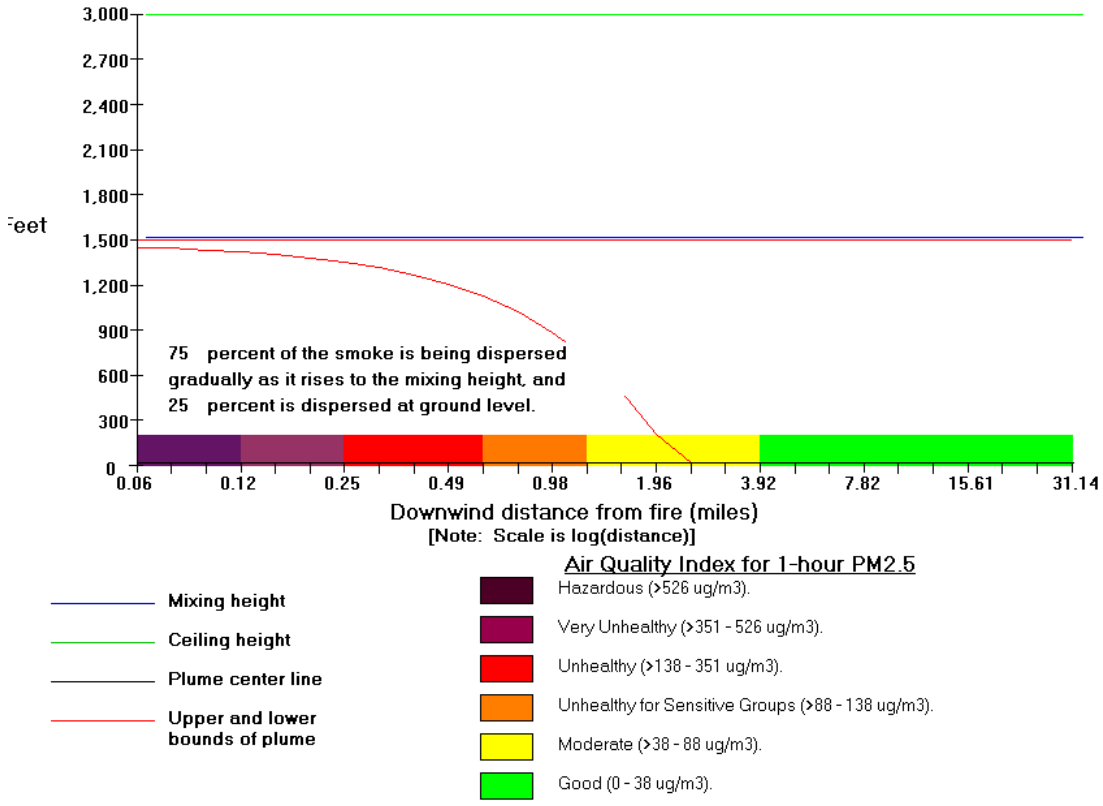
Use Stability in VSMOKE-GIS

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

Distance from fire	PM2.5 (ug/m3)	CO (ppm)	Distance from fire	PM2.5 (ug/m3)	CO (ppm)
328 ft	762.64	12.52	2.47 mi	46.21	5.27
413 ft	668.55	11.57	3.11 mi	41.52	5.22
518 ft	582.84	10.70	3.92 mi	37.67	5.18
656 ft	503.12	9.89	4.94 mi	34.50	5.15
823 ft	433.73	9.19	6.21 mi	31.89	5.12
1037 ft	373.06	8.58	7.82 mi	29.76	5.10
0.25 mi	315.88	8.00	9.85 mi	28.01	5.08
0.31 mi	261.68	7.45	12.40 mi	26.58	5.07
0.39 mi	213.25	6.96	15.61 mi	25.41	5.05
0.49 mi	171.44	6.53	19.65 mi	24.45	5.05
0.62 mi	136.92	6.18	24.74 mi	23.67	5.04
0.78 mi	109.52	5.91	31.14 mi	23.03	5.03
0.98 mi	88.39	5.69	39.21 mi	22.50	5.03
1.24 mi	72.38	5.53	49.36 mi	22.07	5.02
1.56 mi	60.56	5.41	62.14 mi	21.71	5.02
1.96 mi	52.20	5.33			

Visibility Table

Distance from fire	Crossplume Visibility (miles)	Contrast Ratio (miles)	Distance from fire	Crossplume Visibility (miles)	Contrast Ratio (miles)
317 ft	16.68	0.43	2.47 mi	21.90	0.94
422 ft	17.46	0.48	3.11 mi	21.90	0.94
528 ft	18.16	0.53	3.92 mi	21.90	0.95
634 ft	18.82	0.58	4.94 mi	21.90	0.95
845 ft	19.39	0.63	6.21 mi	21.90	0.95
1056 ft	19.87	0.67	7.82 mi	21.90	0.96
0.25 mi	20.30	0.72	9.85 mi	21.90	0.96
0.31 mi	20.68	0.76	12.40 mi	21.90	0.96
0.39 mi	20.98	0.79	15.61 mi	21.90	0.96
0.49 mi	21.22	0.82	19.65 mi	21.90	0.96
0.62 mi	21.41	0.85	24.74 mi	21.90	0.96
0.78 mi	21.57	0.87	31.14 mi	21.90	0.96
0.98 mi	21.69	0.89	39.21 mi	21.90	0.96
1.24 mi	21.78	0.91	49.36 mi	21.91	0.96
1.56 mi	21.85	0.92	62.14 mi	21.93	0.97
1.96 mi	21.89	0.93			

Plume Table

Distance from fire	Plume Height (feet)	Horizontal Dispersion Coefficient (feet)	Vertical Dispersion Coefficient (feet)	Distance from fire	Plume Height (feet)	Horizontal Dispersion Coefficient (feet)	Vertical Dispersion Coefficient (feet)
317 ft	1,500	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 B – 5B: 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 50% Humidity (Subunits 2, 4, 5, 7, 9, 10)

Vsmoke Summary:

The smoke dispersion modeling analysis (using VSMOKE and/or VSMOKE-GIS) for this project was performed for 25.0 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 41.366 degrees latitude and -70.634 degrees longitude (1550273.021 meters east and 1976743.108 meters north using US Albers projection). The emission rate of PM2.5 (fine particles) this hour was 149.8 grams/second, and carbon monoxide was 1800.3 grams/second. The heat release rate was 38445.1 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 50 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 0.98 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 2.47 miles are predicted to be code orange or worse. At distances less than 0.25 miles from the edge of the fire the one-hour carbon monoxide concentrations are predicted to be code red or worse, and distances less than 0.39 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)**

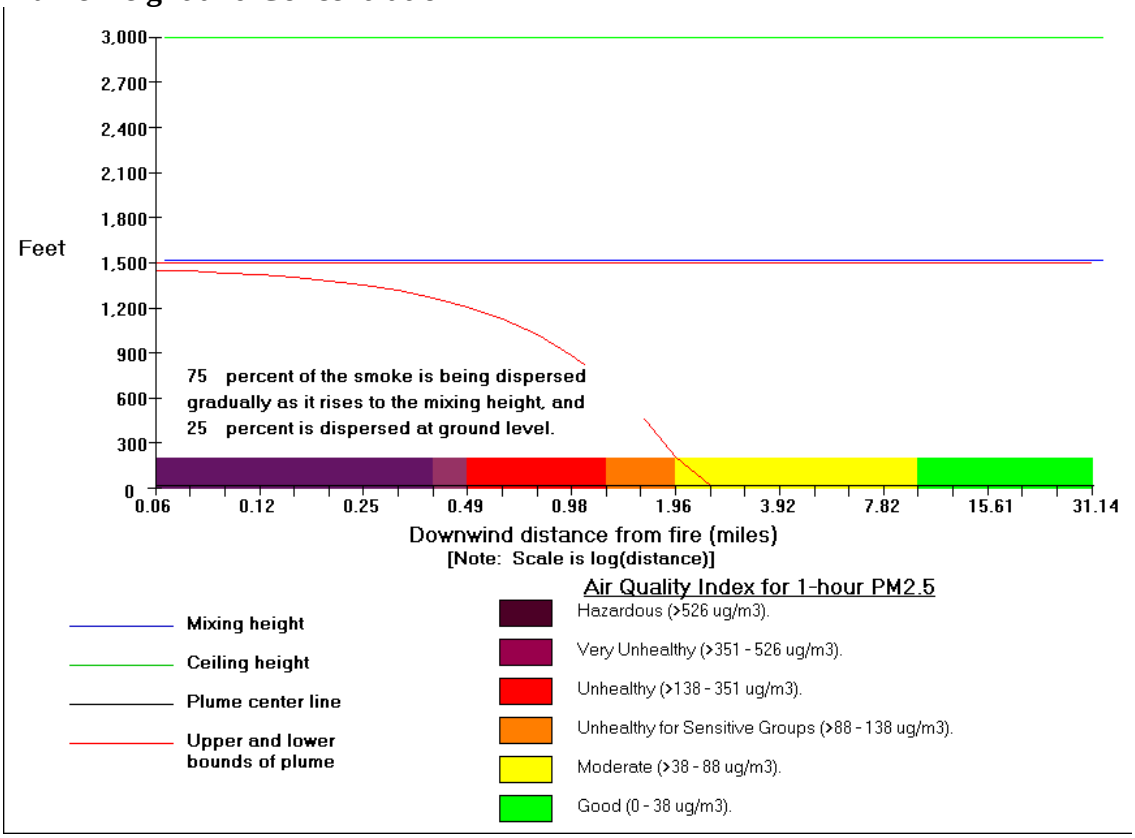
Use Stability in VSMOKE-GIS

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

Distance from fire	PM2.5 (ug/m3)	CO (ppm)	Distance from fire	PM2.5 (ug/m3)	CO (ppm)
328 ft	1,597.90	20.89	2.47 mi	74.65	5.55
413 ft	1,397.98	18.87	3.11 mi	64.86	5.45
518 ft	1,215.87	17.04	3.92 mi	56.82	5.37
656 ft	1,046.48	15.34	4.94 mi	50.21	5.30
823 ft	898.88	13.85	6.21 mi	44.78	5.25
1037 ft	769.42	12.55	7.82 mi	40.34	5.20
0.25 mi	646.92	11.31	9.85 mi	36.69	5.17
0.31 mi	530.69	10.14	12.40 mi	33.71	5.14
0.39 mi	427.11	9.10	15.61 mi	31.28	5.11
0.49 mi	338.13	8.20	19.65 mi	29.28	5.09
0.62 mi	265.05	7.47	24.74 mi	27.64	5.08
0.78 mi	207.29	6.89	31.14 mi	26.30	5.06
0.98 mi	162.89	6.44	39.21 mi	25.21	5.05
1.24 mi	129.34	6.10	49.36 mi	24.30	5.04
1.56 mi	104.61	5.85	62.14 mi	23.57	5.04
1.96 mi	87.15	5.68			

Visibility Table

Distance from fire	Crossplume Visibility (miles)	Contrast Ratio (miles)	Distance from fire	Crossplume Visibility (miles)	Contrast Ratio (miles)
317 ft	10.06	0.18	2.47 mi	20.93	0.90
422 ft	11.68	0.23	3.11 mi	20.93	0.91
528 ft	13.15	0.28	3.92 mi	20.93	0.92
634 ft	14.51	0.33	4.94 mi	20.93	0.93
845 ft	15.70	0.39	6.21 mi	20.93	0.94
1056 ft	16.71	0.45	7.82 mi	20.93	0.94
0.25 mi	17.61	0.52	9.85 mi	20.93	0.95
0.31 mi	18.39	0.58	12.40 mi	20.93	0.95
0.39 mi	19.01	0.64	15.61 mi	20.93	0.95
0.49 mi	19.52	0.69	19.65 mi	20.93	0.96
0.62 mi	19.92	0.74	24.74 mi	20.93	0.96
0.78 mi	20.24	0.78	31.14 mi	20.93	0.96
0.98 mi	20.49	0.81	39.21 mi	20.94	0.96
1.24 mi	20.69	0.84	49.36 mi	20.96	0.96
1.56 mi	20.83	0.87	62.14 mi	21.01	0.96
1.96 mi	20.91	0.89			

Plume Table

Distance from fire	Plume Height (feet)	Horizontal Dispersion Coefficient (feet)	Vertical Dispersion Coefficient (feet)	Distance from fire	Plume Height (feet)	Horizontal Dispersion Coefficient (feet)	Vertical Dispersion Coefficient (feet)
317 ft	1,500	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

ADMINSTRATIVE UNIT(S): Long Point Wildlife Refuge

PRESCRIBED FIRE NAME: Middle Point

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:	MODERATE	HIGH	MODERATE
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	MODERATE	MODERATE	MODERATE
14. Smoke Management:	MODERATE	MODERATE	MODERATE
OVERALL RATINGS:	**MODERATE**	**MODERATE**	**MODERATE**

FINAL SUMMARY COMPLEXITY DETERMINATION:	**MODERATE**

RATIONALE:	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.

PRELIMINARY COMPEXITY ANALYSIS SUMMARY

ADMINSTRATIVE UNIT(S): Long Point Wildlife Refuge

PRESCRIBED FIRE NAME: Middle Point

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:	MODERATE	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	MODERATE	MODERATE	MODERATE
14. Smoke Management:	MODERATE	MODERATE	MODERATE
OVERALL RATINGS:	**MODERATE**	**MODERATE**	**MODERATE**

FINAL SUMMARY COMPLEXITY DETERMINATION:	**MODERATE**

RATIONALE:	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.

PRESCRIBED FIRE COMPLEXITY RATING SYSTEM WORKSHEET

ADMINISTRATIVE UNIT(S): Long Point Wildlife Refuge

PRESCRIBED FIRE NAME: Middle Point

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	Some areas with high fuel loads will be difficult to suppress if fire becomes established.
	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:	MODERATE	Numerous residences and structures are immediately next to the unit to the north and one to the south. Fuels within the unit are not expected to have a high spotting potential.
	Final Rating:	MODERATE	No change.
POTENTIAL CONSEQUENCES	Preliminary Rating:	HIGH	Impact on the community of West Tisbury 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 improved structures exist in the unit. All areas within the unit may be burned.
	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 hade 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	Resource 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 resources 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:	MODERATE	Some area will need initial mechanical treatment before they can be burned. Most areas will need to be maintained on a regular basis using mechanical treatments between burn treatments.

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 dependant 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 his 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	Low potential for serious injury while conducting this burn.
	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	Low fuel loads throughout the unit and small unit size will allow for simple ignition methods and 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	Coordination among agencies will likely be needed to procure the required crew and equipment.
	Final Rating:	HIGH	No change.
POTENTIAL CONSEQUENCES	Preliminary Rating:	HIGH	Availability of other agency staff and equipment will affect the ability to accomplish the burn.
	Final Rating:	HIGH	No change.
TECHNICAL DIFFICULTY	Preliminary Rating:	HIGH	Coordination with at least one agency is expected to be necessary to complete the burn.
	Final Rating:	HIGH	No change.

13. PROJECT LOGISTICS		RATING	RATIONALE
RISK	Preliminary Rating:	MODERATE	Coordination of crew and equipment travel to Martha's Vineyard is essential for completion of burn operations.
	Final Rating:	MODERATE	No change.
POTENTIAL CONSEQUENCES	Preliminary Rating:	MODERATE	Failure to execute travel coordination of crew and equipment will affect the ability to conduct burn operations.
	Final Rating:	MODERATE	No change.
TECHNICAL DIFFICULTY	Preliminary Rating:	MODERATE	Agencies handle their own logistics, ferries readily available during non-summer months.
	Final Rating:	MODERATE	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	Project personnel will be subjected to smoke on the holding lines. Smoke is unlikely to trigger any regulatory issues. However public perception of smoke has low tolerance levels.
	Final Rating:	HIGH	Regulatory agency and public tolerance of any smoke impact is minimal.
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, Middle Point	Begin:	Date-Variable 06:00 (Start Time May be Variable)	12/15/08
	End:	Date-Variable 18:00 (Start Time May be Variable)	

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.

BURN OPERATIONS	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)	Marginal (III)	**Medium**	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.
	Moderate Fire Behavior	Occasional (C)	Marginal (III)	**Medium**	1. Identify escape routes and safety zones. 2. Wear full wildland fire PPE, to include fire shelters.	**Low**	Communicate Extreme Fire Behavior controls to supervisors and crew.
	Power Line Hazard	Unlikely (E)	Critical (II)	**Low**	1. Avoid working under power lines. 2. Do not spray water on or near power lines. 3. Minimize heat, direct flame contact, and heavy smoke impacts on power lines.	**Low**	Communicate Power Line Hazard controls to supervisors and crew.
	Chain Saw Operation	Unlikely (E)	Critical (II)	**Low**	1. PPE should be worn (eye protection, ear protection, hard hat, chaps, boots, and appropriate clothing). 2. Only qualified saw operators will be authorized to operate chain saws. 3. Spotters will be provided for sawyers. 4. Make location of first aid kits known to supervisors and crew.	**Low**	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)	**Medium**	1. Identify First Aid CPR trained crew and first aid kit locations. 2. Brief crew on Lyme Disease prevention. 3. Brief crew on importance of proper hydration. 4. Brief crew on other Environmental/Environment Hazards based on potential exposure.	**Low**	Communicate Environmental/Environment Hazards 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.
	Ignition	Unlikely (E)	Critical (II)	**Low**	1. Wear appropriate PPE (gloves, eye protection, boots, and Nomex with sleeves down). 2. Use proper fuel mix.	**Low**	Communicate Ignition controls to supervisors and crew.
	Tool Use	Unlikely (E)	Marginal (III)	**Low**	1. Wear appropriate PPE (gloves, boots, clothing, and eye protection). 2. Proper spacing should be maintained. 3. Proper tool use and foot should be used.	**Low**	Communicate Tool Use controls to supervisors and crew.
	Pump Operation	Unlikely (E)	Marginal (III)	**Low**	1. When around an operating pump wear eye and ear protection. 2. While operating pressurized water or working around pressurized water operations wear eye protection and gloves.	**Low**	Communicate Pump Operation controls to supervisors and crew.
MOP-UP	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**	1. Identify First Aid CPR trained crew and first aid kit locations. 2. Brief crew on Lyme Disease prevention. 3. Brief crew on importance of proper hydration. 4. Brief crew on other Environmental/Environment Hazards based on potential exposure.	**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**	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.
	Chain Saw Operation	Unlikely (E)	Critical (II)	**Low**	1. PPE should be worn (eye protection, ear protection, hard hat, chaps, boots, and appropriate clothing). 2. Only qualified saw operators will be authorized to operate chain saws. 3. Spotters will be provided for sawyers. 4. Make location of first aid kits known to supervisors and crew.	**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**	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 Chain Saw controls to supervisors and crew.
	Tool Use	Seldom (D)	Marginal (III)	Low	1. Wear appropriate PPE (gloves, boots, clothing, and eye protection). 2. Proper spacing should be maintained. 3. Proper tool use and foot should be used.	Low	Communicate General Accident controls to supervisors and crew.
	Pump Operation	Unlikely (E)	Marginal (III)	Low	1. When around an operating pump wear eye and ear protection. 2. While operating pressurized water or working around pressurized water operations wear eye protection and gloves.	Low	Communicate Tool Use controls to supervisors and crew.
BURN BREAK DOWN	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)	Seldom (D)	Marginal (III)	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.
TRAVEL TO HOME UNIT (OR RESIDENCE)	Motor Vehicle Accident (Other Vehicles, Hazardous Road Conditions, Poor Visibility, and Fatigue/Sleepiness)	Seldom (D)	Critical (II)	**Medium**	1. Drivers are hydrated. 2. Drivers are paired up with others and/or have the opportunity to rest before driving. 3. Practicing defensive driving. 4. Obeying posted speed limits.	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:** Ross M. Dunlap

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, Middle Point	Begin:	Date-Variable 06:00 (Start Time May be Variable)	12/15/08
	End:	Date-Variable 18:00 (Start Time May be Variable)	

Control Options	D. Control Areas				
	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.	- Know and maintain safety controls.

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.

Communicate Extreme Fire Behavior controls to supervisors and crew.		- Only qualified crew will participate in the burn.	- NWCG, S-130 Basic Fire Fighter Training. - 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 Power Line Hazard controls to supervisors and crew.		- Only qualified crew will participate in the burn.	- NWCG, S-215 Fire Operations in the Wildland Urban Interface. - 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 Environmental/Environment Hazards controls to supervisors and crew.	-Provide/stage first aid kits.		- 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.

APPENDIX E: TECHNICAL REVIEWER CHECKLIST

PRESCRIBED FIRE PLAN ELEMENTS:	S/U	COMMENTS
1. Signature Page	S	All elements after initial review and edits meet and/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: [X] **Not Recommended for Approval:** [ ]

TECHNICAL REVIEW BY: _____ **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

PRESCRIBED FIRE PLAN

ADMINISTRATIVE UNIT: Long Point Wildlife Refuge

PRESCRIBED FIRE NAME: Nahommon's Neck Grassland

COMPLEXITY RATING: **MODERATE**

PREPARED BY: _____ **DATE:** 1/1/09

Printed Name: Ross M. Garlapow

Agency: Northeast Forest and Fire Management, LLC

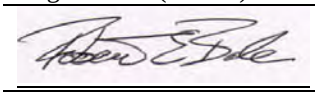
Qualification: Firefighter Type 1 (FFT1)

AMENDED BY: _____ **DATE:** 9/12/11

Printed Name: Alex Belote

Agency: The Nature Conservancy

Qualification: Engine Boss (ENGB)

TECHNICAL REVIEW BY:  **DATE:** 9/13/11

Printed Name: Robert E. Bale

Agency: The Nature Conservancy

Qualification: Prescribed Fire Burn Boss Type 2 (RxB2)

APPROVED BY: _____ **DATE:** _____

Printed Name: Kathy Abbott

Agency: The Trustees of Reservations

Title: Vice President of Field Operations

TABLE OF CONTENTS

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? *Example: amendments, seasonality*
		Will all compliance requirements be completed? *Example: cultural, threatened and endangered species, smoke management, NEPA*
		Is risk management in place and the residual risk acceptable? *Example: Prescribed Fire Complexity Rating Guide completed with rational and mitigation measures identified and documented*
		Will all elements of the Prescribed Fire Plan be met? *Example: Preparation work, mitigation, weather, organization, prescription, contingency resources*
		Will all internal and external notifications and media releases be completed? *Example: Preparedness level restrictions*
		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: _____ **DATE:** _____

Printed Name: Ross M. Garlapow

Agency: Northeast Forest and Fire Management, LLC

Qualification: Firefighter Type 1 (FFT1)

APPROVED BY: _____ **DATE:** _____

Printed Name: Kathy Abbott

Agency: The Trustees of Reservations

Title: Vice President of Field Operations

DATE APPOVAL EXPIRES: _____

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

	YES	NO
A. Has the burn unit experienced unusual drought conditions or contain above normal fuel loadings which were not considered in the prescription development? If **NO** proceed with checklist., if **YES** go to item B.		
B. If **YES** 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 **NO STOP**.		

YES	NO	QUESTIONS
		Are ALL fire prescription elements met?
		Are ALL smoke management specifications met?
		Has ALL required current and projected fire weather forecast been obtained and are they favorable?
		Are ALL planned operations personnel and equipment on-site, available, and operational?
		Has the availability of ALL contingency resources been checked, and are they available?
		Have ALL personnel been briefed on the project objectives, their assignment, safety hazards, escape routes, and safety zones?
		Have all the pre-burn considerations identified in the Prescribed Fire Plan been completed or addressed?
		Have ALL the required notifications been made?
		Are ALL permits and clearances obtained?
		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): Long Point Wildlife Refuge

PRESCRIBED FIRE NAME: Nahommon's Neck Grassland

COMPLEXITY RATING SUMMARY

	OVERALL RATING
RISK:	MODERATE
POTENTIAL CONSEQUENCES:	MODERATE
TECHNICAL DIFFICULTY:	MODERATE
SUMMARY COMPLEXITY RATING:	**MODERATE**

RATIONAL:

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:** _____

Printed Name: Ross M. Garlapow

Agency: Northeast Forest and Fire Management, LLC

Qualification: Firefighter Type 1 (FFT1)

APPROVED BY: _____ **DATE:** _____

Printed Name: Kathy Abbott

Agency: The Trustees of Reservations

Title: Vice President of Field Operations

ELEMENT 4: DESCRIPTION OF PRESCRIBED FIRE AREA

A. Physical Description:

1. Location:

Administrative Unit:	Long Point Wildlife Refuge
Ownership:	The Trustees of Reservations
Town:	West Tisbury
County:	Dukes
State:	Massachusetts
Prescribed Fire Name:	Long Point Wildlife Refuge: Nahommon's Neck Grassland Subunits: 1, 2, and 3
Lat/Long (NW Corner):	WGS 84 41.354722 N -70.638139 W
Elevation:	0' to 20'

2. Size:

Subunit	1	2	3	4	Total
Acres	14	25	25	22	86
Hectares	6	10	10	9	35

3. Topography:
   - Topography is flat.

4. Project Boundaries:
   - The north side of the unit is bound by a mowed break.
   - The west side of the unit is bound by a dirt road adjacent to Tisbury Great Pond and the pond itself on the southern portion of the west side.
   - The south side of the unit is bound by the Atlantic Ocean on the south side of Martha's Vineyard.
   - The east side of the unit is bound by Homer Pond on the south end of the unit and Hugh's Thumb Road (dirt surface) on the north.

B. Vegetation/Fuels Description:

1. On-site fuels data:

The unit is classified into 5 fuel models. Fuel models vary by the amount of canopy cover, herbaceous component, shrub component, and previous treatments.

Sandplain Grasslands – 32 acres (37%)
Grasslands were classified as 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.

Heath Shrublands –43 acres (50%)
Shrublands were classified as low load, humid climate timber-shrub (SH4). Although little to no overstory exists, the fire behavior modeled from the shrub component of this fuel model is consistent with existing shrub fuels on the burn unit. Litter and shrubs are the primary carriers of fire in this fuel. Shrubs in this fuel model are primarily huckleberry (*Gaylusaccia spp.*), *Rubus spp.*, bayberry (*Myrica spp.*), and scrub oak (*Quercus spp.*).

Mowed Shrubs – 5 acres (6%)
Mowed shrubs were classified as moderate load, humid climate timber-grass-shrub (TU3). Although little to no overstory exists, the fire behavior modeled from the carriers of this fuel model is consistent with existing fuels on the burn unit. Litter and woody debris from mowed shrubs are the primary carriers of fire in this fuel. Mowed shrubs in this fuel model are primarily huckleberry (*Gaylusaccia spp.*), *Rubus spp.*, bayberry (*Myrica spp.*), and scrub oak (*Quercus spp.*).

Oak Woodland – 4 acres (4%)
Oak woodlands were classified as low load, humid climate shrub (SH6). Oak litter from an overstory of white oak (*Quercus alba*) and understory shrubs (primarily huckleberry and blueberry) are the primary carriers of fire in this fuel model.

Pitch Pine– 2 acres (2%)
Pitch Pine (*Pinus rigida)* were classified as (Martha's Vineyard Custom Fuel Model for Pitch Pine, Untreated). Pine needles, leaf litter and understory shrubs are the primary carriers of fire in this fuel model. Torching of pitch pine trees can be expected under conditions allowable in the prescription.

2. Adjacent vegetation and fuels data:
   - East
     No burnable fuels to the east(Homer Pond and Long Cove Pond)
   - South
     No burnable fuels are to the south (Atlantic Ocean).
   - West
     Oak woodlands with huckleberry understory extend ~500 feet where they reach Middle Point Cove of Tisbury Great Pond. The southern portion of the unit is immediately adjacent to Tisbury Great Pond.
   - North
     Relatively continuous fuels extend north of the unit for ~1.25 miles first as a mowed shrubland (TU3) for ~300 yards, and then as a pine-oak woodland with a huckleberry and scrub oak understory (SH8). At ~1.25

miles the fuels are broken by Scrubby Neck Farm Rd (dirt surface) and then transition into a residential area where homes are in a matrix of oak woodland (SH6).

C. Description of Unique Features:

- The unit is bisected by several roads and trails, and a water feature (Homer Pond).

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.
   - Top kill greater than 50% of the shrub layer.
   - Reduce shrub fuel loading by 25 to 35%.
   - Provide training assignments for 1 to 2 fire fighters.

2. Prescribed Fire Objectives:
   - Complete each subunit within one operational period.
   - Have no escapes or injuries.
   - Complete operations with no significant damage to equipment.
   - Have no negative impact on on-site and off-site suppression resource availability for wildfires.
   - Keep smoke impacts to off site receptors below 2.5 ppm (Environmental Protection Agency standard for “Unhealthy for Sensitive Groups”) and avoid creating prolonged periods of nuisance smoke.

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. Environnemental Prescription:

Parameter	Max.	Min.
Wind Direction(s):	Any**	
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 (%):	None	None
Live Woody Fuel Moisture (%):	None	None
Air Temperature (F°)	35	90
Relative Humidity (%)	None	30
Days Since Rain:	7	1
KBDI:	299***	None
Transport Winds (mph): S → N wind:	None	10**
Mixing Height (ft): NE → SE wind:	None	1,500**
EPA PM2.5 and Ozone Index:	Good to Moderate**	

NOTE:

******If Wind Direction, Mixing Height, Transport Winds, and/or EPA PM2.5/Ozone Index are out of prescription but atmospheric stability based on upper air soundings and/or on site observations favor good lift and/or only a portion of the unit will be burned; the burn boss may still conduct the burn based on observed conditions.

*******If burning with a KBDI greater than 199 expect spot fires to burn deeply and be persistent (under pitch pines), mop-up to be difficult, a need to conduct mop-up over multiple days, and increase frequency of daily unit checks until significant precipitation. The addition of one engine to the minimum required for the burn unit should be considered.

******** Not all combinations of environmental elements fall within prescription. For fire behavior details see Appendix B – Fire Behavior output tables.

B. Fire Behavior Prescription:

Parameter	Grassland GR3 (103)	Shrubland (SH4) 144	Mowed Shrubs (TU3) 163	Oak Woodland (SH6) 146	Pitch Pine (Martha's Vineyard Custom Fuel Model for Pitch Pine Untreated)
Max. Head Fire ROS (ch/hr):	145	130	93	75	77
Min. Head Fire ROS (ch/hr):	2	3	2	2	5
Max. Head Fire FL (feet):	12	15	13	16	19
Min. Head Fire FL (Feet):	1	2	2	3	5
Max. Backing Fire ROS (ch/hr):	4	3	2	2	3
Min. Backing Fire ROS (ch/hr):	2	2	2	2	2
Max. Backing Fire FL (Feet):	2	3	2	3	5
Min. Backing Fire FL (Feet):	1	2	2	3	3

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 leas 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 West Tisbury, 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 – West Tisbury Fire Department (508) 693-9555
- Day of - Martha's Vineyard Airport Control Tower (508) 693-1170
- 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 Massachusetts Chapter 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:

☐	Burn Organization
☐	Burn Objectives
☐	Description of Burn Area
☐	Expected Weather & Fire Behavior
☐	Communications
☐	Ignition Plan
☐	Holding Plan
☐	Contingency Plan
☐	Wildfire Conversion plan
☐	Safety

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

NOTE: At the burn bosses discretion the checklist can be adjusted to 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. Based 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. Based on site conditions, resources, and crew experience the burn boss may adjust the needed equipment.

C. Supplies:

- 20 Gallons torch mix
- 5 Gallons 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	Transmit freq/tone	Receive freq/tone	Notes

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

Channel	Transmit freq/tone	Receive freq/tone	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):

Name and Title	Phone Number	Comments
West Tisbury Fire Department	Office: (508) 693-9555	Medical and Fire
West Tisbury Police Department	Office: (508) 693-0020	
Martha's Vineyard Emergency Communications Center	Office: (508) 693-1212	
DEP Southeastern MA	Office: (508) 946-2831 Fax: (508) 946-2865	
Long Point Wildlife Refuge	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 Lyme disease.
- Fence lines and gates.
- Fatigue, heat exhaustion, and dehydration on warm days.
- Holes and depressions in the unit.

B. Measures Taken to Reduce Hazards:

- Lyme disease prevention will be mentioned during the briefing and all crew will be reminded of deer ticks.
- Gates in critical locations near the unit will be unlocked on the burn day and gates and fences will be clearly identified to the crew. Supervisors will be reminded in the briefing to ensure that escape routes in around the fences should be maintained.
- Extra water and food will be made available to crew and 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 holes and tripping will be mentioned in the briefing.
- At a minimum of one fire resource will be First aid CPR certified.
- Supervisors will maintain accountability of staff and strict accountability will be maintained of crew who entire the unit (location and entry/exit).

C. Emergency Medical Procedures:

- Victim will be stabilized and only moved if directly under threat and threat cannot 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.
- Qualified individuals will provide immediate first aid until EMS personnel arrive and relieve the first responder.
- After the incident an accident report will be filled out and a copy provided to The Trustees of Reservations, the Burn Boss, and the individuals home unit.

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 [10 Miles – 25 Minutes drive time] 1 Hospital Rd, Vineyard Haven, MA – (508) 693-0410
- Brigham - Women's Hospital Burn Center [90 Miles – 2hrs 25 Minutes drive time via ferry 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 should be in representative fuels and should continue until the burn boss feels that an accurate representation 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 package.
- Test Fire Results:
  Upon completion of the test fire an announcement 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
- Hand-thrown flares
- Fussees
- Other as needed and directed by the Firing or Burn Boss

C. Techniques:

- Backing 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 downwind lines if not water.
- 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.
- Continue until the unit is completed.

E. Patterns:

- On the down wind lines establish black that is at least 10 feet wide or is based on weather and fire behavior conditions that will be sufficiently wide to stop a head fire in combination with the hard breaks. Ensure that intensities are sufficient enough near holding lines so as 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.
- Insure that interior ignition does not progress faster than blacking the down wind holding lines.
- Complete the unit by ringing the final portion.

F. Ignition Staffing:

- 1 Firefighter Type 2 (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 downwind holding line will be the base for the speed of 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 will be responsible for establishing black to improve the line.
- The up-wind holding line will only light on their line when it will not negatively impact the other holding team or the ignition team. Careful coordination with the ignition team should be executed whenever igniting.

B. Critical Holding Points and Actions:

- A down wind patrol for possible spot fires should be conducted.
- 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 or more Firefighter Type 2s per team
- Down wind line should have a minimum of 2backpack pumps and 1tool

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 asses and address the issue, identify source of injury, activate EMS, and shutdown burn if required.
Report of Critical Smoke Sensitive Area Being Impacted	Adjust ignition and monitor results; shutdown burn if required.
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 West Tisbury Fire Department, shutdown burn, and suppress escape.

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

Resources	Response Time
West Tisbury Fire Department (2 Brush Breakers & various other equipment)	10 Minutes
Edgartown Fire Department (1 Brush Breaker and various equipment)	15 Minutes
DCR District 1 (1 Type 6 Engine)	15 Minutes

ELEMENT 18: WILDFIRE CONVERSION PLAN

A. Wildfire Declared By:

If the criteria outlined below are met the Burn Boss will declare the prescribed burn a wildfire.

Fire outside the burn unit will be considered an escape fire under any one or 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 escape fire.

B. IC Assignments (Escape Fire):

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

C. Notifications (Escape Fire):

- West Tisbury Fire Department at (508) 693-9555
- Long Point Wildlife Refuge at (508) 693-3678
- 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 West Tisbury 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 Southeastern 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 West Tisbury Fire Department.

C. Smoke Sensitive Areas:

Smoke Sensitive Area	Distance (miles)	Direction
Island Montessori School	1.4	NW
Residential Area	2.2	NW
Residential Area	1.6	N
Edgartown-West Tisbury Rd	2	N
Martha's Vineyard Airport	2.3	NE

D. Impacted Areas:

Several homes to the northwest of the unit may be impacted (Moderate PM 2.5 ug/m^3)

E. Mitigation Strategies and Techniques to Reduce Potential for 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 protometer (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 should be taken. Fire weather should be taken 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 West Tisbury 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 should be dispatched with a map and cell phone (and/or radio) to check potential problem areas and keep the burn boss or fire effects monitor informed of conditions.

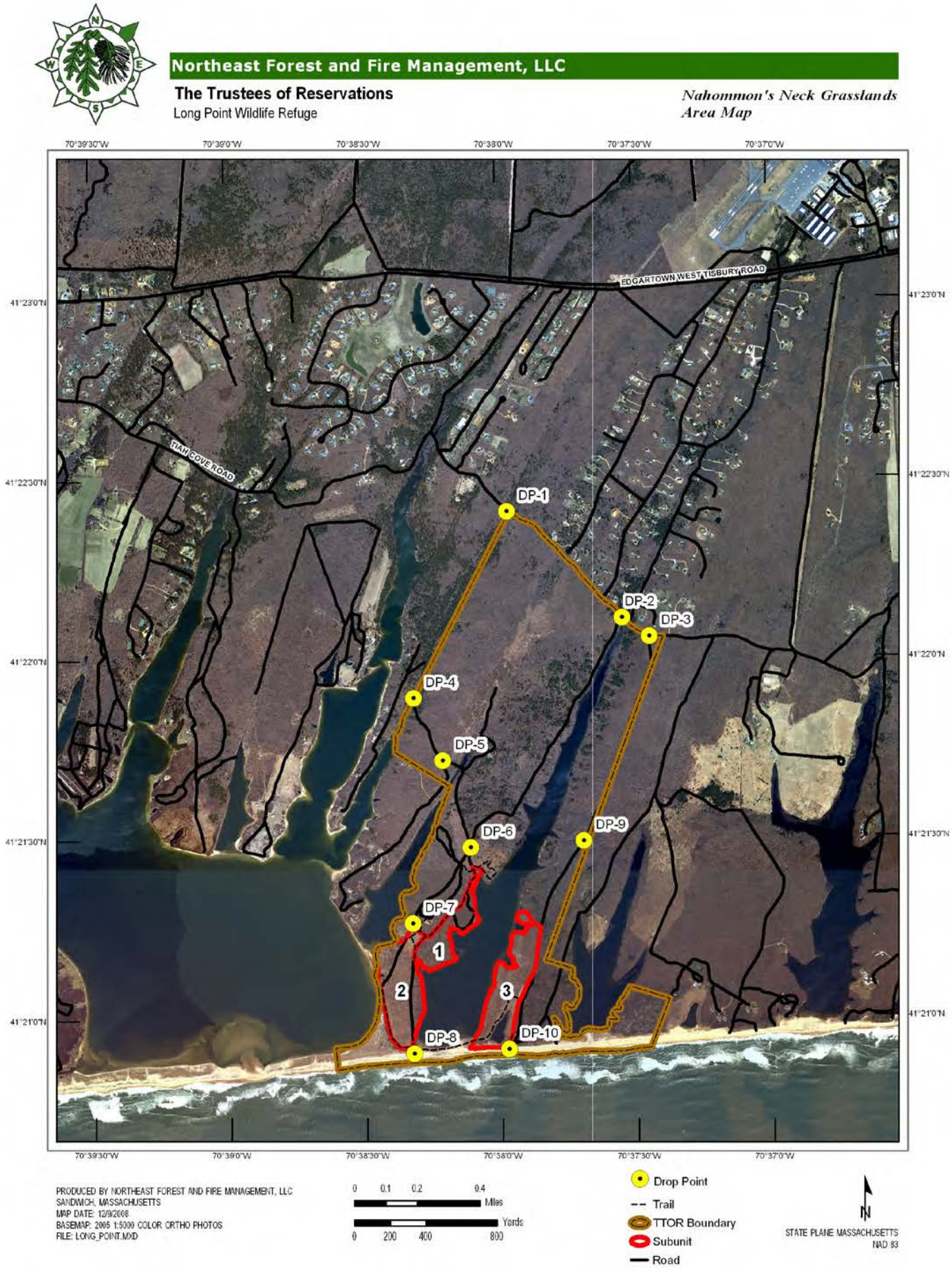
NOTE: All sub-elements to monitoring may be adjusted by the burn boss to meet given conditions. However, fire weather needs to be taken hourly at a minimum.

ELEMENT 21: POST-BURN ACTIVITIES

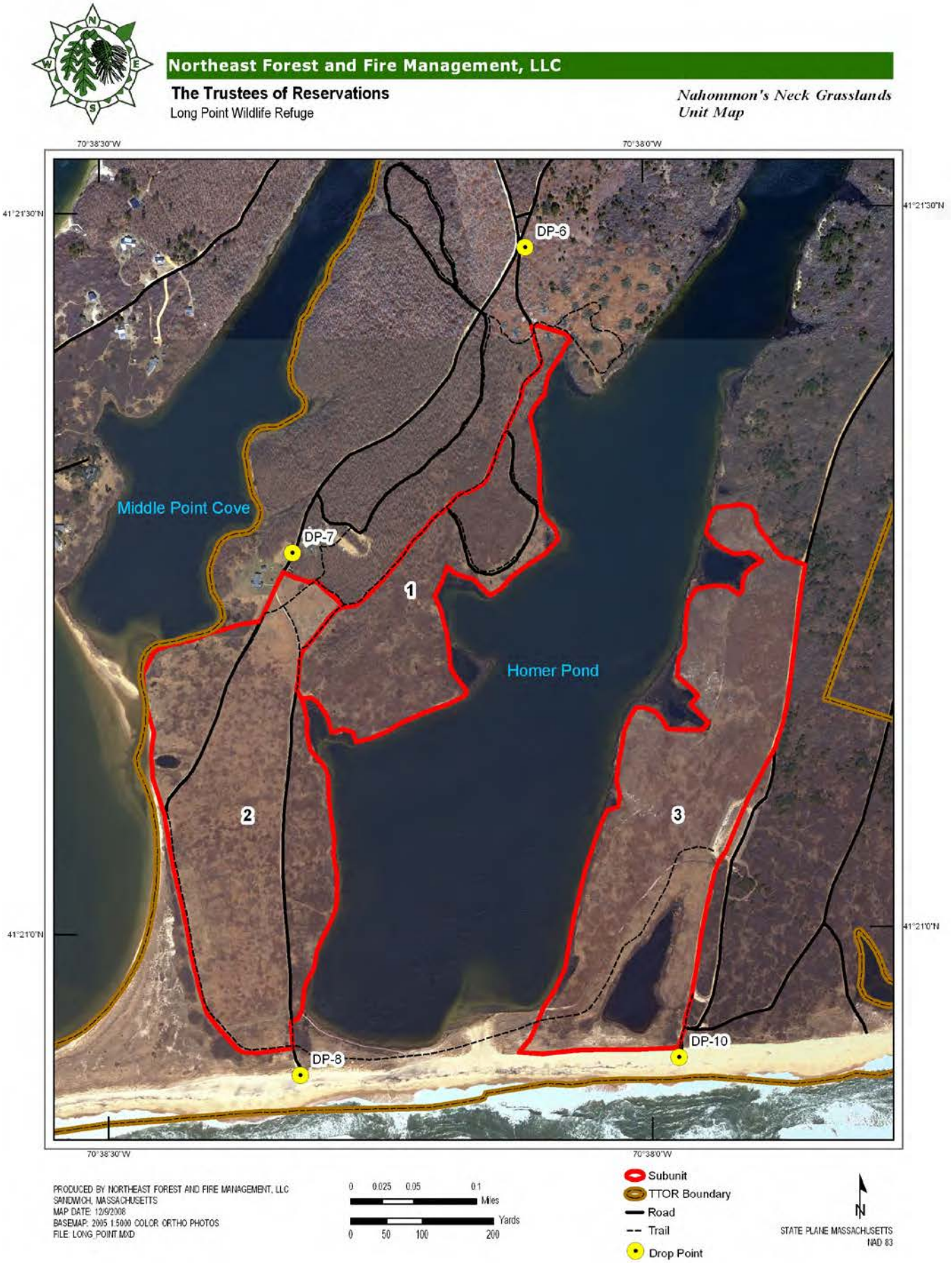
Post Burn Activities to be Completed:

- An After Actions Review should be conducted with the crew.
- The unit needs to be checked every day between 11:00 and 14:00 until a rain event and/or the burn boss declares the unit 100% out. If KBDI is greater than 199 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.

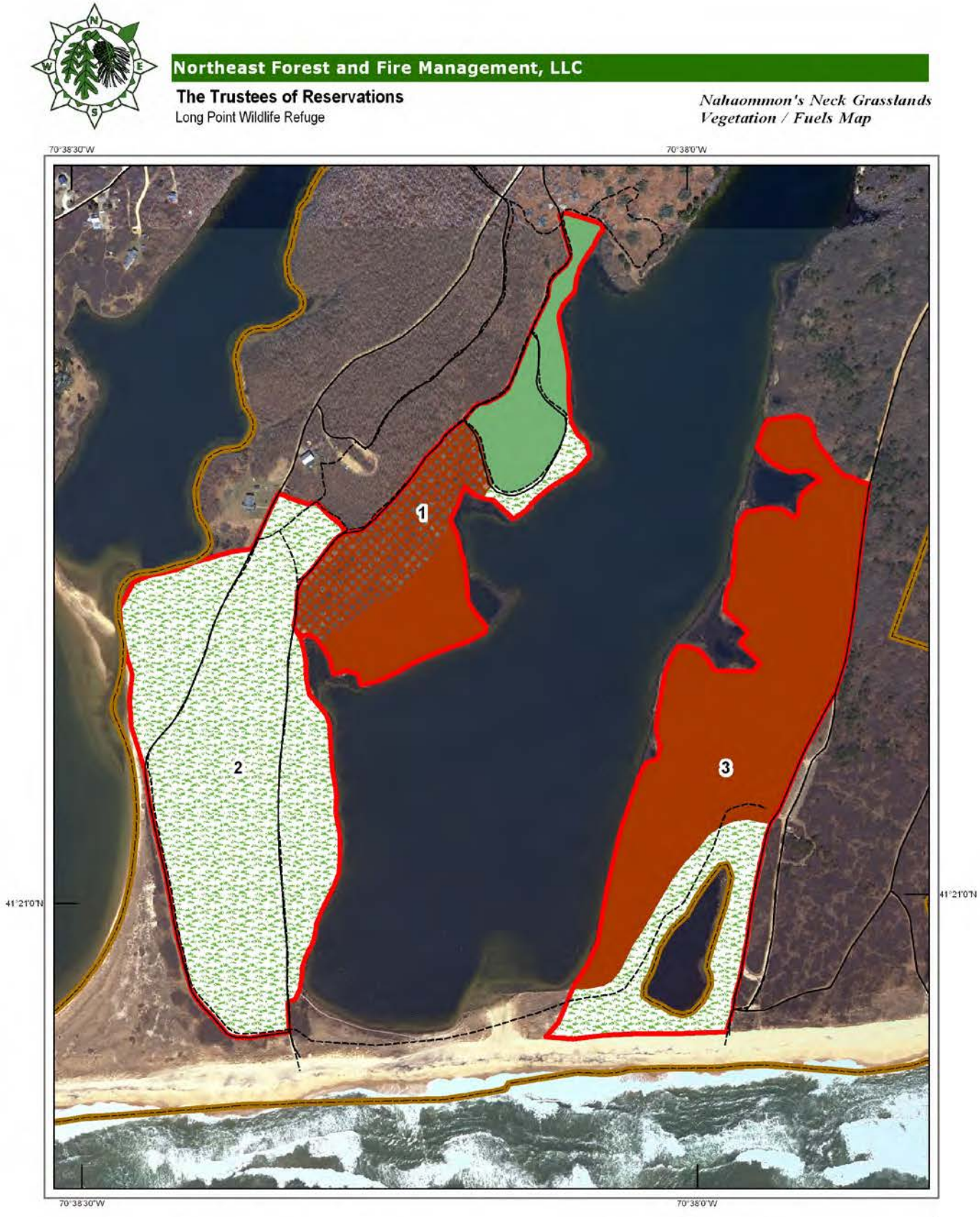
APPENDIX A-1: Area Map



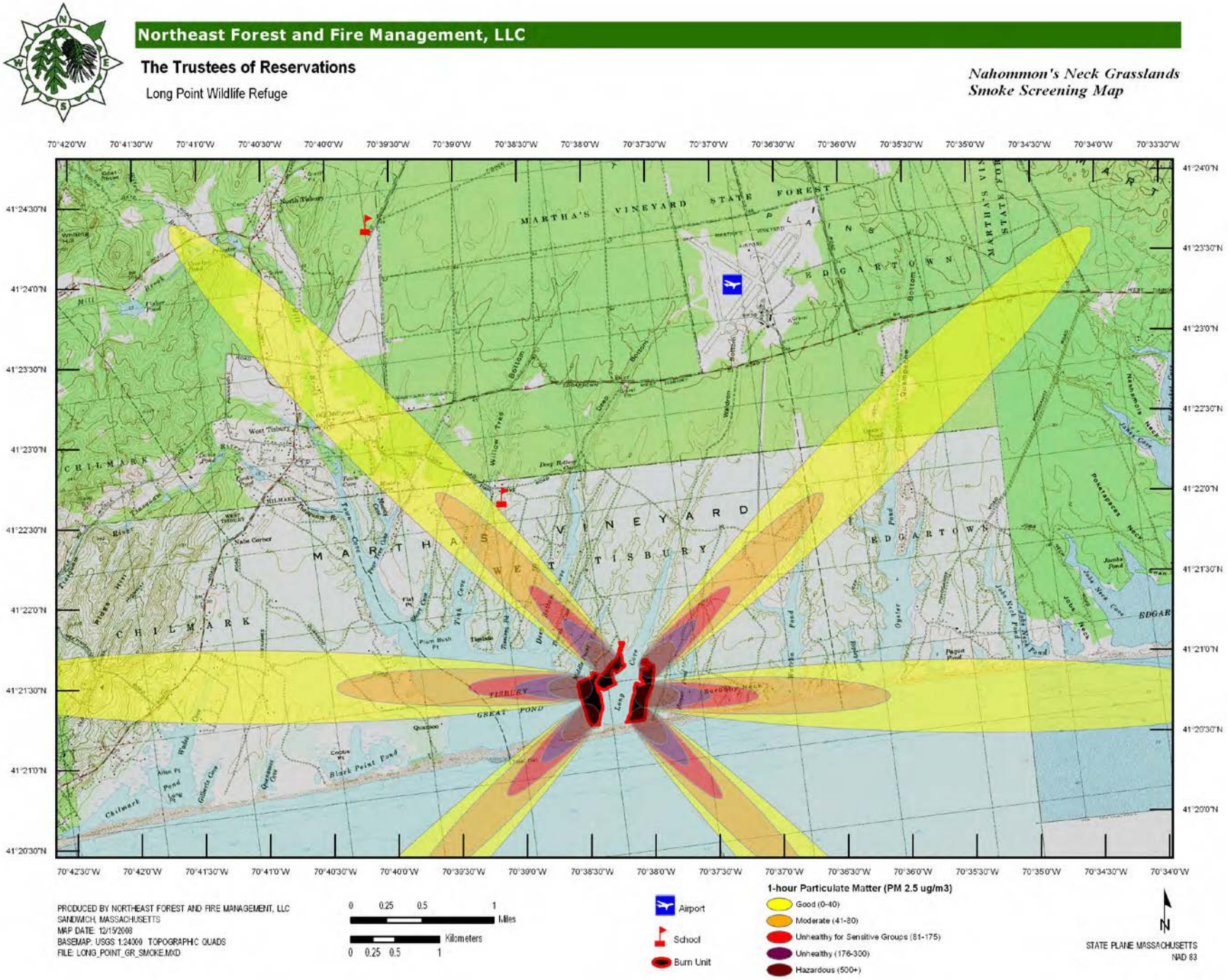
APPENDIX A-2: Unit Ortho Photo



APPENDIX A-3: Unit Vegetation / Fuels



APPENDIX A-4: Smoke Screening Map



APPENDIX B-1A: Fire Behavior Little Bluestem – Grass 3 [FBS FM 103] (Held Constant: 10H Fuels at 10%, 100H Fuels at 12%, 30% Live Fuel Moisture and 0% Slope) [Run in BEHAVEPLUS v. 3.0.2]

Surface Rate of Spread (ch/h) - Head Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	3	14	29	46	64	83	103	124	145	167	189	212	235
5	3	13	27	42	59	76	94	113	132	152	172	193	214
6	2	12	25	39	54	70	86	103	121	139	158	177	196
7	2	11	23	36	50	64	80	96	112	129	146	163	181
8	2	10	21	33	46	60	74	89	104	120	136	152	169
9	2	10	20	31	44	56	70	84	98	113	128	143	159
10	2	9	19	30	41	53	66	79	93	107	121	136	148
11	2	9	18	28	39	51	63	76	89	102	116	129	138
12	2	8	17	27	38	49	60	73	85	98	111	124	131
13	2	8	17	26	36	47	58	70	82	94	107	119	124
14	2	8	16	25	35	45	56	67	79	91	103	115	119

Flame Length (ft) - Head Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	4	6	7	8	9	10	11	12	12	13	14	15
5	2	4	5	6	7	8	9	10	11	12	12	13	14
6	2	4	5	6	7	8	9	9	10	11	12	12	13
7	2	3	5	6	7	7	8	9	10	10	11	11	12
8	2	3	4	5	6	7	8	9	9	10	10	11	11
9	1	3	4	5	6	7	8	8	9	9	10	10	11
10	1	3	4	5	6	7	7	8	9	9	10	10	11
11	1	3	4	5	6	6	7	8	8	9	9	10	10
12	1	3	4	5	6	6	7	7	8	9	9	10	10
13	1	3	4	5	5	6	7	7	8	8	9	9	10
14	1	3	4	5	5	6	7	7	8	8	9	9	9

Surface Rate of Spread (ch/h) - Backing Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	3	4	4	5	5	5	5	4	4	4	4	4	4
5	3	3	4	4	4	4	4	4	4	4	4	4	3
6	2	3	4	4	4	4	4	4	4	4	3	3	3
7	2	3	3	4	4	4	4	3	3	3	3	3	3
8	2	3	3	3	3	3	3	3	3	3	3	3	3
9	2	2	3	3	3	3	3	3	3	3	3	3	3
10	2	2	3	3	3	3	3	3	3	3	3	3	2
11	2	2	3	3	3	3	3	3	3	3	3	2	2
12	2	2	3	3	3	3	3	3	3	2	2	2	2
13	2	2	2	3	3	3	3	3	2	2	2	2	2
14	2	2	2	3	3	3	2	2	2	2	2	2	2

Flame Length (ft) - Backing Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	2	2	2	2	2	2	2	2	2	2	2	2
5	2	2	2	2	2	2	2	2	2	2	2	2	2
6	2	2	2	2	2	2	2	2	2	2	2	2	2
7	2	2	2	2	2	2	2	2	2	2	2	2	2
8	2	2	2	2	2	2	2	2	2	2	2	2	2
9	1	2	2	2	2	2	2	2	2	2	2	2	2
10	1	2	2	2	2	2	2	2	2	2	2	2	2
11	1	2	2	2	2	2	2	2	2	2	2	2	2
12	1	2	2	2	2	2	2	2	2	2	2	2	2
13	1	1	2	2	2	2	2	2	2	2	2	2	2
14	1	1	2	2	2	2	2	2	2	2	2	2	1

APPENDIX B-1B: Fire Behavior Mowed Shrubs – Timber-Understory 3 (TU3) [FBS FM 163] (Held Constant: 10H Fuels at 10%, 100H Fuels at 12%, 30% Live Fuel Moisture and 0% Slope) [Run in BEHAVEPLUS v. 3.0.2]

Surface Rate of Spread (ch/h) - Head Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	8	18	29	42	56	71	87	103	121	139	158	178
5	2	8	17	27	39	53	67	82	98	114	132	150	168
6	2	8	16	26	37	50	64	78	93	109	125	142	160
7	2	7	15	25	36	48	61	74	89	104	120	136	153
8	2	7	15	24	34	46	58	71	85	100	115	130	147
9	2	7	14	23	33	44	56	69	82	96	111	126	141
10	2	6	14	22	32	43	54	66	79	93	107	122	137
11	2	6	13	22	31	41	53	64	77	90	104	118	132
12	2	6	13	21	30	40	51	63	75	88	101	115	129
13	2	6	12	20	29	39	50	61	73	85	98	111	125
14	2	6	12	20	29	38	48	59	71	83	96	109	122

Flame Length (ft) - Head Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	4	6	8	9	11	12	13	14	15	17	18	19
5	2	4	6	7	9	10	11	13	14	15	16	17	18
6	2	4	6	7	9	10	11	12	13	14	15	16	17
7	2	4	5	7	8	10	11	12	13	14	15	16	17
8	2	4	5	7	8	9	10	11	12	13	14	15	16
9	2	4	5	7	8	9	10	11	12	13	14	15	16
10	2	3	5	6	8	9	10	11	12	13	14	14	15
11	2	3	5	6	7	9	10	11	12	12	13	14	15
12	2	3	5	6	7	8	9	10	11	12	13	14	15
13	2	3	5	6	7	8	9	10	11	12	13	14	14
14	2	3	5	6	7	8	9	10	11	12	13	13	14

Surface Rate of Spread (ch/h) - Backing Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	2	2	2	3	3	3	3	3	3	3	2	2
5	2	2	2	2	2	2	2	2	2	2	2	2	2
6	2	2	2	2	2	2	2	2	2	2	2	2	2
7	2	1	2	2	2	2	2	2	2	2	2	2	2
8	2	1	2	2	2	2	2	2	2	2	2	2	2
9	2	1	2	2	2	2	2	2	2	2	2	2	2
10	2	1	2	2	2	2	2	2	2	2	2	2	2
11	2	1	2	2	2	2	2	2	2	2	2	2	2
12	2	1	2	2	2	2	2	2	2	2	2	2	2
13	2	1	1	2	2	2	2	2	2	2	2	2	2
14	2	1	1	2	2	2	2	2	2	2	2	2	2

Flame Length (ft) - Backing Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	2	2	2	2	2	2	2	2	2	2	2	2
5	2	2	2	2	2	2	2	2	2	2	2	2	2
6	2	2	2	2	2	2	2	2	2	2	2	2	2
7	2	2	2	2	2	2	2	2	2	2	2	2	2
8	2	2	2	2	2	2	2	2	2	2	2	2	2
9	2	2	2	2	2	2	2	2	2	2	2	2	2
10	2	2	2	2	2	2	2	2	2	2	2	2	2
11	2	2	2	2	2	2	2	2	2	2	2	2	2
12	2	2	2	2	2	2	2	2	2	2	2	2	2
13	2	2	2	2	2	2	2	2	2	2	2	2	2
14	2	2	2	2	2	2	2	2	2	2	2	2	2

APPENDIX B-1C: Fire Behavior Heath Shrubland – Shrub 4 (SH4) [FBS FM 144] (Held Constant: 10H Fuels at 10%, 100H Fuels at 12%, 30% Live Fuel Moisture and 0% Slope) [Run in BEHAVEPLUS v. 3.0.2]

Surface Rate of Spread (ch/h) - Head Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	3	11	23	38	55	73	94	115	138	162	187	213	240
5	3	10	22	37	53	71	91	112	134	157	182	207	234
6	3	10	22	36	52	69	89	109	130	152	177	202	228
7	3	10	21	35	51	68	87	106	127	150	173	197	222
8	3	10	21	34	49	68	85	104	124	146	169	193	217
9	3	10	20	33	48	65	83	102	122	143	165	189	213
10	3	9	20	33	47	64	81	100	119	140	162	185	208
11	3	9	19	32	47	63	80	98	117	138	159	182	205
12	3	9	19	32	46	62	79	96	115	136	157	179	201
13	3	9	19	31	45	61	77	95	114	134	154	176	198
14	3	9	19	31	45	60	76	93	112	132	152	173	196

Flame Length (ft) - Head Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	4	6	8	10	11	13	14	15	17	18	19	20
5	2	4	6	8	10	11	12	14	15	16	17	18	19
6	2	4	6	8	9	11	12	13	15	16	17	18	19
7	2	4	6	8	9	11	12	13	14	15	17	18	19
8	2	4	6	8	9	10	12	13	14	15	16	17	18
9	2	4	6	7	9	10	11	13	14	15	16	17	18
10	2	4	6	7	9	10	11	13	14	15	16	17	18
11	2	4	6	7	9	10	11	12	13	15	16	17	17
12	2	4	6	7	9	10	11	12	13	14	15	16	17
13	2	4	5	7	8	10	11	12	13	14	15	16	17
14	2	4	5	7	8	10	11	12	13	14	15	16	17

Surface Rate of Spread (ch/h) - Backing Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	3	2	3	3	3	4	4	4	4	4	3	3	3
5	3	2	3	3	3	3	4	4	4	3	3	3	3
6	3	2	3	3	3	3	3	3	3	3	3	3	3
7	3	2	3	3	3	3	3	3	3	3	3	3	3
8	3	2	3	3	3	3	3	3	3	3	3	3	3
9	2	2	2	3	3	3	3	3	3	3	3	3	3
10	2	2	2	3	3	3	3	3	3	3	3	3	3
11	2	2	2	3	3	3	3	3	3	3	3	3	3
12	2	2	2	3	3	3	3	3	3	3	3	3	3
13	2	2	2	3	3	3	3	3	3	3	3	3	3
14	2	2	2	3	3	3	3	3	3	3	3	3	3

Flame Length (ft) - Backing Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	2	2	3	3	3	3	3	3	3	3	3	3
5	2	2	2	2	3	3	3	3	3	3	3	3	3
6	2	2	2	2	2	3	3	3	3	3	3	2	2
7	2	2	2	2	2	2	2	2	2	2	2	2	2
8	2	2	2	2	2	2	2	2	2	2	2	2	2
9	2	2	2	2	2	2	2	2	2	2	2	2	2
10	2	2	2	2	2	2	2	2	2	2	2	2	2
11	2	2	2	2	2	2	2	2	2	2	2	2	2
12	2	2	2	2	2	2	2	2	2	2	2	2	2
13	2	2	2	2	2	2	2	2	2	2	2	2	2
14	2	2	2	2	2	2	2	2	2	2	2	2	2

APPENDIX B-1D: Fire Behavior Oak Woodland – Shrub 6 (SH6) [FBS FM 146] (Held Constant: 10H Fuels at 10%, 100H Fuels at 12%, 30% Live Fuel Moisture and 0% Slope) [Run in BEHAVEPLUS v. 3.0.2]

Surface Rate of Spread (ch/h) - Head Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	10	19	29	39	49	60	71	82	93	104	116	128
5	2	10	18	27	37	47	57	67	78	89	100	111	122
6	2	9	17	26	35	45	55	65	75	85	96	106	117
7	2	9	17	25	34	43	53	62	72	82	92	103	113
8	2	9	16	24	33	42	51	60	70	79	89	99	109
9	2	8	16	24	32	41	50	59	68	77	87	96	106
10	2	8	15	23	31	40	48	57	66	75	84	94	103
11	2	8	15	23	31	39	47	56	65	73	83	92	101
12	2	8	15	22	30	38	46	55	63	72	81	90	99
13	2	8	14	22	29	37	45	54	62	71	79	88	97
14	2	7	14	21	29	37	44	53	61	69	78	87	95

Flame Length (ft) - Head Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	3	7	9	11	12	14	15	16	17	18	19	20	21
5	3	6	9	10	12	13	14	16	17	18	19	20	21
6	3	6	8	10	11	13	14	15	16	17	18	19	20
7	3	6	8	10	11	12	14	15	16	17	18	18	19
8	3	6	8	9	11	12	13	14	15	16	17	18	19
9	3	6	8	9	11	12	13	14	15	16	17	18	18
10	3	6	8	9	10	12	13	14	15	16	16	17	18
11	3	6	7	9	10	11	13	14	14	15	16	17	18
12	3	5	7	9	10	11	12	13	14	15	16	17	18
13	3	5	7	9	10	11	12	13	14	15	16	17	17
14	3	5	7	9	10	11	12	13	14	15	16	16	17

Surface Rate of Spread (ch/h) - Backing Fire

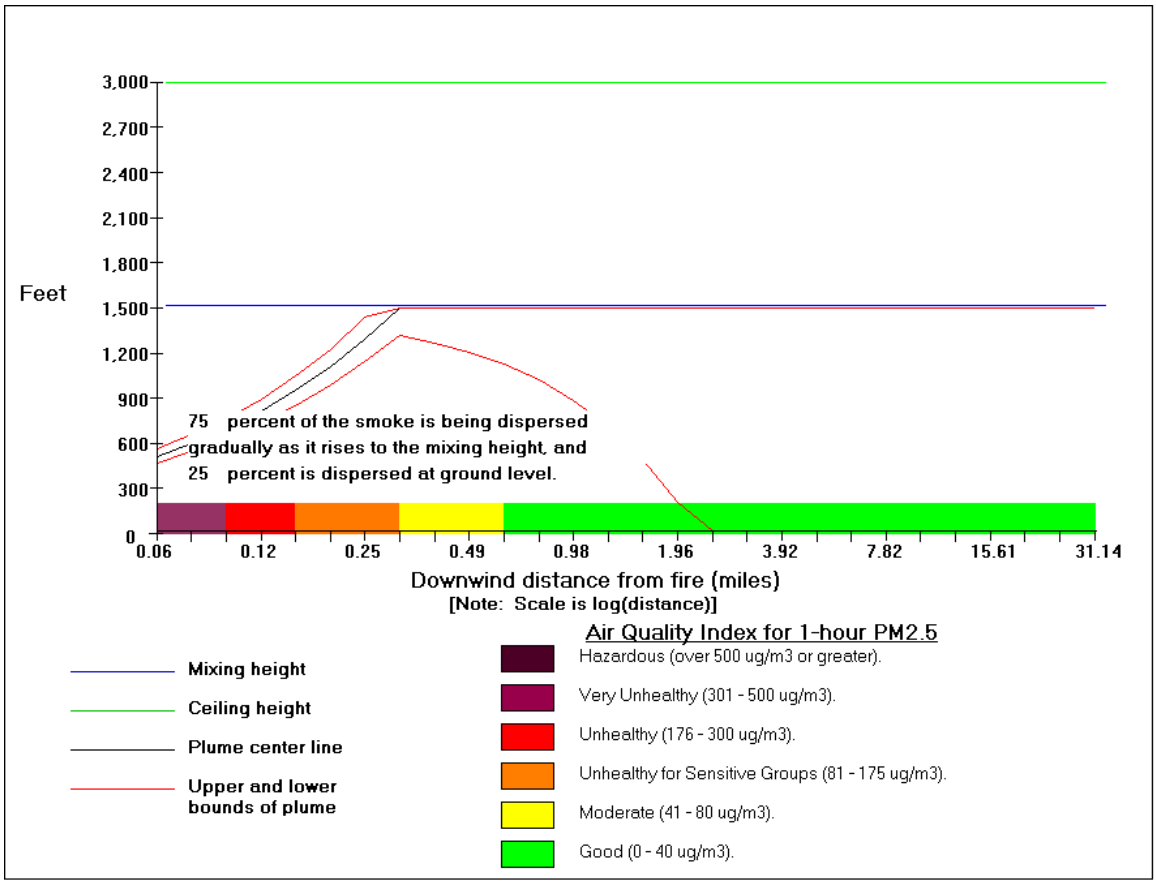
	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	2	3	3	3	3	3	3	3	2	2	2	2	2
5	2	2	3	3	3	3	3	2	2	2	2	2	2
6	2	2	3	3	3	3	2	2	2	2	2	2	2
7	2	2	2	3	2	2	2	2	2	2	2	2	2
8	2	2	2	2	2	2	2	2	2	2	2	2	2
9	2	2	2	2	2	2	2	2	2	2	2	2	2
10	2	2	2	2	2	2	2	2	2	2	2	2	2
11	2	2	2	2	2	2	2	2	2	2	2	2	2
12	2	2	2	2	2	2	2	2	2	2	2	2	2
13	2	2	2	2	2	2	2	2	2	2	2	2	2
14	2	2	2	2	2	2	2	2	2	2	2	2	2

Flame Length (ft) - Backing Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	3	4	4	4	4	4	4	4	3	3	3	3	3
5	3	3	4	4	4	4	3	3	3	3	3	3	3
6	3	3	3	3	3	3	3	3	3	3	3	3	3
7	3	3	3	3	3	3	3	3	3	3	3	3	3
8	3	3	3	3	3	3	3	3	3	3	3	3	3
9	3	3	3	3	3	3	3	3	3	3	3	3	3
10	3	3	3	3	3	3	3	3	3	3	3	3	3
11	3	3	3	3	3	3	3	3	3	3	3	3	3
12	3	3	3	3	3	3	3	3	3	3	3	3	3
13	3	3	3	3	3	3	3	3	3	3	3	3	3
14	3	3	3	3	3	3	3	3	3	3	3	3	3

APPENDIX B-2: 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

Plume Height Graph



Stability, DI, and LVORI Table

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.

Concentration Table

APPENDIX B-2: 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

Distance from fire	PM2.5 (ug/m3)	CO (ppm)	Distance from fire	PM2.5 (ug/m3)	CO (ppm)
328 ft	884.30	13.98	2.47 mi	43.33	5.24
413 ft	761.31	12.70	3.11 mi	39.11	5.20
518 ft	654.58	11.59	3.92 mi	35.67	5.16
656 ft	564.03	10.65	4.94 mi	32.85	5.13
823 ft	483.05	9.81	6.21 mi	30.53	5.11
1037 ft	408.62	9.04	7.82 mi	28.64	5.09
0.25 mi	336.40	8.29	9.85 mi	27.09	5.07
0.31 mi	269.25	7.59	12.40 mi	25.82	5.06
0.39 mi	212.19	7.00	15.61 mi	24.79	5.05
0.49 mi	165.93	6.52	19.65 mi	23.94	5.04
0.62 mi	129.90	6.14	24.74 mi	23.25	5.03
0.78 mi	102.60	5.86	31.14 mi	22.68	5.03
0.98 mi	82.27	5.65	39.21 mi	22.21	5.02
1.24 mi	67.25	5.49	49.36 mi	21.83	5.02
1.56 mi	56.35	5.38	62.14 mi	21.51	5.02
1.96 mi	48.74	5.30			

Visibility Table

Distance from fire	Crossplume Visibility (miles)	Contrast Ratio (miles)	Distance from fire	Crossplume Visibility (miles)	Contrast Ratio (miles)
317 ft	17.22	0.46	2.47 mi	22.00	0.94
422 ft	18.01	0.52	3.11 mi	22.00	0.94
528 ft	18.70	0.57	3.92 mi	22.00	0.95
634 ft	19.28	0.61	4.94 mi	22.00	0.95
845 ft	19.78	0.65	6.21 mi	22.00	0.95
1056 ft	20.21	0.69	7.82 mi	22.00	0.96
0.25 mi	20.59	0.73	9.85 mi	22.00	0.96
0.31 mi	20.92	0.77	12.40 mi	22.00	0.96
0.39 mi	21.19	0.80	15.61 mi	22.00	0.96
0.49 mi	21.40	0.83	19.65 mi	22.00	0.96
0.62 mi	21.57	0.86	24.74 mi	22.00	0.96
0.78 mi	21.71	0.88	31.14 mi	22.00	0.96
0.98 mi	21.82	0.90	39.21 mi	22.01	0.96
1.24 mi	21.90	0.91	49.36 mi	22.01	0.97
1.56 mi	21.96	0.92	62.14 mi	22.03	0.97
1.96 mi	21.99	0.93			

APPENDIX B-2: 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

Plume Table

Distance from fire	Plume Height (feet)	Horizontal Dispersion Coefficient (feet)	Vertical Dispersion Coefficient (feet)	Distance from fire	Plume Height (feet)	Horizontal Dispersion Coefficient (feet)	Vertical Dispersion Coefficient (feet)
317 ft	1,160	76	49	2.47 mi	1,500	1,732	1,653
422 ft	1,352	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				

Nahommon's Neck Grassland VSMOKE Report
Prepared by: Ross M. Garlapow
Date: 12/12/2008

The smoke dispersion modeling analysis (using VSmoke and/or VSmoke-GIS) for this project was performed for 16.0 acres to be burned on 04/15/2009 at the time period of 1400 hours. This time period has daytime dispersion characteristics to disperse the pollutants from the fire. The location of the fire is at approximately 41.349 degrees latitude and -70.633 degrees longitude (1550541.89 meters east and 1974870.47 meters north using US Albers projection). The emission rate of PM2.5 (fine particles) this hour was 63.6 grams/second, and carbon monoxide was 789.4 grams/second. The heat release rate was 10946.9 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).

APPENDIX B-2: 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

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 0.49 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 1.24 miles are predicted to be code orange or worse. At distances less than 518 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 1037 feet 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

APPENDIX B-2: 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

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 (41, 81, 176, 301, and 501 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 slightly unstable and this is different than the calculated stability class in Vsmoke.

APPENDIX C: PRESCRIBED FIRE COMPLEXITY RATING

FINAL COMPEXITY ANALYSIS SUMMARY

ADMINSTRATIVE UNIT(S): Long Point Wildlife Refuge

PRESCRIBED FIRE NAME: Nahommon's Neck 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	HIGH	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	MODERATE	MODERATE	MODERATE
14. Smoke Management:	MODERATE	MODERATE	MODERATE
OVERALL RATINGS:	**MODERATE**	**MODERATE**	**MODERATE**

FINAL SUMMARY COMPLEXITY DETERMINATION:	**MODERATE**

RATIONALE:	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.

PRELIMINARY COMPEXITY ANALYSIS SUMMARY

ADMINSTRATIVE UNIT(S): Long Point Wildlife Refuge

PRESCRIBED FIRE NAME: Nahommon's Neck 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	HIGH	LOW
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	MODERATE	MODERATE	MODERATE
14. Smoke Management:	MODERATE	MODERATE	MODERATE
OVERALL RATINGS:	**MODERATE**	**MODERATE**	**MODERATE**

FINAL SUMMARY COMPLEXITY DETERMINATION:	**MODERATE**

RATIONALE:	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.

PRESCRIBED FIRE COMPLEXITY RATING SYSTEM WORKSHEET

ADMINISTRATIVE UNIT(S): Long Point Wildlife Refuge

PRESCRIBED FIRE NAME: Nahommon's Neck 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:	LOW	A residence and several other structures are approximately 100 yards west of the unit. Numerous residential structures in the West Tisbury community are to the north of the burn unit. However, due to light and/or non-burnable fuels surrounding these structures, and/or their distance from the unit, the risk of ignition is low.
	Final Rating:	LOW	No change.
POTENTIAL CONSEQUENCES	Preliminary Rating:	HIGH	Impact on the community of West Tisbury would result in severe consequences.
	Final Rating:	HIGH	No change.
TECHNICAL DIFFICULTY	Preliminary Rating:	LOW	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:	LOW	No change.
4. ON SITE VALUES		**RATING**	**RATIONALE**
RISK	Preliminary Rating:	LOW	Several wildlife habitat structures are within the unit on the perimeter. Light fuels will be easily pre-treated to minimize impact of fire.
	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 hade 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	Resource 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 resources 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:	MODERATE	Some area will need initial mechanical treatment before they can be burned. Most areas will need to be maintained on a regular basis using mechanical treatments between burn treatments.

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 dependant 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 his 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	Low potential for serious injury while conducting this burn.
	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**	Coordination among agencies will likely be needed to procure the required crew and equipment.
	Final Rating:	**HIGH**	No change.
POTENTIAL CONSEQUENCES	**Preliminary Rating:**	**HIGH**	Availability of other agency staff and equipment will affect the ability to accomplish the burn.
	Final Rating:	**HIGH**	No change.
TECHNICAL DIFFICULTY	**Preliminary Rating:**	**HIGH**	Coordination with at least one agency is expected to be necessary to complete the burn.
	Final Rating:	**HIGH**	No change.

13. PROJECT LOGISTICS		RATING	RATIONALE
RISK	Preliminary Rating:	MODERATE	Coordination of crew and equipment travel to Martha's Vineyard is essential for completion of burn operations.
	Final Rating:	MODERATE	No change.
POTENTIAL CONSEQUENCES	Preliminary Rating:	MODERATE	Failure to execute travel coordination of crew and equipment will affect the ability to conduct burn operations.
	Final Rating:	MODERATE	No change.
TECHNICAL DIFFICULTY	Preliminary Rating:	MODERATE	Agencies handle their own logistics, ferries readily available during non-summer months.
	Final Rating:	MODERATE	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	Project personnel will be subjected to smoke on the holding lines. Smoke is unlikely to trigger any regulatory issues. However public perception of smoke has low tolerance levels.
	Final Rating:	HIGH	Regulatory agency and public tolerance of any smoke impact is minimal.
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, Nahommon's Neck Grasslands	Begin:	Date-Variable 06:00 (Start Time May be Variable)	12/15/08
	End:	Date-Variable 18:00 (Start Time May be Variable)	

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.

BURN OPERATIONS	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)	Marginal (III)	**Medium**	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.
	Moderate Fire Behavior	Occasional (C)	Marginal (III)	**Medium**	1. Identify escape routes and safety zones. 2. Wear full wildland fire PPE, to include fire shelters.	**Low**	Communicate Extreme Fire Behavior controls to supervisors and crew.
	Power Line Hazard	Unlikely (E)	Critical (II)	**Low**	1. Avoid working under power lines. 2. Do not spray water on or near power lines. 3. Minimize heat, direct flame contact, and heavy smoke impacts on power lines.	**Low**	Communicate Power Line Hazard controls to supervisors and crew.
	Chain Saw Operation	Unlikely (E)	Critical (II)	**Low**	1. PPE should be worn (eye protection, ear protection, hard hat, chaps, boots, and appropriate clothing). 2. Only qualified saw operators will be authorized to operate chain saws. 3. Spotters will be provided for sawyers. 4. Make location of first aid kits known to supervisors and crew.	**Low**	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)	**Medium**	1. Identify First Aid CPR trained crew and first aid kit locations. 2. Brief crew on Lyme Disease prevention. 3. Brief crew on importance of proper hydration. 4. Brief crew on other Environmental/Environment Hazards based on potential exposure.	**Low**	Communicate Environmental/Environment Hazards 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.
	Ignition	Unlikely (E)	Critical (II)	**Low**	1. Wear appropriate PPE (gloves, eye protection, boots, and Nomex with sleeves down). 2. Use proper fuel mix.	**Low**	Communicate Ignition controls to supervisors and crew.
	Tool Use	Unlikely (E)	Marginal (III)	**Low**	1. Wear appropriate PPE (gloves, boots, clothing, and eye protection). 2. Proper spacing should be maintained. 3. Proper tool use and foot should be used.	**Low**	Communicate Tool Use controls to supervisors and crew.
	Pump Operation	Unlikely (E)	Marginal (III)	**Low**	1. When around an operating pump wear eye and ear protection. 2. While operating pressurized water or working around pressurized water operations wear eye protection and gloves.	**Low**	Communicate Pump Operation controls to supervisors and crew.
MOP-UP	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**	1. Identify First Aid CPR trained crew and first aid kit locations. 2. Brief crew on Lyme Disease prevention. 3. Brief crew on importance of proper hydration. 4. Brief crew on other Environmental/Environment Hazards based on potential exposure.	**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**	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.
	Chain Saw Operation	Unlikely (E)	Critical (II)	**Low**	1. PPE should be worn (eye protection, ear protection, hard hat, chaps, boots, and appropriate clothing). 2. Only qualified saw operators will be authorized to operate chain saws. 3. Spotters will be provided for sawyers. 4. Make location of first aid kits known to supervisors and crew.	**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**	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 Chain Saw controls to supervisors and crew.
	Tool Use	Seldom (D)	Marginal (III)	**Low**	1. Wear appropriate PPE (gloves, boots, clothing, and eye protection). 2. Proper spacing should be maintained. 3. Proper tool use and foot should be used.	**Low**	Communicate General Accident controls to supervisors and crew.
	Pump Operation	Unlikely (E)	Marginal (III)	**Low**	1. When around an operating pump wear eye and ear protection. 2. While operating pressurized water or working around pressurized water operations wear eye protection and gloves.	**Low**	Communicate Tool Use controls to supervisors and crew.
BURN BREAK DOWN	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)	Seldom (D)	Marginal (III)	**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.
TRAVEL TO HOME UNIT (OR RESIDENCE)	Motor Vehicle Accident (Other Vehicles, Hazardous Road Conditions, Poor Visibility, and Fatigue/Sleepiness)	Seldom (D)	Critical (II)	**Medium**	1. Drivers are hydrated. 2. Drivers are paired up with others and/or have the opportunity to rest before driving. 3. Practicing defensive driving. 4. Obeying posted speed limits.	**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, Nahommon's Neck Grasslands	**Begin:**	Date-Variable 06:00 (Start Time May be Variable)	12/15/08
	End:	Date-Variable 18:00 (Start Time May be Variable)	

	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.	- Know and maintain safety controls.

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.

Communicate Extreme Fire Behavior controls to supervisors and crew.		- Only qualified crew will participate in the burn.	- NWCG, S-130 Basic Fire Fighter Training. - 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 Power Line Hazard controls to supervisors and crew.		- Only qualified crew will participate in the burn.	- NWCG, S-215 Fire Operations in the Wildland Urban Interface. - 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 Environmental/Environment Hazards controls to supervisors and crew.	-Provide/stage first aid kits.		- 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.

APPENDIX E: TECHNICAL REVIEWER CHECKLIST

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

S = Satisfactory and U = Unsatisfactory

Recommended for Approval: ☐ **Not Recommended for Approval:** ☐

TECHNICAL REVIEW BY: _____ **DATE:** _____

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

APPENDIX F-A: Fire Behavior Pitch Pine – [Martha's Vineyard Custom Fuel Model For Mowed Scrub Oak] (Held Constant: 10H Fuels at 10%, 100H Fuels at 12%, 30% Live Fuel Moisture and 0% Slope) [Run in BEHAVEPLUS v. 3.0.2]

Surface Rate of Spread (ch/h) - Head Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	5	8	15	24	33	45	57	69	83	98	113	129	145
5	5	7	14	22	31	41	52	64	77	90	104	119	134
6	5	7	13	19	29	38	49	60	72	84	97	111	125
7	4	6	12	18	27	34	46	56	67	79	91	98	117
8	4	6	11	17	26	32	43	53	63	75	86	89	111
9	4	6	10	17	24	31	41	50	60	71	82	189	105
10	4	6	10	16	23	30	39	48	57	68	78	86	101
11	4	6	9	16	22	29	38	46	55	65	75	83	97
12	4	5	9	15	21	28	36	45	53	63	73	80	93
13	4	5	9	15	20	28	35	43	52	61	70	78	90
14	4	5	9	14	20	60	34	42	50	59	68	76	88

Flame Length (ft) - Head Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	5	7	9	12	14	16	18	20	21	23	25	26	28
5	5	7	9	11	13	15	17	19	20	22	23	25	26
6	5	7	9	11	13	14	16	18	19	21	22	24	25
7	5	6	8	10	12	14	15	17	18	20	21	22	24
8	4	6	8	10	12	13	15	16	18	19	20	22	23
9	4	6	8	10	11	13	14	15	17	18	20	21	22
10	4	6	8	9	11	12	14	15	17	17	19	20	21
11	4	6	7	9	11	12	14	15	16	17	19	20	21
12	4	6	7	9	10	12	13	16	16	17	18	19	20
13	4	5	7	9	10	12	13	14	15	17	18	19	20
14	4	5	7	9	10	11	13	14	15	16	18	19	20

Surface Rate of Spread (ch/h) - Backing Fire

	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	4	2	2	2	2	2	3	3	2	2	2	2	2
5	4	2	2	2	2	2	2	2	2	2	2	2	2
6	4	2	2	2	2	2	2	2	2	2	2	2	2
7	3	2	2	2	2	2	2	2	2	2	2	2	2
8	3	2	2	2	2	2	2	2	2	2	2	2	2
9	3	1	2	2	2	2	2	2	2	2	2	2	2
10	3	1	2	2	2	2	2	2	2	2	2	2	2
11	3	1	1	2	2	2	2	2	2	2	2	2	2
12	3	1	1	2	2	2	2	2	2	2	2	2	2
13	2	1	1	1	2	2	2	2	2	2	2	2	2
14	2	1	1	1	1	1	2	2	2	1	1	1	1

Flame Length (ft) - Backing Fire

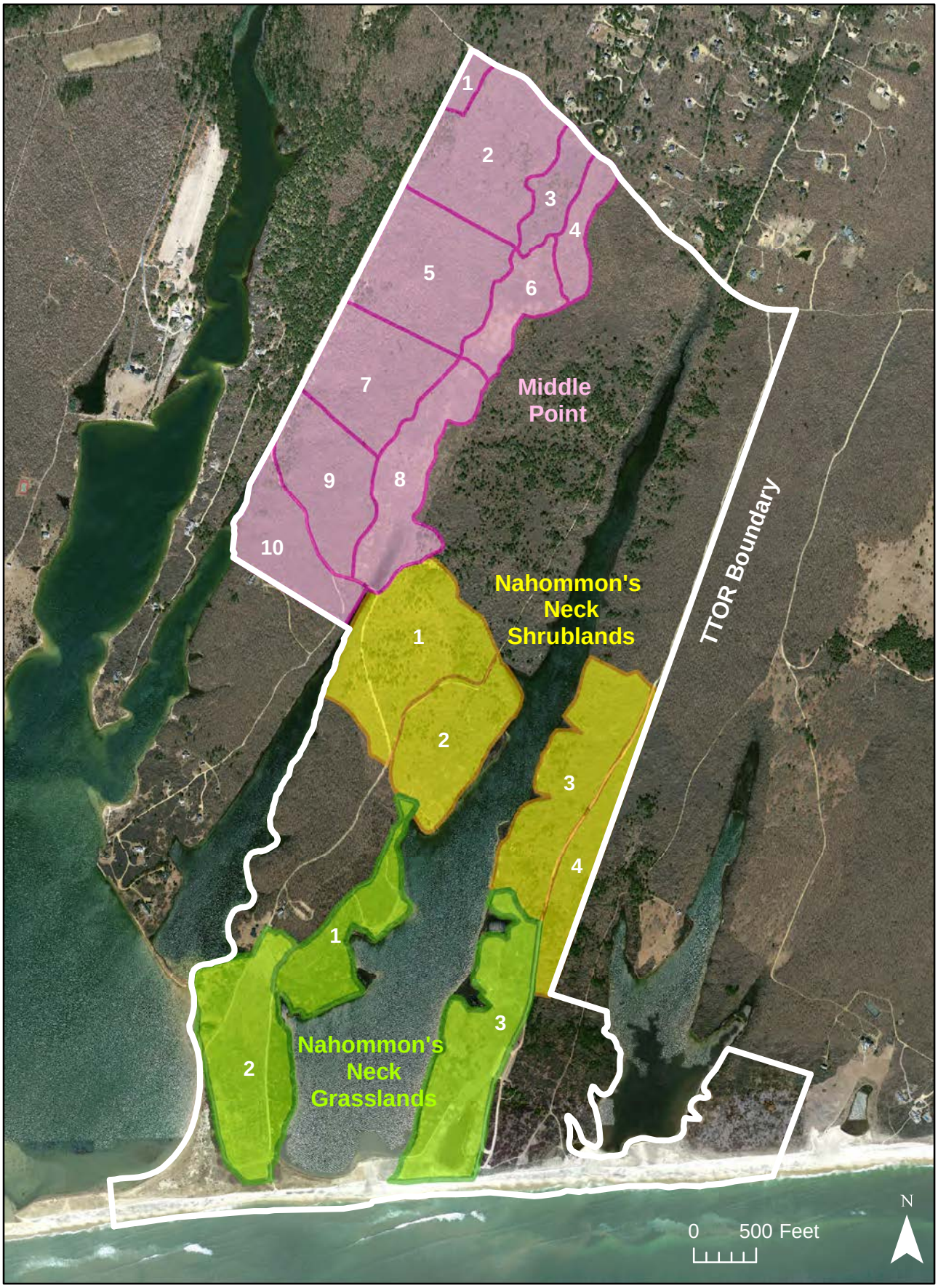
	Midflame Wind Speed (mph)												
1-H Moisture	0	1	2	3	4	5	6	7	8	9	10	3	12
4	4	4	4	4	4	4	4	4	4	4	4	4	4
5	4	4	4	4	4	4	4	4	4	4	4	4	4
6	4	4	4	4	4	4	4	4	4	4	4	4	4
7	4	3	3	4	4	4	4	4	4	4	4	4	3
8	3	3	3	3	3	3	4	4	4	3	3	3	3
9	3	3	3	3	3	3	3	3	3	3	3	3	3
10	3	3	3	3	3	3	3	3	3	3	3	3	3
11	3	3	3	3	3	3	3	3	3	3	3	3	3
12	3	3	3	3	3	3	3	3	3	3	3	3	3
13	3	3	3	3	3	3	3	3	3	3	3	3	3
14	3	3	3	3	3	3	3	3	3	3	3	3	3

Long Point Wildlife Preserve
West Tisbury, MA

Nahommons Neck Grassland Unit 4

The Nature Conservancy

Long Point Burn Units



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