Solicitation Information

May 2, 2016

Addendum #1

RFP # 7550522

TITLE: Consultant Forester to Prepare Community Wildfire Protection Plan

SUBMISSION DEADLINE: May 13, 2016 at 2:00 PM (ET)

ATTACHED ARE VENDOR QUESTIONS WITH STATE RESPONSES.

NO FURTHER QUESTIONS WILL BE ANSWERED.

Gail Walsh

Chief Buyer

Have the potential areas for the burn days been identified?

- **Yes, there are 15 burn units Identified for treatment at this time.**

Do the potential areas have a burn plan? If so what is it format (NWCG or other) and what is its complexity level?

- **These burn units do currently have a burn plan that contains all elements found in NWCG burn plan. The burn plan identifies this as a moderate complexity operations. The draft of the current burn plan will be made available, as well as a map of identified burn units.**

If the potential areas have not been identified and/or do not have a burn plan will the contractor be provided one or are they expected to prepare one?

- **The CWPP will identify future projects, this current project will not require additional burn plans**

If a burn plan is to be prepared by the contractor should the cost be included with the proposal for RFP #7550522 ?

- **No**

Specifically how many crew, at what qualification level and how much equipment of what type should the contractor plan for, for each burn day?

- **Burn plan identifies min resource needs and qualifications. Some available resources to supplement crew will be from the state if needed as well as Prudence Island Volunteer Fire Department. Best case scenario for state response would be 2 type 6 engines, 1 ICT 5 and 2 FFT2. Fire department resource availability may be limited to tanker and water supply apparatus.**

What does the outreach that the contractor may be expected to conduct consist of for the burns?

- **The outreach would be notifying local home owners of operations and potential smoke impact prior to operations as well as posting notifications (within the reserve, post office, Fire Department, and/or other location) of burn plans and potential dates, potential area closures to allow area users to plan accordingly.**

Is the draft submission deadline for the CWPP correct as listed as August 2016?

- **yes**

Is there flexibility in this draft submission and meeting deadline as long as adequate time is provided for stake holder review and comment on the CWPP?

- **Short extension on draft deadline would be possible as long as approved by project partners RI DEM, NBNERR, PIVFD**

Can the contractor provide an alternative timeline for the CWPP?

- **Contract may suggest an alternate timeline. This time line would have to be reviewed and approved by project partners.**

The RFP mentions a "First Fuel reduction to be complete Summer/Fall season 2016", that would be before the final CWPP is complete, is that correct?

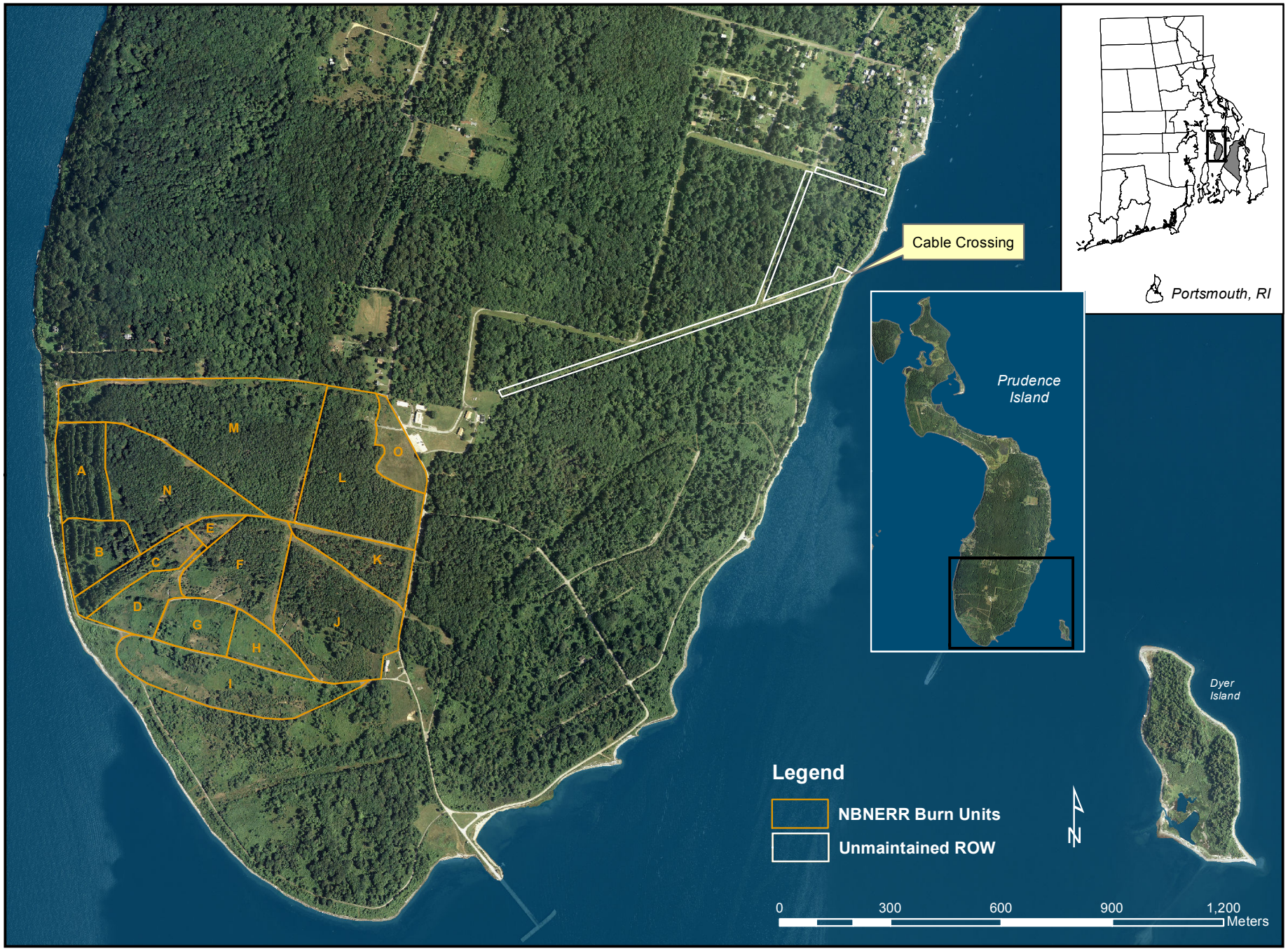
- **Correct, we can operate off a draft with approved components (ex. Fuel reduction priority component is finished though other components require more work). It is important to identify which burn units are priorities in the draft plan prior to conducting operations. Though other components may take more time than burn window allows.**

Additional is the "First Fuel reduction to be complete Summer/Fall season 2016", one of the prescribed burn days and if not what does it consist of and should the contractor provide rates?

- **Yes this would be one of the prescribed burn days**

Under "Compensation and Payment Terms" it is indicated that full payment will be made after the CWPP, two burns, and one prep is complete, does this mean that only one payment will be made at the end of this multiyear project or can payment be made after completion of each component?

- **The purchase will be set up as a blanket. So the contractor will submit an invoice upon completion of each project component which will be processed at that time.**


Cable Crossing
Portsmouth, RI
Prudence Island
Dyer Island
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
Legend
NBNERR Burn Units
Unmaintained ROW
N
0
300
600
900
1,200
Meters

PRESCRIBED FIRE PLAN

DRAFT

NARRAGANSETT BAY NATIONAL ESTUARINE RESEARCH RESERVE

Prudence Island

Narragansett Bay National
Estuarine Research Reserve
PO Box 151
Prudence Island, RI 02872
Phone: 401-683-6780
Fax: 401-683-7366

Produced by

Northeast
Forest and Fire Management LLC

ADMINISTRATIVE UNIT: *Narragansett Bay National Estuarine Research Reserve*

PRESCRIBED FIRE NAME: *Prudence Island*

COMPLEXITY RATING: ***MODERATE***

PREPARED BY: _____ **DATE:** _____

Printed Name: Ross M. Garlapow

Agency: Northeast Forest and Fire Management, LLC

Qualification: Fire and Forestry Specialist
Firefighter Type 1 (FFT1)

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

Printed Name: Joel R. Carlson

Agency: Northeast Forest and Fire Management, LLC

Qualification: Prescribed Fire Burn Boss Type 2 (RxB2)

APPROVED BY: _____ **DATE:** _____

Printed Name: Robin Weber

Agency: Narragansett Bay National Estuarine Research Reserve

Title: Natural Resources / GIS Specialist

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ELEMENT 2A

AGENCY ADMINISTRATOR GO/NO-GO PRE-IGNITION APPROVAL CHECKLIST

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 is implemented. The completion of the checklist expresses the Agency Administrator's intent to implement the Prescribed Fire Plan and evaluates compliance requirements, Prescribed Fire Plan elements, and notifications.

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:

RECCOMMENDED BY: _____ **DATE:** _____

Printed Name: Ross M. Garlapow

Agency: Northeast Forest and Fire Management, LLC

Qualification: Fire and Forestry Specialist
Firefighter Type 1 (FFT1)

APPROVED BY: _____ **DATE:** _____

Printed Name: Robin Weber

Agency: Narragansett Bay National Estuarine Research Reserve

Title: Natural Resources / GIS Specialist

DATE APPOVAL EXPIRES: _____

	YES	NO
A. Has the burn unit experienced unusual drought conditions or contain above normal fuel loadings that 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 forecasts 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: _____

ADMINISTRATIVE UNIT: *Narragansett Bay National Estuarine Research Reserve*

PRESCRIBED FIRE NAME: *Prudence Island*

COMPLEXITY RATING SUMMARY

RISK: *MODERATE*

POTENTIAL CONSEQUENCES: *MODERATE*

TECHNICAL DIFFICULTY: *MODERATE*

OVERALL COMPLEXITY: ***MODERATE***

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

PREPARED BY: _____ **DATE:** _____

Printed Name: Ross M. Garlapow

Agency: Northeast Forest and Fire Management, LLC

Qualification: Fire and Forestry Specialist
Firefighter Type 1 (FFT1)

APPROVED BY: _____ **DATE:** _____

Printed Name: Robin Weber

Agency: Narragansett Bay National Estuarine Research Reserve

Title: Natural Resources / GIS Specialist

ELEMENT 4 DESCRIPTION OF PRESCRIBED FIRE AREA

A. Physical Description

1. Location

Administrative Unit:	Narragansett Bay National Estuarine Research Reserve	
Ownership:	Rhode Island and NOAA	
Town:	Portsmouth	
County:	Newport	
State:	Rhode Island	
Prescribed Fire Name:	Prudence Island	
Lat/Long DMS:	41° 35' 22.3" N	71° 19' 50.2" W
Decimal Degrees	41.5894	-71.3308
Elevation:	0' to 105'	

2. Size

SUBUNIT	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	TOTAL
ACRES	6.2	6.6	6.0	7.2	2.4	13.7	6.5	5.4	17.6	22.7	8.3	21.9	37.9	22.0	5.7	190.1
HECTARES	2.5	2.7	2.4	2.9	1.0	5.5	2.6	2.2	7.1	9.2	3.4	8.9	15.3	8.9	2.3	76.9

3. Topography
The site is generally flat, with a gentle downslope grade running from the east side of the unit, down to the ocean on the west side. The elevation ranges between zero and 105 feet.

4. Project Boundaries
The Prudence Island Prescribed Burn Unit is bound on all sides by dirt and/or paved roads. The Narragansett Bay National Estuarine Research Reserve office is located immediately adjacent to the unit at the northeast corner. The east side of the unit is bound by South Prudence Bay Island Parkway from the NBNERR office down to the intersection with West Bunker Road. West Bunker Road forms most of the southern boundary along with Hope View Road at the west end. Hope View Road turns north at the shore and forms the west boundary. The intersection of Hope View and Cram Roads is at the northwest corner of the unit. Cram Road runs east from here to the NBNERR office to form the northern boundary. Within the unit are roads and trails that form subunit boundaries/breaks, and are in various states of regrowth. Vegetation should be cut back along these subunit breaks if the width is not already approximately 3 times the maximum predicted flame length those particular fuels will produce from a backing fire (see element 7-B).

B. Vegetation / Fuels Description

Fire behavior is predicted by applying environmental conditions to standard fuel models. Standard fuel models are based on fuel loadings associated with vegetation types and were assigned to pre-existing vegetation cover data. Full documentation on standard fuel models can be found in:

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.

1. On-site Fuels
The Prudence Island Prescribed Burn Unit has fuels that cover a broad spectrum of successional stages associated with pine barrens habitats that include grassland, shrubland, and forested areas. NBNERR personnel classified vegetation as 14 habitat/vegetation types based on plant species and age structure. Six different standard fire behavior fuel models were assigned to these habitat types.

- Timber Litter 6 – Moderate Load Broadleaf Litter – *93 acres (48%)*
  This fuel model was used to describe the Oak-Pine Forest habitat. This fuel model is the most prevalent on the unit, covering 93 of the 190 acres. White oak (*Quercus alba*), black oak (*Q. velutina*), and pitch pine (*Pinus rigida*) are the prevalent overstory species while typical understory species include high-bush blueberry and greenbrier.

- Grass-Shrub 3 – Moderate Load, Humid Climate Grass-Shrub – *26 acres (14%)*
  The primary carrier of fire in this fuel model is grass and shrubs combined. This is a dynamic fuel model where the spread rate and intensity is dependant on the relative amount of grass and shrub load. This fuel model was used to describe habitats without well-developed overstories. These include areas of saplings, natural shrublands that have a grass component, and areas that are maintained as shrublands through mechanical treatments. The dominant shrub and sapling species include blueberry, bayberry, cherry, and pitch pine, while the grass species are primarily composed of switch grass and little bluestem.

- Timber Litter 4 – Small Downed Logs – *25 acres (13%)*
  The primary carrier of fire in TL4 is a moderate load of fine litter and coarse fuels, including small diameter downed logs. The spread rate and flame length is low. This fuel model is assigned to areas that were previously a European larch (*Larix* deciduas) plantation. As this plan is being written, the larch is being clearcut. The logging contract specifies that wood > 11" diameter will be removed from the site, wood < 11" but > 8" will be chipped, and wood < 8" will be piled on site either as individual piles or windrows. It's unclear if the chips will be broadcast throughout the site or consolidated into piles. The primary understory species within the larch stand is greenbrier. The downed material from the logging operation should be left to cure for at least a year before it is burned in order to reach fuel moisture levels that will allow for some consumption of the 1-3" diameter fuels. This fuel model represents the most extreme case likely to occur. Fuel loads and fire behavior associated with this fuel model will most likely be lower, and it is possible that this area will not burn if wood chips are broadcast throughout due to their compactness. However, the plan will still be adequate for implementation unless there is a significant deviation from this model where fire intensity and rate of spread will be significantly higher.

- Shrub 6 – Low Load, Humid Climate Shrub – *18 acres (9%)*
  The primary carrier of fire in this model is woody shrubs and shrub litter. This fuel model is comprised of dense shrubs with little to no herbaceous vegetation. This model was used to describe fire behavior in greenbrier and coastal shrubland habitats. These habitats are dense shrublands primary composed from greenbrier, bayberry, beach rose, high tide bush, and poison ivy.

- Grass 5 – Low Load, Humid Climate Grass – *16.5 acres (9%)*
  The primary carrier of fire in this fuel model is grass with an average fuelbed depth of 1 to 2 feet. The fuel moisture content of this fuel model changes rapidly with atmospheric conditions, along with the seasonal changes in fuel moisture content associated with the annual nature of grasses. This fuel model was assigned to habitats composed primarily from switch grass (*Panicum virgatum*) and little bluestem (*Schezachyrium scoparium*).

- Timber Litter 2 – Low Load Broadleaf Litter - *11.5 acres (6%)*
  This fuel model was used to describe the fuel loads of the red maple swamp habitat. The moisture associated with these areas makes much of the litter fuel unavailable to burn. Available fuels consist of litter from woody over and understory vegetation. Dominant species that comprise this habitat are red maple and high bush blueberry.

- Timber-Shrub 2 – Moderate Load, Humid Climate Timber-Shrub and Non-burnable 9 – *0.7 acres (<1%)*
  These two fuel models make up less than 1% of the prescribed burn unit. Timber-shrub 2 (TU2) is used to describe pitch pine forests. Primary carriers of fire in this fuel model are litter from pitch pines, and understory shrubs such as huckleberry and greenbrier. This fuel model is found on ½ acre of the unit in subunit I. The non-burnable 9 fuel model is assigned to areas that lack the amount and continuity of organic material to burn. These areas were classified as sand barren habitats.

2. Adjacent Fuels
   Fuels adjacent to the prescribed burn unit are very similar to what is found on the unit. There is a mixture of forest, shrubland, and grassland in upland and wetland areas. The majority of the fuel surrounding the prescribed burn unit is low and moderate load broad leaf litter from forested areas. Immediately west of the unit is a strip of coastal shrubs approximately 50 feet wide. Further west of this strip of shrubs is the beach and ocean. Light shrub and low load broadleaf litter fuels in the form of coastal shrubland and red maple swamp extend approximately 1500 feet to the south of the unit before they reach the ocean. Immediately to the east of the unit is mostly oak-pine forest (TL6) that extends out ~700 feet where it transitions to mostly red maple swamp for ~1500

where it reaches beach and ocean. Immediately to the north of the unit are several residential areas of home mixed in with oak-pine forests and red maple swamp.

C. Unique Features

This area of Prudence Island was once used as an installation for the US Navy. Consequently, there are some structures and debris scattered throughout the area, mostly on roads. There are approximately 11 bunkers that are built into the landscape within subunits D, F, G, H, I, and J. These bunkers are approximately 20 feet tall in the front. Because they are built into the landscape, it can be difficult to see where they are when approaching them from the sides or rear, which leads to a sheer drop in the front of the bunker. Fences exist on the tops of these bunkers, but caution should still be exercised when working in and around the above-mentioned subunits.

Organic debris from logging operations will be located thoughout subunits A, B, and C. Debris may include slash in the form of windrows or individual piles, and piles of wood chips.

ELEMENT 5 GOALS & OBJECTIVES

A. Goals

- Expose areas of mineral soil
- Promote regeneration of pitch pine
- Top-kill European larch regeneration
- Use prescribed burning to restore and maintain the pine barrens thereby providing habitat for a diverse assemblage of regionally declining plants and animals.
- Protect public and private property from catastrophic wildfire by using prescribed fire to reduce fuel loads.
- Use prescribed burns as training exercises in basic wildland fire behavior, fire suppression principles, and burning techniques.

B. Objectives

1. Resource Objectives
   - Reduce 1 Hour fuel loads throughout the unit by 20 to 50%.
   - Reduce 10 Hour fuels by 5 to 20%.
   - 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 sensitive smoke receptors.
   - Complete operations without preventable damage to equipment.
   - Create a reduced fuel area from which to extend future prescribed burns.

ELEMENT 6 FUNDING

A. Cost

The Rhode Island Department of Environmental Management and/or the Audubon Society of Rhode Island will provide the majority of funding to plan and implement the prescribed burn. Some or all of the resources used for the burn will be funded from the participating agencies budget centers.

B. Funding

Funding will come in part from an existing NRCS WHIP grant, with the balance paid out of NBNERR's federal options grant.

ELEMENT 7 PRESCRIPTION

Prescribed burn operations may continue at the discretion of the Burn Boss if an environmental or fire behavior parameter is outside of prescription limits, given that the observed fire behavior is still within control capabilities of the on-site resources. Adjustments to parameters, resources, and/or tactics must be documented in the burn plan. The changed parameter, resources, and/or tactics cannot result in an increase in the complexity level of the burn.

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 (%):	None	None
Live Woody Fuel Moisture (%):	None	None
Air Temperature (F°):	90	35
Relative Humidity (%):	None	30
Days Since Rain:	7	1
KBDI:	299 **	None
Transport Winds (mph):	None	8
Mixing Height (ft):	None	1,500
EPA PM2.5 and Ozone Index:	Good to Moderate	

** 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 engine is required when the KBDI is greater than 200 (see Element 11B).

B. Fire Behavior Prescription

Parameter	TL6	GS3	TL4	SH6	GR5	TL2	TU2
Max. Head ROS (ch/hr):	11	138	4	75	158	2	29
Min. Head ROS (ch/hr):	1	3	1	2	3	1	1
Max. Head FL (feet):	3	17	1	16	17	1	5
Min. Head FL (feet):	1	3	1	3	3	1	1
Max. Backing ROS (ch/hr):	1	4	1	2	4	1	1
Min. Backing ROS (ch/hr):	1	3	1	2	3	1	1
Max. Backing FL (feet):	1	3	1	3	3	1	1
Min. Backing FL (feet):	1	2	1	2	2	1	1

ELEMENT 8 SCHEDULING

A. Ignition Time Frame/Season(s)

Burns during growing and dormant seasons are expected to achieve burn objectives. The slash from the logged areas should be left to cure for at least a year before it is burned to get the maximum amount of consumption.

B. Projected Project Duration

Subunits should be burned one at a time, several may be burned in one day. Duration for one or more subunits in a day should be 8 hours from arrival time to departure. Briefing and setup should be approximately 2 hours, ignition and holding will be approximately 4 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:

There are currently no regulatory constraints on when a prescribed burn can occur. At the request of NBNERR staff, it is preferred that burns do not take place during previously scheduled overnight activities (i.e. summer camp) or the paraplegic hunting season. Coordinate with NBNERR when in a burn window to avoid these activities.

ELEMENT 9 *PRE-BURN CONSIDERATIONS*

A. Considerations

1. On Site
   - Fire breaks should be checked prior to the burn day (to be coordinated by NBNERR)
   - Burn signs should be posted for public awareness of operations (to be coordinated by NBNERR)
   - Confirmation by NBNERR that all water sources and Prudence Island equipment is accessible and operational.

2. Off Site
   - Prescribed burn equipment should be checked and prepared.
   - Coordination with participating agencies to arrange logistics concerning crew and equipment
   - Contact Portsmouth and Prudence Island Fire Departments regarding the intent to burn.
   - Notify island residents at Stevens Landing and Mt. Pleasant Ave. of intent to burn.

B. Method for Obtaining Weather and Smoke Management Forecast(s)

- *NWS fire weather forecasts should be checked the day prior to and the day of burning, and are available at:*

  http://forecast.weather.gov/product.php?site=NWS&format=CI&version=1&glossary=0&highlight=off&issuedby=BOX&product=FWF.

  Prudence Island is on the edge of several NWS forecast zones. The following zones can be compared to get a representative forecast for the area:

  RIZ005-090900-BRISTOL RI
  RIZ007-090900-NEWPORT RI
  RIZ006-090900-WASHINGTON RI
  RIZ004-090900-EASTERN KENT RI

- NWS Marine/General forecast is accessible on frequency 162.400 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 Providence - NAM Model (00 UTC, 12 UTC) hourly 48 hrs, or Providence – NAM 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

- Spot Weather Forecast Request may be made at http://spot.nws.noaa.gov/cgi-bin/spot/spotmon?site=box.

- RI DEM Office of Air Resources – Air Quality Forecast : http://www.dem.ri.gov/programs/benviron/air/pm.htm (Use Providence & Vicinity)

C. Notifications

- Day of burn: Prudence Island Volunteer Fire Dept 401-683-7503
- Day of burn: Portsmouth Fire Department 401-683-1200
- Day of burn: T. F. Greene Airport 401-691-2471
- Day of burn: RI Forest Fire Control 401-539-2356
- 24 hour advance: RI DEM (air quality) 401-222-2808 x7011
- 24 hour advance: neighboring residents

ELEMENT 10 *BREIFING*

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

Alternative Briefing Checklist Attached? ***YES / NO***

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.

ELEMENT 11 *ORGANIZATION & EQUIPMENT*

A. Positions

- (1) One Prescribed Burn Boss Type 2, RXB2
- (1) Firefighter Type 1, FFT1
- (6) Firefighter Type 2, FFT2

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

- 6 drip torches
- 8 backpack pumps
- 10 hand tools (various types)
- 4 radios
- 1 first aid kit
- 1 weather kit
- 1 set PPE / person
- 2 prescribed burn signs
- 1 type 6 engine
- 1 type 7 engine or similar capacity

The burn boss may adjust the amount and/type of equipment needed based on site conditions, resources, and crew experience.

C. Supplies

- 20 gallons drip torch mix
- 5 gallons pump fuel
- food and drinks

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

A. Radio Frequencies

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.

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

B. Telephone Numbers

Agency and Title	Contact	Phone Number
Prudence Island Volunteer Fire Department	Chief Marshall	401-683-7503
Portsmouth Fire Department		401-683-1200
Middletown Fire Department		401-846-7888
Newport Fire Department		401-845-5900
Jamestown Fire Department		401-423-0062
N. Kingstown Fire Department		401-2943346
Warwick Fire Department		401-468-4000
Bristol Fire Department		401-253-6912
Portsmouth Police Department	Officer Glen Young	401-683-0300
RI State Police		401-444-1000
RI DEM - Air Quality	Doug McVay	401-222-2808 x7011
NBNERR - Prudence Island Property Manager	Bob Stankelis	401-683-7365
RI DEM Division of Forest Environment	Karl Kenyon	401-539-2356
Newport Hospital		401-846-6400
T. F. Greene Airport		401-691-2471
Shaw's Water Taxi		401-683-2021

ELEMENT 13 SAFETY & MEDICAL

A. Safety Hazards

- Deer ticks and lymes disease
- Fatigue, heat exhaustion, and dehydration
- Falling limbs and snags
- Uneven terrain
- Tripping hazards (stumps, branches, vegetation)
- Falling from height off bunkers
- Unexploded ordinance (UXO)

B. Hazard Mitigation

- Tick-borne disease prevention and UXO encounters will be covered during briefing.
- Food and drinks will be made available to the crew. Crew will be briefed on symptoms and treatments of heat exhaustion, dehydration, and fatigue.
- A minimum of one crewmember will be First Aid/CPR certified.
- Supervisors will maintain accountability of staff.
- Bunker locations will be pointed out during briefing.

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 aid first responder.
- After the incident an accident report will be completed and a copy provided to the burn boss and the property manager.

D. Emergency Evacuation Methods

EMS will be contacted at 911 and provided symptom information and location of incident. EMS will coordinate transportation of the victim with the burn boss or chief of party. Delays in EMS and medical transport arrival are possible due to the fact the burn unit is on an island without a bridge to the mainland.

E. Medical Facilities

Newport Hospital
15.5 Miles – 45 Minutes travel time via ferry
11 Friendship St
Newport, RI 02840
401-846-6400

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, with the burn not continuing beyond the test fire phase until the burn boss has determined that an accurate representation of expected fire behavior has been demonstrated. The burn will not continue unless objectives will be met, and the burn can be conducted within prescription limits in a safe manner.

B. Test Fire Documentation

Weather conditions during the test fire will be recorded and added to the burn report package. Upon completion of the test fire, an announcement will be made to the crew stating if the burn will continue or be shut down. This announcement should be documented and added to the burn report.

ELEMENT 15 *IGNITION PLAN*

A. Firing Methods

Firing methods will be executed in such a manner where burn and resource management objectives will be met. Firing methods should also minimize re-burn potential, torching along the edges, and spotting distance. The ignition team will coordinate all actions with the holding resources and the burn boss so that operations do not negatively impact one another.

B. Firing 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 downwind lines.
- As black is extended on downwind lines, commence interior ignition.
- Continue creating black on the downwind 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 secure.
- Continue until the unit is completed.

E. Patterns

- On the downwind 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 minimize 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 the blacking of the downwind holding lines.
- Complete the unit by ringing the final portion.

F. Ignition Staffing

- One or more firefighter type 2's

ELEMENT 16 *HOLDING PLAN*

A. General Holding Procedures

- 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 to avoid negative impact on adjacent resources.
- Spot fires and slopovers will be suppressed using direct attack.
- The downwind holding line crew will be responsible for establishing black to improve the line.

- The upwind 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 downwind patrol for possible spot fires 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

- 1-2 Holding Teams
- 1 Holding Boss (Firefighter Type 1)
- 2 or more Firefighter Type 2s per holding team
- Downwind line should have 1 drip torch, 3 backpack pumps, and miscellaneous hand tools
- Upwind line should have a 1 drip torch, 3 backpack pumps, and miscellaneous hand tools

ELEMENT 17 _____ *CONTINGENCY PLAN*

A. Trigger Points and Actions Needed

Trigger Point	Action Needed
Multiple Spot Fires	Adjust ignition and increase downwind patrolling or shutdown.
Slop Over	Suppress slop over and shutdown burn if necessary.
Minor Injury	Assign first aid first responder to victim, identify source of injury, and shutdown burn if required.
Significant Injury	Assign first aid first responder to victim, 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	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 or shutdown burn.
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 fire department, shutdown the prescribed burn, and suppress the escape.

ELEMENT 18 _____ *WILDFIRE CONVERSION PLAN*

A. Wildfire Criteria

The burn boss will consider the prescribed fire an escape when fire leaves the unit and one or both of the following conditions exist:

- The fire has exceeded or is expected to exceed on-site initial attack capabilities.
- The fire has exceeded The NBNERR property boundaries or is expected to exceed those boundaries.

B. Escaped Fire Incident Command

Upon arrival of the Prudence Island FD, Portsmouth FD, or Rhode Island DEM Division of Forest Environment the senior fire department officer will serve as the incident commander (IC). The burn boss will immediately transition all command authority to the IC, provide as much pertinent information as possible, and announce the transition to the prescribed burn crew.

The burn boss will assign a liaison from the burn crew to the IC and designate a supervisor in charge of the prescribed burn crew to direct suppression actions by the prescribed burn crew in coordination and under the direction of the IC. The burn boss can serve in any one of these two capacities or may perform the tasks of both positions – as directed by the IC.

C. Notifications

Prudence Island Fire Department	401-683-7503
Rhode Island DEM Division of Forest Environment	401-539-2356
NBNERR Prudence Island Property Manager Bob Stankelis	401-683-7365

D. Initial Attack Contingency Lines

Fuels adjacent to the prescribed burn unit are very similar to what is found on the unit. There is a mixture of forest, shrubland, and grassland in upland and wetland areas. The majority of the fuel surrounding the prescribed burn unit is low and moderate load broad leaf litter from forested areas. Immediately west of the unit is a strip of coastal shrubs approximately 50 feet wide. Further west of this strip of shrubs is the beach and ocean. Low fuel loads over most of the areas adjacent to the burn unit lend themselves to direct attack suppression tactics in most cases.

North

There are several residences immediately to the north of the unit on the west side. Fire leaving the unit to the north should be aggressively suppressed. Approximately 100 feet to the north of subunit M there is a spur road (Chippaquasett Rd) that extends 300' to the west from Hope View Road. Broadway Road is 4000 feet to the north of the unit and spans the island from east to west. An escape to the north will be flanked by Bay Ave. on the west side and Pleasant Ave. on the east side. Fuels north of the unit are low and moderate load broadleaf litter from oak-pine forests and red maple swamp. These light fuel loads will make direct attack possible in most situations.

South

There are no structures to the south of the unit. Light shrub and low load broadleaf litter fuels in the form of coastal shrubland and red maple swamp extend approximately 1500 feet to the south of the unit before they reach the ocean. An escape to the south will be boxed in on the west side by the ocean and/or Levesque Memorial Dr. and Pleasant Ave. to the east.

East

Immediately to the east of the unit is mostly oak-pine forest (TL6) that extends out ~700 feet where it transitions to mostly red maple swamp for ~1500 where it reaches West Bunker Rd and beach and ocean. An escape to the east from subunits J, K, or L will by boxed in from the south by Pleasant Ave. and by South Prudence Bay Island Parkway to the north. An escape to the east from subunit O would be boxed in by South Prudence Bay Island Parkway to the south, South Reserve Drive and a mowed break to the north, and to the east by Cliff Road which is adjacent to the ocean.

E. Extended Attack Actions

The IC will be in charge of all extended attack activities. The prescribed burn crew will assist and report to the IC through a chain of command established during the incident.

ELEMENT 19 _____ *SMOKE & AIR QUALITY MANAGEMENT*

A. Compliance

- Fire Department notification of intent to burn prior to ignition.
- DEM notification of intent to burn prior to ignition.

B. Permits

- DEM Air Quality Permit (who will issue permits at the state level and what is the process)
- Day of burn verbal authorization from the Fire Chief or senior duty officer of the Prudence Island Fire Department.

C. Smoke Sensitive Areas

There are several residences immediately adjacent to the prescribed burn unit that may be impacted by smoke with PM 2.5 levels in the moderate to unhealthy for sensitive groups range, depending on wind direction. Urban areas in the towns of Portsmouth, Middletown, Newport, and Jamestown are within 5 miles of the burn unit. However, smoke production and dispersion models do not predict these areas to receive more than moderate levels of PM 2.5. Smoke producing PM 2.5 levels that may be unhealthy for sensitive groups is not expected to impact residences off of Prudence Island. There are several residences within 1.25 miles of the burn unit that may be impacted by these levels of PM 2.5, depending on which wind directions are present, but the majority of residences on the island are not predicted to be impacted. T. F. Greene airport is 10.5 miles to the northwest of the burn unit. Flight paths may be impacted. The Mount Hope Bridge is 5.75 miles to the south of the unit and may be impacted under adverse, unplanned circumstances.

E. Smoke Management and Mitigation

- Maintain communications with the fire department.
- Burn during a day that has favorable lift and dispersion.
- Create a strong convective column to lift smoke above surrounding receptors.
- Dispatch smoke patrols in areas that could be impacted.
- Minimize overnight smoldering to avoid possible fog associated with burning near the coast.

ELEMENT 20 *MONITORING*

A. Fuels Information

At a minimum, fine dead fuel moisture should be calculated. 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 measured using a protimeter (if available) periodically during the burn.

B. Weather Monitoring

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

Flame length, 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. Measuring Objectives

- A monitoring plan that will measure the degree of success or failure of the burn to meet objectives will be developed prior to the ignition of the prescribed burn.
- A burn summary will be completed using information compiled from burn day records.

E. Smoke Dispersal

- Communication should be maintained with the fire department to ascertain if receptors are being impacted by smoke.
- If concerns of negative smoke impacts arise, a smoke monitor will be dispatched to check potential problem areas and inform the burn boss and the fire effects monitor of conditions.

- 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 an appreciable rain event and 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 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 within 30 days.
- The burn file should be assembled and filed.

Narragansett Bay National Estuarine Research Reserve

Narragansett Bay National Estuarine Research Reserve

Prudence Island, RI **Unit Map**

PRODUCED BY NORTHEAST FOREST AND FIRE MANAGEMENT, LLC
SANDWICH, MASSACHUSETTS
MAP DATE: 02/08/2010

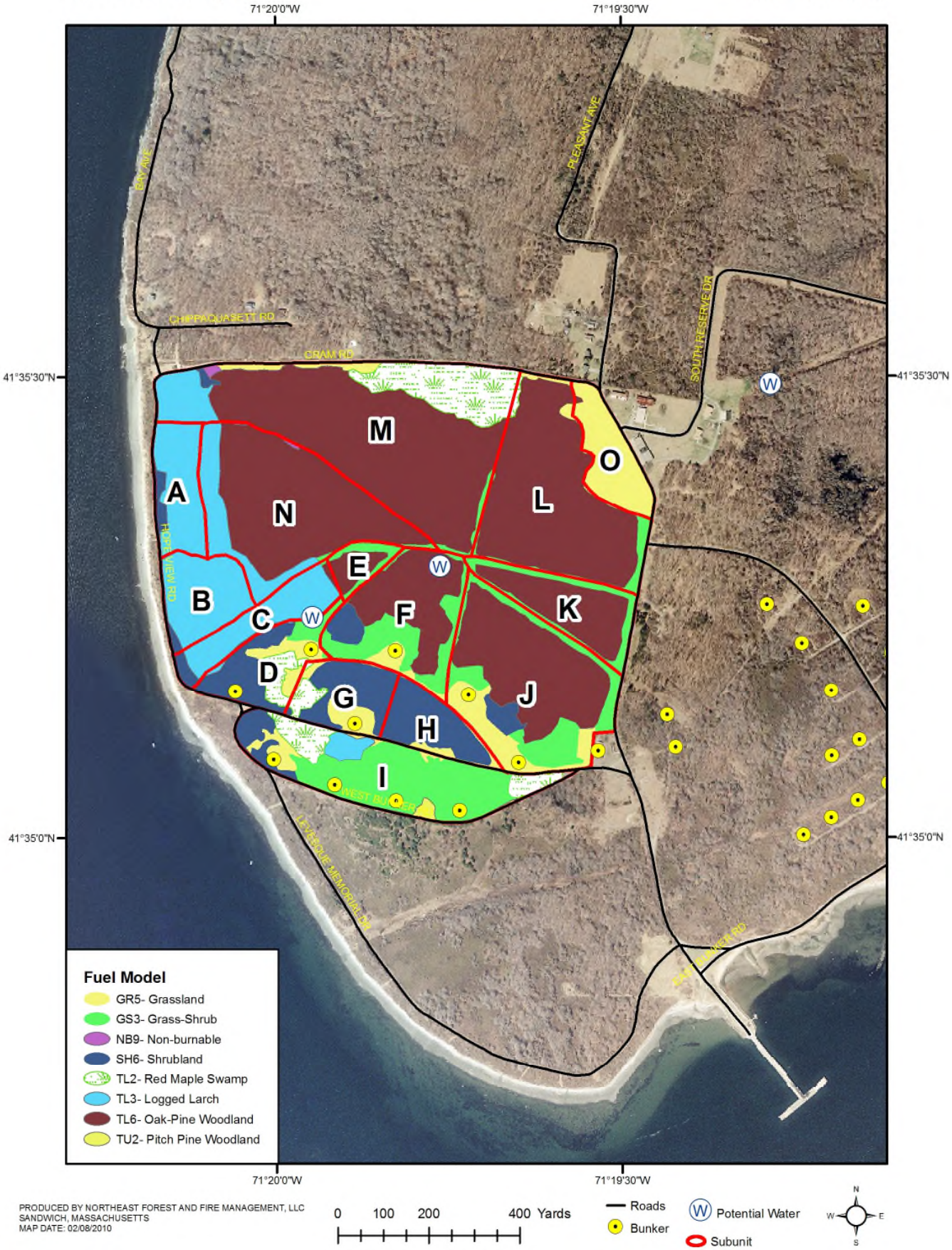
0 100 200 400 Yards

Roads
Bunker
Potential Water
Subunit

N W E S

Narragansett Bay National Estuarine Research Reserve

Prudence Island, RI ***Unit Fuels Map***



PRODUCED BY NORTHEAST FOREST AND FIRE MANAGEMENT, LLC
SANDWICH, MASSACHUSETTS
MAP DATE: 02/08/2010

0 100 200 400 Yards

Roads
Bunker
Potential Water
Subunit

N W E S

Narragansett Bay National Estuarine Research Reserve

Prudence Island, RI **Smoke Screening Map**

APPENDIX B – 1A _____ *Fire Behavior Oak-Pine Forest– Timber Litter 6 (TL6)*

(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/hr) - Head Fire

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

Flame Length (ft) - Head Fire

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

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

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

Flame Length (ft) - Backing Fire

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

(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/hr) - Head Fire

	Midflame Wind Speed (mph)												
1-hr Moisture	0	1	2	3	4	5	6	7	8	9	10	11	12
4	4	12	26	43	61	82	103	127	151	177	204	232	260
5	4	12	25	41	58	78	99	121	145	169	195	221	249
6	3	11	24	39	56	75	95	116	138	162	186	212	238
7	3	11	23	37	54	72	91	111	133	156	179	203	229
8	3	11	22	36	52	69	88	107	128	150	172	196	220
9	3	10	21	35	50	67	85	124	124	145	166	189	213
10	3	10	21	34	48	64	82	120	120	140	161	183	206
11	3	10	20	33	47	63	79	116	116	136	156	178	200
12	3	9	19	32	46	61	77	113	113	132	152	173	194
13	3	9	19	31	44	59	75	110	110	128	148	168	189
14	3	9	18	30	43	58	73	107	107	125	144	164	184

Flame Length (ft) - Head Fire

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

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

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

Flame Length (ft) - Backing Fire

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

APPENDIX B – 1C Logged Larch Fire Behavior – Timber Litter 4 (TL4)

(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/hr) - Head Fire

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

Flame Length (ft) - Head Fire

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

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

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

Flame Length (ft) - Backing Fire

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

(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/hr) - Head Fire

1-hr Moisture	Midflame Wind Speed (mph) 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

1-hr Moisture	Midflame Wind Speed (mph) 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/hr) - Backing Fire

1-hr Moisture	Midflame Wind Speed (mph) 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

1-hr Moisture	Midflame Wind Speed (mph) 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

(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/hr) - Head Fire

1-hr Moisture	Midflame Wind Speed (mph) 0	1	2	3	4	5	6	7	8	9	10	11	12
4	5	15	32	52	75	100	128	157	187	219	253	287	323
5	4	14	29	48	69	92	117	143	171	201	231	263	296
6	4	13	27	44	63	84	107	132	158	185	213	242	272
7	4	12	25	40	58	78	99	122	146	171	197	224	252
8	4	11	23	38	54	73	92	113	136	159	183	208	234
9	3	10	21	35	51	68	86	106	127	149	171	195	219
10	3	10	21	33	48	64	81	100	119	140	161	183	206
11	3	9	19	31	45	60	77	94	113	132	152	173	195
12	3	9	18	30	43	57	73	89	107	125	144	164	185
13	3	8	17	28	41	55	69	85	102	120	138	157	176
14	3	8	16	27	39	52	67	82	98	114	132	150	169

Flame Length (ft) - Head Fire

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

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

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

Flame Length (ft) - Backing Fire

1-hr Moisture	Midflame Wind Speed (mph) 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	2	3	3	3	3	3	3	3	3	3	3
8	2	2	2	2	3	3	3	3	3	3	3	3	3
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 – 1F _____ *Red Maple Swamp Fire Behavior – Timber Litter 2 (TL2)*

(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/hr) - Head Fire

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

Flame Length (ft) - Head Fire

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

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

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

Flame Length (ft) - Backing Fire

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

(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/hr) - Head Fire

1-hr Moisture	Midflame Wind Speed (mph) 0	1	2	3	4	5	6	7	8	9	10	11	12
4	1	3	6	9	13	18	23	28	33	39	46	52	59
5	1	3	5	9	12	17	21	26	31	37	43	49	55
6	1	2	5	8	12	16	20	25	29	35	40	46	52
7	1	2	5	8	11	15	19	23	28	33	38	43	49
8	1	2	4	7	10	14	18	22	27	31	36	41	47
9	1	2	4	7	10	13	17	21	25	30	35	40	45
10	1	2	4	7	10	13	16	20	24	29	33	38	43
11	1	2	4	6	9	12	16	20	24	28	32	37	41
12	1	2	4	6	9	12	15	19	23	27	31	35	40
13	1	2	4	6	9	12	15	18	22	26	30	34	39
14	1	2	4	6	8	11	14	18	21	25	29	33	38

Flame Length (ft) - Head Fire

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

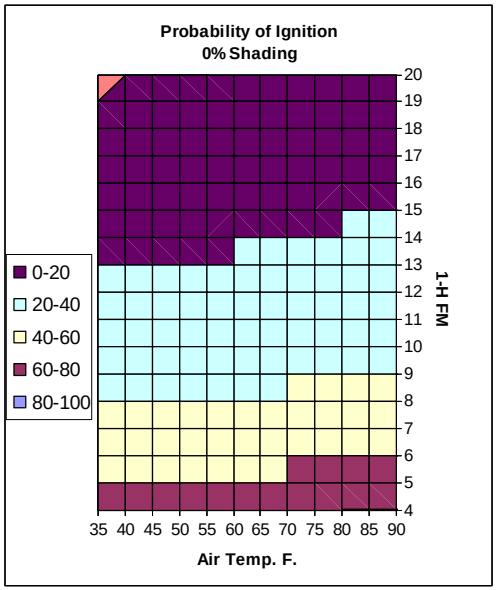
Surface Rate of Spread (ch/hr) - Backing Fire

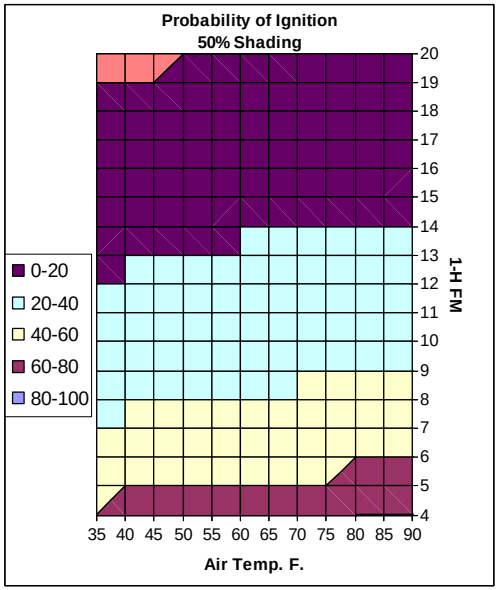
1-hr Moisture	Midflame Wind Speed (mph) 0	1	2	3	4	5	6	7	8	9	10	11	12
4	1	1	1	1	1	1	1	1	1	1	1	1	1
5	1	1	1	1	1	1	1	1	1	1	1	1	1
6	1	1	1	1	1	1	1	1	1	1	1	1	1
7	1	1	1	1	1	1	1	1	1	1	1	1	1
8	1	1	1	1	1	1	1	1	1	1	1	1	1
9	1	1	1	1	1	1	1	1	1	1	1	1	1
10	1	1	1	1	1	1	1	1	1	1	1	1	1
11	1	1	1	1	1	1	1	1	1	1	1	1	1
12	1	1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

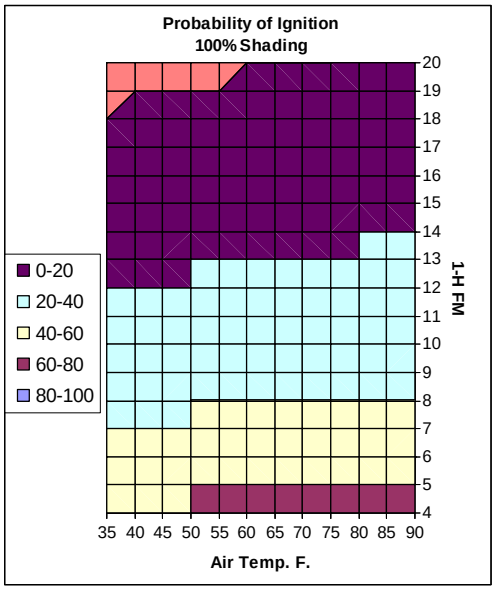
Flame Length (ft) - Backing Fire

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

[Run in BEHAVEPLUS v. 3.0.2]

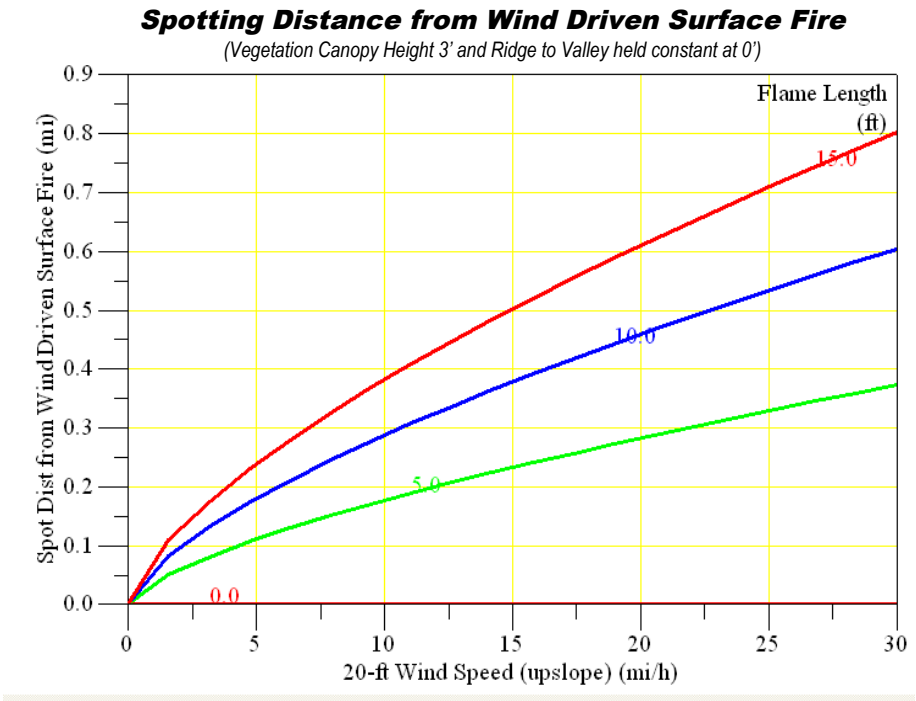






APPENDIX B – 3 *Spotting Distance*

[Run in BEHAVEPLUS v. 3.0.2]



APPENDIX B – 4 *Fire Size*

[Run in BEHAVEPLUS v. 3.0.2]

Smoke screening procedures were used that were recommended for prescribed burns that are less than 50 acres in size and occur at the Wildland Urban Interface (WUI). Two types of smoke models were used: 1) geometric smoke screening procedures, and 2) V-smoke plume generation. The geometric screening identifies the areas that are likely to be impacted by smoke while the V-smoke estimates the concentration of particulate matter likely to be within that area.

WUI smoke screening first buffers the burn unit by 500 feet, which indicates the minimum area that is likely to be impacted regardless of wind direction. The dispersion index for which the burn will be conducted is then chosen. Dispersion index is not included on the fire weather forecast in the northeastern US, but calculations made from historical data shows most burns have been conducted when DI has been in the "Fair" to "Generally Good" ranges. Based on these data and conservative estimates of fuel loads and firing techniques, smoke was plotted out 2.5 miles. This distance represents the maximum distance to which smoke is likely to be a problem. Visible smoke may be present for this distance; however, it can be smelled at much greater distances.

The WUI smoke screening system tends to be conservative and may over-predict the amount of smoke production from a particular burn. However, it is the responsibility of the burn boss to evaluate smoke production, dispersion and direction throughout the burn. Variables affecting smoke columns such as burning with sea breezes, near bodies of water, and on topography have to be considered by the burn boss when managing smoke. Burning near water may cause the smoke column to collapse once it travels over the cooler temperature water and should be considered when operations are conducted near the coast.

VSmoke-Web is a web-based implementation of VSmoke (Lavdas, 1996) and is designed to assist with planning prescribed burns. VSmoke is a simple gaussian smoke dispersion model that calculates isopleths of surface smoke concentration. Output from the model represents peak hourly concentrations of PM2.5 or visibility (under development). Contour values and their colors correspond to the PM 2.5 thresholds for the Air Quality Index (AQI) and reflect potential health impacts ranging from moderate to hazardous.

VSmoke Variable Inputs	
Acres:	*6.6*
Duration (hours):	*2*
Ignition Method:	*Head*
Fuel Type:	*Slash-Light*
Fuel Moisture Scenario:	*Dry*
% Consumed:	*70*
Mixing Height (feet):	*1500*
Transport Wind (mph):	*8*
Stability Class:	*Moderately Unstable*
Background PM 2.5 (ug/m3):	*30*

There are several residences within the 500-foot and first quarter (3300 feet) buffers. These residences on Hope View and Pleasant Avenues will be contacted prior to burning. The edge of Portsmouth and Jamestown are within the 2.5 mile buffer and may experience PM 2.5 concentrations in the "Moderate" range, a smell of smoke, and a slight visible haze. Burning with wind directions towards these smoke receptors is still acceptable given prescription parameters. However, the burn boss may want to consider the following to minimize smoke impacts to these areas if burning with west or north winds:

- Burn when the DI is above 50
- Reduce the size of the area to be burned
- Complete firing at least 3 hours before sunset
- Mop up 100%
- Burn when surface winds are < 8 mph and transport winds are > 15 mph
- Burn when mixing height is above 2500 feet

Level of Health Concern	AQI Value	Hourly PM 2.5 Concentration	Definition
GOOD	*0 - 50*	*0 - 38*	*Air quality is considered satisfactory, and air pollution poses little or no risk*
MODERATE	*51 - 100*	*39 - 88*	*Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.*
UNHEALTHY FOR SENSITIVE GROUPS	*101 - 150*	*89 - 138*	*Members of sensitive groups may experience health effects. The general public is not likely to be affected.*
UNHEALTHY	*151 - 200*	*139 - 351*	*Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.*
VERY UNHEALTHY	*201 - 300*	*352 - 526*	*Health alert: everyone may experience more serious health effects*
HAZARDOUS	*301 - 500*	*> 526*	*Health warnings of emergency conditions. The entire population is more likely to be affected.*

For complete documentation on geometric smoke screening procedures see:

Wade, D and Mobley, H. 2007. Managing smoke at the wildland urban interface. USDA Forest Service General Technical Report SRS-103. 28p.

For Complete documentation on VSmoke see:

Lavdas, L. G. 1996. VSMOKE—Users Manual. USDA Forest Service General Technical Report SRS-6. 156 p.

Vsmoke Web: http://shrmc.ggy.uga.edu/maps/vsmoke.html

FINAL COMPLEXITY ANALYSIS SUMMARY

ADMINSTRATIVE UNIT: *Narragansett Bay National Estuarine Research Reserve*

PRESCRIBED FIRE NAME: *Prudence Island*

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***	***HIGH***	***MODERATE***
OVERALL RATING	***MODERATE***	***MODERATE***	***MODERATE***

FINAL 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 COMPLEXITY ANALYSIS SUMMARY

ADMINSTRATIVE UNIT: *Narragansett Bay National Estuarine Research Reserve*

PRESCRIBED FIRE NAME: *Prudence Island*

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 RATING	***MODERATE***	***MODERATE***	***MODERATE***

FINAL 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

Narragansett Bay National Estuarine Research Reserve

Prudence Island

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***	Crewmembers 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***	Residences and structures are immediately next to the unit. 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 Prudence Island 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 across these breaks will differ and require different tactics.
	Final Rating:	LOW	Low fuel loads will allow for quick alteration of fuels and fire behavior with relatively little effort.
POTENTIAL CONSEQUENCES	Preliminary Rating:	MODERATE	Fire behavior outside the burn unit will be similar to that within the unit, in some areas the fire behavior could be greater, and could increase difficulty of initial attack.
	Final Rating:	MODERATE	No change.
TECHNICAL DIFFICULTY	Preliminary Rating:	LOW	Low fuel loads will allow for direct attack in most situations. Fuel breaks exist throughout the unit and on the perimeter.
	Final Rating:	LOW	No change.

6. MANAGEMENT ORGANIZATION		RATING	RATIONALE
RISK	Preliminary Rating:	LOW	A minimum amount of highly experienced personnel are needed for this burn. All positions may be supervised by the Burn Boss and one other experienced firefighter (FFT1) without exceeding the span of control.
	Final Rating:	LOW	No change.
POTENTIAL CONSEQUENCES	Preliminary Rating:	LOW	Supervisory and/or communications problems are not expected due to the low number of required personnel and small subunit size.
	Final Rating:	LOW	No change.
TECHNICAL DIFFICULTY	Preliminary Rating:	MODERATE	The number of qualified individuals on the local unit is limited and will create a reliance on other agency staff.
	Final Rating:	MODERATE	No change.

7. PUBLIC & POLITICAL INTEREST		RATING	RATIONALE
RISK	***Preliminary Rating:***	***MODERATE***	The public, media, regulators, and political entities have a high level of interest in activities on site and have had interests in prescribed burns.
	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 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***	NBNERR does not have the capability at this time to supply all of the required crew and equipment. Interagency cooperation is essential.
	Final Rating:	***MODERATE***	No change.
POTENTIAL CONSEQUENCES	***Preliminary Rating:***	***LOW***	Alternative management techniques are available.
	Final Rating:	***LOW***	No change.
TECHNICAL DIFFICULTY	***Preliminary Rating:***	***MODERATE***	The environmental parameters required for this burn will allow for burning under a wide range of conditions. Burning is more dependent on crew and equipment availability.
	Final Rating:	***MODERATE***	No change.

10. SAFETY		RATING	RATIONALE
RISK	***Preliminary Rating:***	***LOW***	Low fuel loads, good line-of-sight within the unit, adequate breaks, and large areas suitable for use as safety zones minimize risk associated with 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 Prudence Island 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***	Downwind smoke monitoring may be required. Due 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.

PRESCRIBED FIRE JOB JAZARD ANALYSIS

Narragansett Bay National Estuarine Research Reserve

Prudence Island

Task	Identify Hazards	Probability	Severity	Assess Hazards	Develop Controls	Residual Risk	Implement Controls
TRAVEL TO BURN UNIT	Motor Vehicle Accident	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	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.
BURN SETUP	General Accidents (Cuts, abrasion, hearing damage, eye injury, and back/lifting injuries)	Occasional (C)	Negligible (IV)	**Low**	1. Wear appropriate PPE 2. Practice sound lifting techniques. 3. Identify first aid kit locations	**Low**	Communicate General Accident controls to supervisors and crew.
BURN SETUP	Fuel Mixing and Refueling	Seldom (D)	Marginal (III)	**Low**	1. Wear eye protection and gloves. 2. Use funnels and secondary containment. 3. Use appropriate fuel mixes. 4. Label all containers.	**Low**	Communicate Fuel Mixing and Refueling controls to supervisors and crew.
BURN OPERATIONS	Motor Vehicle Accident	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.
BURN OPERATIONS	General Accidents (Cuts, abrasion, hearing damage, eye injury, and back/lifting injuries)	Occasional (C)	Marginal (III)	**Medium**	1. Wear appropriate PPE 2. Practice sound lifting techniques. 3. Identify first aid kit locations	**Low**	Communicate General Accident controls to supervisors and crew.
BURN OPERATIONS	Moderate Fire Behavior	Occasional (C)	Marginal (III)	**Medium**	1. Identify escape routes and safety zones. 2. Wear and carry all wildland fire PPE	**Low**	Communicate Extreme Fire Behavior controls to supervisors and crew.
BURN OPERATIONS	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 on power lines.	**Low**	Communicate Power Line Hazard controls to supervisors and crew.

Task	Identify Hazards	Probability	Severity	Assess Hazards	Develop Controls	Residual Risk	Implement Controls
BURN OPERATIONS	Fuel Mixing and Refueling	Seldom (D)	Marginal (III)	**Low**	1. Wear eye protection and gloves. 2. Use funnels and secondary containment. 3. Use appropriate fuel mixes. 4. Label all containers.	**Low**	Communicate Fuel Mixing and Refueling controls to supervisors and crew.
BURN OPERATIONS	Ignition	Unlikely (E)	Critical (II)	**Low**	1. Wear appropriate PPE. 2. Use proper fuel mix.	**Low**	Communicate Ignition controls to supervisors and crew.
BURN OPERATIONS	Tool Use	Unlikely (E)	Marginal (III)	**Low**	1. Wear appropriate PPE. 2. Maintain proper spacing. 3. Use appropriate tools and techniques	**Low**	Communicate Tool Use controls to supervisors and crew.
BURN OPERATIONS	Pump Operation	Unlikely (E)	Marginal (III)	**Low**	1. Wear ear and eye PPE 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 Hazards (Burns, Poison Ivy, Bees, Lyme Disease, Illness, Tripping/Falling, Snags, Smoke 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 Hazards based on potential exposure.	**Medium**	Communicate Environmental Hazard controls to supervisors and crew.
MOP-UP	Motor Vehicle Accident	Occasional (C)	Critical (II)	**High**	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.
MOP-UP	Chain Saw Operation	Unlikely (E)	Critical (II)	**Low**	1. PPE should be worn. 2. Only qualified saw operators will operate chain saws. 3. Identify first aid kit locations.	**Low**	Communicate Chain Saw controls to supervisors and crew.
MOP-UP	General Accidents (Cuts, abrasion, hearing damage, eye injury, and back/lifting injuries)	Occasional (C)	Marginal (III)	**Medium**	1. Wear appropriate PPE 2. Practice sound lifting techniques. 3. Identify first aid kit locations	**Low**	Communicate General Accident controls to supervisors and crew.
MOP-UP	Tool Use	Seldom (D)	Marginal (III)	**Low**	1. Wear appropriate PPE. 2. Maintain proper spacing. 3. Use appropriate tools and techniques	**Low**	Communicate Tool Use controls to supervisors and crew.
MOP-UP	Pump Operation	Unlikely (E)	Marginal (III)	**Low**	1. Wear ear and eye PPE 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.

Task	Identify Hazards	Probability	Severity	Assess Hazards	Develop Controls	Residual Risk	Implement Controls
TRAVEL TO HOME UNIT (OR RESIDENCE)	Motor Vehicle Accident	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.

OVERALL MISSION RESIDUAL RISK LEVEL: ***LOW***

REMARKS:

Mop-up Environmental Hazards and Travel to home unit Motor Vehicle Accidents are the only tasks/hazards that the residual risk was greater than "Low" after mitigation controls. These tasks/hazards should be paid special attention to and stressed in briefings.

PREPARED BY: _____ **DATE:** _____

Printed Name: Ross M. Garlapow

Agency: Northeast Forest and Fire Management, LLC

Qualification: Fire and Forestry Specialist
Firefighter Type 1 (FFT1)

PRESCRIBED FIRE JOB JAZARD CONTROL OPTIONS

Narragansett Bay National Estuarine Research Reserve

Prudence Island

Control Option	Support	Standards	Training	Leader	Individual
Communicate Motor Vehicle Accident controls to agency contacts/chief of parties/supervisors and drivers.		- 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.

Control Option	Support	Standards	Training	Leader	Individual
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. Safety and Medical		
14. Test Fire		
15. Ignition Plan		
16. Holding Plan		
17. Contingency Plan		
18. Wildfire Conversion		
19. Smoke and Air Quality Management		
20. Monitoring		
21. Post-burn Activities		
Appendix A: Maps		
Appendix B: Fire Behavior Modeling		
Appendix C: Complexity Analysis		
Appendix D: Job Hazard Analysis		
Appendix E: Technical Reviewer Checklist		
Other		

S = Satisfactory **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 Type 2 (RxB2)