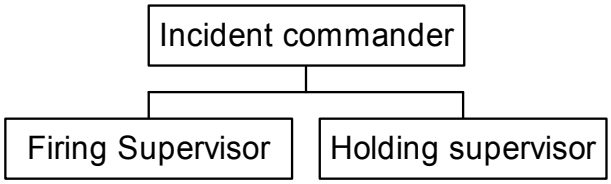
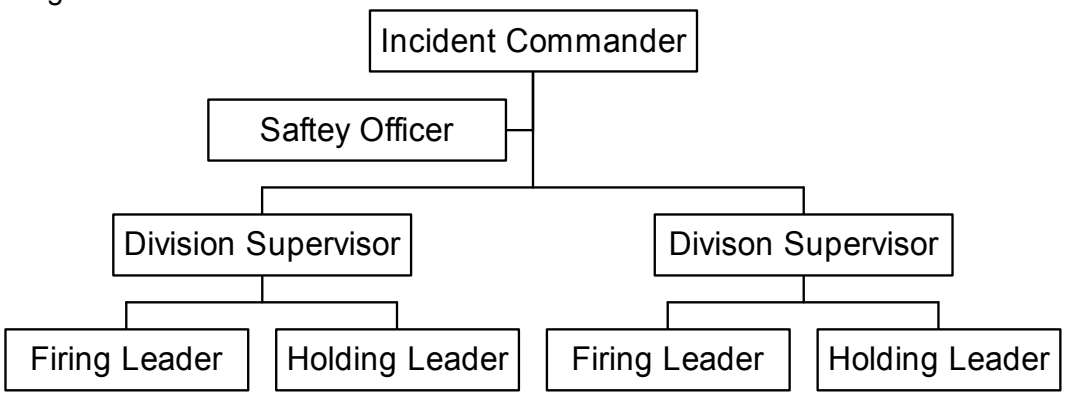
RI DEM Division of Forest Environment (DFE)
PRESCRIBED FIRE PLAN

INCIDENT COMMAND SYSTEM TEMPLATE

Simple Prescribed Fire:



Larger Prescribed Fire:



DFE PERSONNEL QUALIFIED FOR THESE INCIDENT COMMAND POSITIONS:

INCIDENT COMMANDER
- Karl Kenyon
- Paul Wright
- Tom Bourn
- Jay Aron
- Paul Ricard

SAFETY OFFICER
- Tom Bourn
- Karl Kenyon

DIVISION/HOLDING/FIRING SUPERVISOR
- Karl Kenyon
- Paul Wright
- Tom Bourn
- Jay Aron
- Paul Ricard
- Rod Petruska

FIRING LEADER
- Karl Kenyon
- Paul Wright
- Tom Bourn
- Jay Aron
- Paul Ricard
- Rod Petruska

HOLDING LEADER
- Karl Kenyon
- Paul Wright
- Tom Bourn
- Jay Aron
- Paul Ricard
- Rod Petruska
- Bill Glidden
- Paul St.Pierre

PRESCRIBED FIRE GUIDELINES

PURPOSE

The Rhode Island Department of Environmental Management has taken the approach that management-ignited prescribed fires, done under carefully monitored conditions when adequate, trained, resources are available, is often the most prudent and economical method of meeting resource management objectives. Further, prescribed fire provides many excellent training opportunities for department personnel involved in wildland fire suppression.

It is the intent of the Rhode Island Department of Environmental Management to use prescribed fire as a vital management tool, with the process requiring three critical steps to complete each burn:

1. Each prospective burn must go through a thorough proposal and planning process.
2. Burn day conditions will be evaluated by a qualified fire manager using an established Go/No Go process. The GO/NO GO checklist will be used and filed with the Prescribed Burn Report.
3. As with wildland fires, each prescribed burn is contained after ignition, mop-up is completed to plan standards, and the burn is patrolled until it is formally declared out.

PRESCRIBED BURN TREATMENT PROPOSAL AND PLAN

The Prescribed Burn Treatment Proposal and Prescribed Burn Plan are completed to assure that management objectives are established, that site factors are evaluated, and that ignition pattern, expected fire behavior and firefighting resources can be matched to safely

meet objectives and minimize risks due to fire escape, smoke production, and/or holdover fire.

- The process begins with the DEM division determining that a prescription of fire, or fires, as a treatment, will meet specific resource management objective(s) for an administered property. Public comment as well as professional review are considered in establishing these objectives.

- The Prescribed Burn Treatment Proposal is developed by the DEM administrative manager or his/her staff. This proposal should include the specific objectives to be met with the use of fire, the values to be protected, and any limitations to operations. It is submitted for approval to the Chief of the Division that developed the proposal.

- After approval by the respective Chief, the proposal is submitted to the Supervising Forester in the Division of Forest Environment (DFE) who is responsible for wildland fire control for the given area.

- In developing a site-specific Prescribed Burn Plan, the Supervising Forester or a qualified member of his/her staff visits the site
    - to review fuel and soil conditions, both on the site and in adjacent areas
    - to determine best locations for control lines,
    - to identify additional pre-burn preparations, and
    - to consider how best to protect any values at risk.

  Logistical resources such as water sources and staging areas are considered. Other hazards and obstacles, such as fences, utility corridors, and natural features are also assessed.

- The Supervising Forester then develops a written Prescribed Burn Plan, including site preparations, burn day fire behavior parameters, ignition pattern to be used, required resource complements, mop-up and monitoring standards, and public contacts to be made

SITE PREPARATION REQUIREMENTS include control line standards and sections of line to be constructed; reduction of fuel loads adjacent to protected values, and water resource development.

FIRE BEHAVIOR PARAMETERS are designed to assure that the burn will meet management objectives through appropriate fire effects and that risks to values inside and adjacent to the burn unit can be protected during and after the ignition process. There will be situations where burn plans will require parameters outside of the general limits indicated below, with operating plans written specifically to assure that objectives may be met safely under those conditions:

FIRE BEHAVIOR FACTOR	PARAMETERS CONSIDERED	PURPOSE OF PRESCRIPTION
Season of Year	Date Limits	Many species exhibit seasonal variation in their sensitivity and response to fire on the landscape. Limits are to protect valuable species and to assure desired fire effects for others.
Fuel Loading	Fuel Model Fuel Loading	The fuel complex must be quantitatively assessed to determine how weather factors will influence fire behavior, fire effects, and lingering potential risk for escape and smoke events.
Spread Potential	Rate of Spread	Usually both lower and upper limits are established. Lower limits are used to assure adequate fire movement so that the entire unit can be burned effectively. Upper limits generally reflect control capabilities.
Fireline Intensity	Flame Length Relative humidity Ambient Air Temperature	Again, usually both lower and upper limits are established. Lower limits are to assure that the fuel complex will burn adequately to minimize reburn potential. Upper limits are intended to protect firefighters from dangerous heat levels and limit mortality of overstory vegetation.
Spotting and Ignition	1 hr & 10 hr Fuel Moistures Fine Fuel Moisture Wind Speed and Direction	Fire within control lines presents risk to control due to embers spotting into receptive fuels. Upper limits for both fuel moisture and wind speed are generally established in those situations where receptive fuels exist outside the burn perimeter. Under most circumstances, burns should be conducted with wind speeds below 15 mph. Wind Direction is limited to protect values outside the burn unit from risk.
Fuel Consumption Holdover Fire Smoke Production	Buildup Index	Lower limits are established in situations where fire is needed to reduce surface vegetative competition and litter/duff layers, and to expose mineral soil. Both lower and upper limits may be established to minimize smoke production, both during and after the burn.

IGNITION METHOD AND PATTERN are specified for the purposes of either enhancing or reducing fire spread, fireline intensity, and/or fire severity. Conditions range from sparse fuels and moderate weather that require enhancement to understory burns that require careful control of fireline intensity to minimize overstory mortality.

MOP-UP AND MONITORING STANDARDS are based on the fuel and soil complex burned and the fire behavior parameters used to meet treatment objectives. Spring season burns with heavy fuels that need to produce more severe fire effects will require greater mop-up and

monitoring effort to assure control. Light fuels such as springtime grass fuel complexes will require relatively little mop-up since most of the surface fuels are consumed with the passing fire front.

PUBLIC CONTACTS TO BE MADE include adjacent landowners, fire dispatch offices, local police and fire officials, and cooperators. Among the details provided are the location of the burn, the size and type of burn planned, the planned time of ignition, and a contact for further information.

APPROVAL. The plan is then submitted for approval, to the Chief, Division of Forest Environment.

Go/No Go Process

A No-Go decision can be made at any point in time, from the point of first contact up to and including the option to stop during the ignition procedures. The Go/No-Go decision is a communications process between the Burn Boss and the DEM unit manager, requiring many factors to be considered as the decision is made. Because a specific plan has been prepared and adopted in the previous process, many of the decision parameters have been laid out. But because there are factors external to the burn and because fire behavior models are approximate, experience and judgment are critical to making good decisions.
The factors considered for each burn include the following, though their relative importance vary with the specifics of each burn unit and each fire day:

- FUELS IN AND AROUND THE BURN must be confirmed. Loadings in the fine fuels are important indicators of potential fire spread and fireline intensity. Loading of heavier fuels and existence of conifer crown fuels are important indicators of potential for spotting and mop-up problems. The presence of a significant organic soil layer indicates a potential for holdover fire.

- PRESCRIPTION PARAMETERS that have been established in the burn plan are compared to forecasts for those parameters. Forecast values need to fall within planned ranges. Some limited adjustments may be considered as long as compensating factors will assure that fire effects will not change and management objectives will be met. Otherwise, a No Go decision is made.

- PLANNED PREPARATIONS established in the burn plan must be certified by the prospective burn boss as complete. The burn boss is to assure that any required line improvements have been made, any efforts to protect values at risk are completed, and that all specified public contacts have been made. If not, a No Go decision is made.

- RECENT WILDFIRE AND PRESCRIBED FIRE BEHAVIOR OBSERVATIONS are evaluated to calibrate the fire behavior models. Observed fire behavior near the burn and/or in similar fuels and weather are excellent indicators of spread potential, fireline intensity, burn severity, smoke production/dispersal, and spotting behavior. The unit manager and the prospective burn boss are responsible for collecting and interpreting this information on a daily basis. If these indicate potential problems with controlling the burn, a No Go decision may be made.

- RESOURCE REQUIREMENTS established in the burn unit plan must be met. Assigned personnel must be adequately skilled to deal with the relative complexity of the planned burn. Ongoing fire suppression activities may compromise resource availability, especially if it is nearby. Any of these factors may lead to a No Go decision.

- FIRE DANGER CONSIDERATIONS include the prescription parameters outlined in the burn plan, observed and forecasted weather patterns, and other fire danger factors such as atmospheric stability. Though exceeding any one of the prescription parameters listed earlier and fire danger factors identified here may be considered sufficient for a No Go decision, generally these factors are considered in combination using the experience of the Burn Boss. Additional factors to be considered include:
  - Forecasts of changing weather patterns either during or shortly after the burn is to be ignited may indicate potential control problems.
  - If fuel complex and moistures indicate high fire intensity and the prospect of extreme fire behavior, the Haines Index and wind profile are used to determine the convective influence of the atmosphere. With these conditions and an unstable atmosphere, fires may be difficult to control.

Consultation

The DEM supervisor of the property to be burned and the Burn Boss must communicate prior to the burn. This will generally involve contacts both the day before and the day of the burn. The following is an example process:

On the DAY BEFORE BURN, the Burn Boss and the DEM supervisor will analyze the following:

- ❑ Verify that an approved burn plan is on file.
- ❑ Verify that an exemption from Air Pollution Control Regulation No. 4 has been granted.
- ❑ Verify that recent fire occurrence indicates no problems for the planned burn.
- ❑ Review the fuels to be burned.
- ❑ Evaluate the short- and long-range weather forecasts for any expected changes in potential fire danger and/or smoke problems.
- ❑ Evaluate if the burn parameters and management objectives can be met, considering potential mop-up difficulty.
- ❑ Consider the resources available, including equipment and personnel.
- ❑ At this time a tentative decision will be made, allowing for further preparations.

On the DAY OF THE BURN the Burn Boss and DEM supervisor will do the following:

- ❑ Verify the weather forecast.
- ❑ Obtain a Permit to Kindle a Fire from the fire department with jurisdiction for the burn.
- ❑ Assess changes in resource availability.
- ❑ Review fire activity.
- ❑ Establish a time of ignition.
- ❑ Assure that the specified public and agency contact process is followed.
- ❑ The final decision will be made prior to initiating a burn.
- ❑ The Burn Boss will immediately report the completion of ignition operations for the burn unit to the DEM supervisor. The report must include observed fire behavior and control difficulty, and confirm the Go decision for any additional units to be burned.

Post Burn Containment, Mop-Up and Patrol

As with wildland fires, mop-up and patrol are a critical part of the prescribed burning process. This portion can be very time consuming. The DEM supervisor, the Chief of the division on whose property the burn occurred, and Burn Boss must be willing to commit the necessary resources to complete this effort in a safe and efficient manner. Once the ignition is complete, the burn will not be left unattended until the Burn Boss is confident the fire is CONTAINED and will remain within the perimeter.

MOP-UP. Mop-up will be thorough and complete to the standards established in the approved burn plan, though they may be increased due to observed fire behavior and any problems arising from forecasts. Effort required to meet these standards will continue until the burn is declared out by the Burn Boss. Generally, a zone of control is established based on the size and configuration of each burn. Within this zone of control, mop-up is to be conducted and continue daily until all fire is extinguished. This zone will vary from 100% of small burn units to some defined distance within the perimeter for large burns, usually 100 to 200 feet, depending on fuels and soils burned, expected weather, and fuels/values outside the burn. If any fire is found within the zone of control during the patrol phase, mop-up activities will be reinitiated.

PATROL. Once mop-up is completed to the standards established, patrol efforts will continue until the prescribed burn is declared and certified out. This is especially important for burn units where mop-up is not 100%, where heavy fuels are burned and/or ground fire is observed. The Burn Boss will notify the DEM unit manager within 24 hours of the declaration, and a written certification will be included in the final burn report.

- Patrol begins the day after mop-up is completed. If no smoke is observed within the zone of control on a given day, an additional day may be included between visits. For example, if no smoke is observed during the first day of patrol, a day may be skipped. If no smokes are observed on the next visit, two days may be skipped, and so on. This progression may be used until the fire is declared out, unless factors outlined below are encountered.
- Depending on the fuels burned and fire behavior observed, patrol should include both morning visits (to observe any lingering smoke from nighttime inversions) and peak burning period visits (to observe development of heat, smoke, and flames). These do not have to occur on the same days, especially if no smoke has been recently observed within the zone of control.
- If extreme fire danger develops during the patrol phase, the burn should be monitored throughout that day, regardless of whether smoke was found the previous day.
- If fire activity is increasing further inside the burn unit, even if no smokes are observed in the zone of control, patrol activities should continue daily.
- Patrol activities are not required on days when the fuels remain wet.
- If any smoke or fire is observed within the zone of control, it will be marked so that mop-up forces can locate it. The burn boss and/or DEM unit manager will be immediately advised of the need for mop-up activity. Once mop-up is again completed, patrol will be reinitiated.

Unless mop-up is 100%, fires will not be declared out until a fire-ending event is encountered. This is usually defined by sufficient rainfall followed by two days of high fuel moisture.

PERSONNEL GUIDELINES FOR PRESCRIBED FIRE OPERATIONS

PURPOSE

The Rhode Island Department of Environmental Management recognizes that there are risks associated with prescribed fire operations and that these risks can be reduced by requiring personnel involved on prescribed burns on DEM property to meet minimum standards for wearing personal protective equipment (PPE), training and experience. The DEM recognizes that employees may be involved in prescribed fire operations with other agencies in Rhode Island, and conversely personnel from other agencies may participate in prescribed burning operations on DEM property as provided in these guidelines.

PERSONAL TRAINING, SAFETY, AND FITNESS REQUIREMENTS

Qualifications: DEM personnel who will participate in prescribed burning operations on DEM properties normally have satisfactorily completed training within five (5) years prior to the burn as described below:

Prescribed Fire Crew Member

Required Training:	Basic Wildland Firefighting and Fire Fire Behavior
Experience:	None

Prescribed Fire Burn Boss

Required Training:	Basic Fire Suppression (5-130) Basic Fire Behavior (S-190) Intermediate Fire Behavior (S-290) Fire Behavior Calculations (S-390)
Experience:	Satisfactory performance as Prescribed Fire Crewmember, plus satisfactory performance as Burn Boss trainee

To a limited extent, DEM personnel -- for example, new employees -- on a prescribed burn may not have completed the required training. Insofar as possible, these persons should be assigned tasks that will not expose them to any fire. If they are to be exposed to any fire THEY WILL ONLY WORK UNDER THE DIRECT ORAL AND VISUAL CONTROL AND SUPERVISION OF A QUALIFIED CREWMEMBER. Where sufficient numbers of qualified persons are present, untrained personnel will not be assigned any task that will expose them to any fire.

Non-DEM employees may be involved in prescribed burning on DEM lands. This might include fire departments or federal or private land management agencies (e.g., US Fish & Wildlife Service, The Nature Conservancy, Audubon, etc.). They should be considered a source of trained resources to assist on prescribed burns. The DEM will accept training and fitness standards of other agencies for prescribed burning.

Personal Protective Equipment (PPE): All personnel, including non-DEM employees, shall have the following items of PPE before they will be assigned any position on a prescribed fire that may expose them to the burn:

- Nomex© fire shirt and trousers, Nomex© coveralls, or other National Fire Protection Association approved fire resistant clothing for wildland fire fighting.
- Cotton undershirt (synthetic and cotton blends are unacceptable).
- Hard hat, non-metal, designed for high heat environments.
- Leather gloves.
- Eye protection.
- Leather boots, lace-type, lug-type soles, and 8-inch height minimum. Steel toes are optional but not recommended.
- Other equipment such as chainsaw chaps and hearing protection are required for some operations (i.e. sawyers, pump operators).

All of the above equipment except boots and undershirts will be provided by DEM to department employees.

Fitness: Prescribed burning is a physically strenuous activity that frequently involves working in smoky and high-heat environments. All participants on a prescribed fire are responsible for notifying the Prescribed Burn Boss, prior to beginning a burn, about any physical problems or special concerns they have that might affect their ability to carry out their assignment. The Prescribed Burn Boss may limit or exclude an individual from participating on a burn if he or she feels uncomfortable with an individual's physical capabilities