

Prescribed Fire Management Handbook

MASSACHUSETTS DIVISION OF FISHERIES AND WILDLIFE

April 19, 2017



MASSWILDLIFE

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SUMMARY OF CHANGES

The Handbook will be updated on an as-needed basis and a summary of changes will be provided in this section.

Table of Contents

| | |
|---|-----------|
| Executive Summary | V |
| Director's Statement | VI |
| Acknowledgments | VI |
| Compilation | VI |
| I Introduction | 1 |
| A Purpose and Need for Prescribed Fire Management | 1 |
| B Prescribed Fire Program Mission Statement, Goals, and Objectives | 2 |
| C Laws and Regulations Governing Open Burning | 4 |
| II Prescribed Fire Priorities, Planning, and Documentation | 8 |
| A Prescribed Fire Priorities on MassWildlife and Other Public and Private Lands | 8 |
| B Setting Prescribed Fire Priorities | 9 |
| C Permits and Approvals | 11 |
| D Prescribed Fire Planning and Documentation | 13 |
| E Complexity Analysis and Guidance | 15 |
| F Crew Briefings and Assignments on Day of Burn | 17 |
| G Communications – Radio Use, Frequencies, Cell Phone Use, Hand Signals | 17 |
| H Spot Weather Forecast and On-site Weather Monitoring | 18 |
| I Fire Effects Monitoring | 19 |
| J Smoke Management and Monitoring | 21 |
| K Mop-Up Procedures | 24 |
| L Procedures for After Action Reviews and Lessons Learned | 25 |
| M Fire Event Log, Prescribed Fire Summary Report, and Annual Burn Accomplishment Report | 27 |
| N Wildfire Declaration and Conversion | 28 |
| O Declared Wildfire Reviews | 29 |
| P Equipment Inventory, Storage, and Maintenance | 30 |
| III Prescribed Burn Qualifications, Agreements, and Contracts | 31 |
| A Qualifications | 31 |
| B Certification | 34 |
| C Position Task Books | 36 |
| D Physical Fitness Standard | 37 |
| E Agreements and Contracts | 37 |
| F Principal Positions | 40 |
| IV Safety | 59 |
| A Prescribed Fire Planning and Operations | 59 |
| B Risk Management and Hazard Mitigation | 59 |
| C Contingency Planning | 59 |
| D Crew Safety and Smoke Considerations | 60 |
| E Safe Ignition Operations | 61 |
| F Safety Responsibility, Analysis, and Briefing | 61 |
| G Personal Protective Equipment | 62 |
| H Operating and Working Around Equipment | 64 |
| I Public Safety, Visitation Restrictions, Road and Trail Closures, Signs | 65 |
| J Emergency Medical Response | 67 |
| K Safety Communication | 70 |

| | | |
|-------------------|---|-----------|
| V | Notifications and Public Outreach | 71 |
| A | Neighbor and Community Notifications | 71 |
| B | National Weather Service Requests, Information Sharing, and Meetings | 73 |
| C | Local Fire Department Notification and Coordination | 73 |
| D | Massachusetts DCR District Fire Warden Notification and Coordination | 73 |
| E | Massachusetts DEP Air Quality Notifications and Year End Reports | 74 |
| F | Crew and Regional Cooperator Post Burn Notifications, Summaries, and Meetings | 75 |
| G | Responding to Public Inquiries and Increasing Public Awareness | 76 |
| Appendices | | |
| | Appendix 1. Prescribed Fire Policy | 1-1 |
| | Appendix 2a. Fire-Influenced Communities of Massachusetts | 2-1 |
| | Appendix 2b. Rare and Declining Fire-Influenced Plants of Massachusetts | 2-3 |
| | Appendix 2c. Rare and Declining Animals of Fire-Influenced Natural Communities in Massachusetts | 2-7 |
| | Appendix 3. Permit and Approval Forms (Section IIC) | 3-1 |
| | Appendix 4a. Sample Prescribed Fire Plan Template | 4-1 |
| | Appendix 4b. Technical Review Checklist for a Prescribed Burn Plan | 4-25 |
| | Appendix 4c. Prescribed Burn Briefing Checklist | 4-31 |
| | Appendix 5a. Prescribed Fire Complexity Rating System Guide | 5-1 |
| | Appendix 5b. Worksheet for Prescribed Fire Complexity Rating System | 5-2 |
| | Appendix 6a. Brush Pile Burning Checklist | 6-1 |
| | Appendix 6b. Flame Weeding Checklist | 6-3 |
| | Appendix 7a. Prescribed Fire Event Log | 7-1 |
| | Appendix 7b. Prescribed Fire Summary Report | 7-24 |
| | Appendix 7c. MassWildlife Annual Prescribed Burn Accomplishment Report | 7-25 |
| | Appendix 8. Sample Property Map of Roads and Access Points for Firefighters | 8-1 |
| | Appendix 9a. Health Screening Questionnaire | 9-1 |
| | Appendix 9b. Medical Assessment for Work Capacity Test | 9-2 |
| | Appendix 9c: Work Capacity Test Record | 9-3 |
| | Appendix 10. Volunteer Acknowledgement and Release for Participation in Prescribed Fire | 10-1 |
| | Appendix 11. Sample Grant of Permission to Burn Lands Not Administered by MassWildlife | 11-1 |
| | Appendix 12: Prescribed Fire and Wildfire Experience Log | 12-1 |
| | Appendix 13. Incident Action Plan Safety Analysis | 13-1 |
| | Appendix 14. Sample Contingency Map | 14-1 |
| | Appendix 15. Medical Plan | 15-1 |

| | |
|---|------|
| Appendix 16: HRD Incident Report Forms for Personal Injury and Vehicle Damage | 16-1 |
| Appendix 17. SafeCommunication Reporting Form | 17-1 |
| Appendix 18a: Sample Neighbor Notifications | 18-1 |
| Appendix 18b: Sample Public Service Announcement | 18-5 |
| Appendix 18c: Fire Public Service Announcement Spreadsheet | 18-6 |
| Appendix 19: Sample Burn Crew and Partner Pre-Burn Notification | 19-1 |
| Appendix 20: Sample Email Notification Form to MassDEP and Partners | 20-1 |
| Appendix 21: Glossary of Terms | 21-1 |
| Appendix 22: Resources and Pertinent References | 22-1 |

List of Tables

| | |
|--|----|
| Table 1: Massachusetts Laws and Regulations Governing Open Burning | 4 |
| Table 2: Minimum Levels of Prescribed Burn Monitoring | 20 |
| Table 3: Massachusetts Wildlife Fire Position Titles and Training Requirements | 32 |
| Table 4: Qualification Requirements related to Complexity | 34 |
| Table 5: Typical Notifications for Prescribed Fire Planning | 74 |

List of Figures

| | |
|--|----|
| Figure 1: Locations of Some Fire-Influenced Communities in Massachusetts | 9 |
| Figure 2: Preburn Briefing | 17 |
| Figure 3: Test Burn and Fire Behavior Monitoring | 21 |
| Figure 4: After Action Review | 26 |
| Figure 5: Position Flow Chart and Typical Hierarchy within Fire Operations | 40 |
| Figure 6: Sample Prescribed Burn Signs Trail Closure | 66 |

Executive Summary

Prescribed fire is an essential tool for managing wildlife habitats and fire-influenced natural communities throughout the Commonwealth. At a time when human landscape influences disrupt natural ecological processes such as wildfire, active management including prescribed fire is increasingly needed to maintain habitat and biological diversity. The Massachusetts Division of Fisheries and Wildlife (MassWildlife) is charged with the stewardship of all native wild amphibians, reptiles, birds, mammals, and freshwater and diadromous fishes in the state, as well as endangered, threatened, and special concern species, including native wild plants and invertebrates. A great diversity of wildlife and plants, including both game and non-game species, benefit from prescribed fire, and sound application of prescribed fire can significantly enhance wildlife related recreation activities, such as hunting, bird-watching, hiking, and nature photography. Thoughtful use of prescribed fire can also decrease threats to human life and property posed by wildfire through active fuels management. Prescribed fire is essential to ensure the persistence of the full suite of fire-influenced natural communities in Massachusetts and the diversity of plants and animals that depend on them, many of which are imperiled. Our work to manage fire-influenced natural communities in Massachusetts such as pine barrens and sandplains has regional and even global conservation implications.

The purpose of this Prescribed Fire Policy and Handbook is to describe goals, procedures, and standards for safe prescribed fire management by MassWildlife. The Handbook is intended as a practical guide for MassWildlife staff and administrators, and covers (1) permitting, (2) Prescribed Fire Planning, (3) equipment, (4) implementation, (5) incident management, (6) burn crew qualifications and fitness, (7) partnerships and agreements, (8) safety and risk management, (9) record-keeping, and (10) public outreach and communications. In most cases, MassWildlife standards are consistent with those established by the National Wildfire Coordinating Group (NWCG). Cases where MassWildlife deviates from NWCG standards to address state or MassWildlife specific circumstance are noted in the Handbook.

Implementation of prescribed fire on a landscape scale demands cooperation and partnerships across agencies and organizations, and across property lines. MassWildlife is committed to continued and expanded cooperation with our many prescribed fire partners, including our sister agency the Department of Conservation and Recreation, other state and federal agencies, and private conservation organizations—this Policy and Handbook are a reflection of that commitment. More broadly, the Policy and Handbook reflect MassWildlife's ongoing commitment to maintaining a strong prescribed fire program in furtherance of our mission and the many wildlife-related, recreational, aesthetic, and wildfire risk reduction benefits it provides the public.



Prescribed burn ignitions in Oak – Pine Woodland



Mechanical and prescribed fire treatments

Director's Statement--Jack Buckley

MassWildlife views prescribed fire as an essential habitat restoration and management tool for conserving the biodiversity of the Commonwealth, and for achieving sustainable populations of game and non-game wildlife. This Handbook provides procedures and guidance for the safe application of prescribed fire. Prescribed fire is truly a “bridge building” endeavor because it can only occur at a landscape level in Massachusetts through the cooperative efforts of multiple public agencies, conservation organizations, institutions, local fire department and emergency services, and private landowners. MassWildlife is grateful to have received extensive and timely input and support from our prescribed fire partners throughout the development of this Handbook. We very much look forward to resuming prescribed fire activities with our partners for the benefit of wildlife, the restoration of natural communities, and the promotion of human health and safety.

Acknowledgements

MassWildlife thanks our dedicated partners within the prescribed fire community for the extensive time and effort they contributed toward meetings and review of early drafts of this Handbook, including Dave Celino and Patti Correia at the Department of Conservation and Recreation (DCR) Bureau of Forest Fire Control, Dave Walker and Art Canterbury at the U.S. Fish & Wildlife Service Northeast Regional Office, Dave Crary at the National Park Service Cape Cod National Seashore, Tony Davis at the National Park Service North Country and New England Region, Jacob McCumber at the Joint Base Cape Cod, Massachusetts Military Reservation, Dr. William Patterson III, UMass, Amherst, Department of Natural Resource Conservation (Retired), and Joel Carlson, Mark Teixeira, and Alex Entrup at Northeast Forest & Fire Management.

Compilation

Numerous current or former MassWildlife staff contributed to compilation of this Handbook. This effort was coordinated by Caren Caljouw with assistance from (in alphabetical order) Christopher Buelow, Rebecca DiGirolomo, Brian Hawthorne, Ben Mazzei, Marianne Piche, Jon Regosin, John Scanlon, Tim Simmons, and Jason Zimmer.

I. Introduction

Prescribed fire is an essential tool for managing wildlife habitats and fire-influenced natural communities throughout the Commonwealth. This Handbook describes goals, procedures, and standards for the application of prescribed fire by the Massachusetts Division of Fisheries and Wildlife (MassWildlife). It also sets a strong foundation to work closely with the fire management community and regulatory authorities to enhance communications, coordination, and resource allocation for wildland fire. The Handbook describes the minimum requirements for prescribed fire planning and implementation.

The Handbook provides procedures consistent with accepted National Wildfire Coordinating Group (NWCG) standards for the planning and implementation of prescribed fire, the review and reporting of prescribed fire and wildfire events, and strategies for risk mitigation. It establishes minimum qualifications, training, and experience required of MassWildlife personnel involved in prescribed fire management activities. The Handbook provides the supporting framework for the MassWildlife Prescribed Fire Management Policy approved by the Massachusetts Fisheries and Wildlife Board on April 19, 2017 (Appendix 1).

MassWildlife promotes the safe use of prescribed fire as an important habitat management tool. This includes using prescribed fire to restore fire as an ecological process, while helping to reduce conditions under which wildfire can threaten public safety, destroy property, and damage natural and cultural resources. Application of prescribed fire requires detailed awareness and coordination of numerous interdependent parts (e.g., weather, fuels, terrain, equipment, staffing, partnerships, risk assessment and mitigation) to obtain successful outcomes. This document was developed in collaboration with land managers, scientists, and fire management experts, and focuses on achieving resource management goals, assessing risks, and developing comprehensive strategies to safely implement prescribed fire on MassWildlife lands.

Wildland Fire is a general term describing non-structural fire that occurs in vegetation and natural fuels. Wildland Fire includes both planned and unplanned fires.

Prescribed Fire is a planned fire intentionally set by resource managers to meet management objectives.

Wildfire is an unplanned fire caused by lightning or other natural causes, by accidental (or arson caused) human ignitions, or by an escaped prescribed fire.

A. Purpose and Need for Prescribed Fire Management

Fire is an important ecological process for sustaining biodiversity in the Commonwealth and beyond. Our understanding of the value and need for prescribed fire has increased dramatically over the past several decades and is supported by sound academic research and management. Because of this, land managers, conservationists, and government officials are increasingly turning to prescribed fire as a critical tool for wildlife habitat management and landscape restoration and maintenance. Fire is a necessary ecological process in many natural communities and habitat types, and prescribed fire is a critical tool for restoring and sustaining the Commonwealth's diversity of animals, plants, and natural communities. Thoughtful use of prescribed fire can also decrease threats to life and property posed by wildfire through active fuels management.

The following are some of the many benefits of prescribed burning:

- Natural community and ecosystem restoration and perpetuation
- Rare and declining species habitat restoration and maintenance
- Game and nongame wildlife habitat improvement
- Increased mast and berry production
- Enhanced germination, recruitment, and productivity of forest trees
- Soil nutrient improvements
- Site preparation for planting
- Invasive plant control
- Insect pest and disease control
- Hazardous fuel reduction and lowered wildfire risk

By statute, MassWildlife is responsible for the conservation - including restoration, protection, and management of fish and wildlife resources for the benefit and enjoyment of the public. Specifically, MassWildlife's charge is the stewardship of all native wild amphibians, reptiles, birds, mammals, and freshwater and diadromous fishes in the state, as well as endangered, threatened, and special concern species, including native wild plants and invertebrates (MGL c. 131 and 131A et seq.).

A great diversity of wildlife and plants, including both game and non-game species, benefit from prescribed fire, and sound application of prescribed fire can significantly enhance recreational activities, such as hunting, bird-watching, hiking, and nature photography. In the context of MassWildlife's mission, fire-influenced natural communities are of extremely high conservation importance and a priority for restoration and management. Of the 30 fire-influenced natural communities that have been classified in Massachusetts, over half have been identified as Priority Natural Communities, with several of this subset being of global significance. Over forty percent of the 427 plants and animals currently listed on the Massachusetts Endangered Species list have been identified as requiring fire-influenced habitats during at least part of their life cycles. Prescribed fire is essential to ensure the persistence of the full suite of fire-influenced natural communities in Massachusetts and the diversity of plants and animals that depend on them. Our work to manage fire-influenced natural communities in Massachusetts has regional and even global conservation implications. Appendix 2 contains a list of Massachusetts natural communities, rare plants, and animals benefitting from prescribed fire.

B. Prescribed Fire Program Mission Statement, Goals, and Objectives

The mission of the MassWildlife Prescribed Fire Program is to conserve and restore the suite of fire-influenced natural communities, and the full range of associated native species. The goals and objectives supporting this mission will be achieved through a comprehensive approach to fire management that recognizes the relationships between ecosystem health and safety, sound planning, science-based management, and the importance of public and private partnerships.

Goals and Objectives:

- 1. Use prescribed fire to conserve and restore the region's fire-influenced natural communities and associated biological diversity.**
 - a. Identify and evaluate fire-influenced natural communities.
 - b. Prioritize fire-influenced natural communities and project areas on MassWildlife lands for fire management based on ecological and public safety parameters.

- c. Develop and implement Site Plans, Fire Management Plans, and/or Prescribed Fire Plans for priority sites.
 - d. Restore and maintain resilient fire influenced landscapes and natural communities using prescribed fire, mechanical treatments, and other appropriate management tools.
 - e. Systematically monitor community and species response to fire related events at prioritized sites, and adjust management regimes in response to monitoring outcomes.
 - f. Work with partners to plan and implement prescribed fire on high value sites owned or managed by other landowners
- 2. Ensure prescribed burn crew, firefighter, and public safety.**
- a. Conduct reasoned and informed risk management to achieve safe operation of all fire-related activities.
 - b. Ensure personnel are qualified and use safe working standards and/or guidelines while participating in prescribed fire and fuels treatment projects.
 - c. Provide appropriate training, experience, mentorship, and learning opportunities for prescribed fire personnel to maintain currency and standards of technical expertise.
 - d. Require annual safety refreshers and fitness standards for all prescribed fire personnel.
 - e. Ensure Prescribed Fire Plans adhere to National Wildfire Coordinating Group (NWCG) guidelines and/or MassWildlife Policies, as applicable.
 - f. Work closely with local, state, federal, and non-governmental fire management partners in planning and implementing fire management activities.
 - g. Apply prescribed fire on MassWildlife lands, where appropriate, to support efforts by local fire departments and DCR Bureau of Forest Fire Control to reduce fuel loads and mitigate wildfire-related risks to life, safety, and property.
- 3. Engage scientists, land managers, regulators, and the public to advance our understanding of fire ecology and ensure continued support for prescribed fire as a management tool.**
- a. Support research and long-term monitoring programs to advance understanding of fire and its effective application through prescribed burning.
 - b. Participate in cooperative landscape scale projects with partners to achieve ecosystem and natural community restoration goals, promote public safety, and reduce wildfire risk in the wildland-urban interface.
 - c. Enhance communication and coordination with regulatory authorities to facilitate prescribed burning and achieve resource management goals.
 - d. Conduct outreach and provide technical assistance to appropriate landowners (e.g., site visits, management recommendations) including those private and public conservation entities with the capacity to impact fire-influenced landscapes.
 - e. Provide science-based information and education materials on the benefits of prescribed fire and fire-related activities.

C. Laws and Regulations Governing Open Burning

MassWildlife will comply with all federal, state, and local laws, regulations, and procedures that are applicable to prescribed burning. Open burning is regulated by a number of provisions in the Massachusetts General Laws (M.G.L.) and associated regulations of the Code of Massachusetts Regulations (CMR). Two laws, in particular, apply to all MassWildlife prescribed burning, while other relevant laws may apply only in certain cases (see Table 1 below). Specifically, M.G.L. c. 48 controls the fire safety aspects of fires and fire departments, while M.G.L. c. 111 regulates the potential air pollution impacts related of open burning. The relevant section of M.G.L.c. 48 establishes jurisdiction at the municipal level by local forest wardens and fire chiefs and at the state level by the Massachusetts Department of Conservation and Recreation (DCR). The relevant sections of M.G.L. c. 111 establish jurisdiction by local boards of health and the Massachusetts Department of Environmental Protection (MassDEP).

Table 1. Massachusetts Laws and Regulations Governing Open Burning

| M.G.L. Chapter and Sections | Title | Regulations | Applicability (see section II.C for Permit guidelines) |
|---|---|--------------|--|
| c. 48 § 13 https://malegislature.gov/Laws/GeneralLaws/PartI/TitleVII/Chapter48/Section13 | Fires, Fire Departments and Fire Districts | 527 CMR 1 | Local permit required for all burns. |
| c. 111 §§ 31C, 122, 142A https://malegislature.gov/Laws/GeneralLaws/PartI/TitleXVI/Chapter111/Section31C https://malegislature.gov/Laws/GeneralLaws/PartI/TitleXVI/Chapter111/Section122 https://malegislature.gov/Laws/GeneralLaws/PartI/TitleXVI/Chapter111/Section142A | Public Health | 310 CMR 7.07 | DEP permit required for all burns. |
| c. 131A https://malegislature.gov/Laws/GeneralLaws/PartI/TitleXIX/Chapter131A | Massachusetts Endangered Species Act (MESA) | 321 CMR 10 | Management plan and MassWildlife Natural Heritage & Endangered Species Program (NHESP) letter for burns in priority habitat. |
| c. 30 §§ 61 – 62H https://malegislature.gov/Laws/GeneralLaws/PartI/TitleIII/Chapter30 | Massachusetts Environmental Policy Act (MEPA) | 301 CMR 11 | MEPA review required only if thresholds exceeded (see below). |
| c. 131 § 40 https://malegislature.gov/Laws/GeneralLaws/PartI/TitleXIX/Chapter131/Section40 | Wetlands Protection Act (WPA) | 310 CMR 10 | Local wetland permit (and/or MassDEP) applies only if burn or associated actions (e.g. firebreak construction) alter resource area or buffer zone. |
| c. 132 §§ 41 – 45 https://malegislature.gov/Laws/GeneralLaws/PartI/TitleXIX/Chapter132 | Forest Cutting Practices Act (FCPA) | 304 CMR 11 | DCR Forest Mgt Plan applies only if forest cutting is required in addition to burning. |

Conditions and Restrictions on Open Air Fires are established pursuant to M.G.L. c. 48 s. 13. This section makes it a crime for any person to “set, maintain or increase a fire in the open air” (other than certain cooking fires) except by permit.

The items currently relevant to prescribed burning are:

1. Local fire officials must give permission no more than two days before the fire is initiated.
2. Permission must be in writing, or local fire officials must keep a detailed written record.
3. Fire officials may make it a requirement that burning be conducted only after 4pm. [Note: this requirement has essentially been eliminated by Air Pollution laws and regulations.]
4. Penalties for violations include a fine of up to \$500 plus the cost of suppression, imprisonment for not more than one month, or both.

M.G.L. c. 48 § 13 is cited in regulations at 527 CMR 1, promulgated by the Board of Fire Prevention of the Department of Fire Services. Those regulations adopt the National Fire Protection Association 2012 edition fire code with Massachusetts amendments. Sections of these regulations include stipulations that:

1. Open fires must be attended by a competent person until the fire is extinguished, and to have a garden hose or other fire-extinguishing equipment.
2. The permit holder must be present until the fire is extinguished.
3. Burning on public property or land of another include permission from the agency or owner.
4. Permits (whether written or verbal) must be obtained no more than two days before the date of the prescribed burn.
5. The issuing authority may set the hours of burning, and limits for atmospheric conditions or hours are to be listed in the permit.
6. Fires must be 50 feet or more from a structure. Conditions that could cause a fire to spread within 25 feet of a structure must be eliminated before ignition.

MassWildlife procedures for obtaining a local fire permit are described in Section II.C of this Handbook.

Other sections of M.G.L c. 48 contain provisions related to prescribed fire and wildfire. For example, Sections 8 through 12 provide authority for regulating woodland fires, including the annual appointment of a "forest warden" by each city and town, and to report this appointment to the "commissioner of environmental management, in this chapter called the forester" (section 8). These sections allow local fire officials to set back fires and take necessary precautions to prevent the spread of fires that occur in woodlands (section 9), to appoint deputies and compel the assistance of persons and require the use of equipment and property to aid in extinguishment or prevention of forest fire (section 10), sets penalties for refusal to provide assistance (section 11), and provides for payments for such aid (section 12).

Important note on terminology: The Department of Environmental Management referred to in section 8 was subsequently renamed DCR. In the remainder of this Handbook we replace references to the "forester" with "DCR," consistent with section 8. In most towns and cities, the chief or other officer of the fire department serves as the forest warden. For the remainder of this Handbook, we use the term "local fire officials" to refer to the forest warden or whichever local fire officials have been designated in the town to have this jurisdiction.

Section 15 gives the power to arrest anyone violating section 13 to the "forester, the state fire warden or any duly authorized assistant, the forest warden in a town or the official performing the duties of a forest warden in a city, or any duly appointed deputy forest warden, the director of the division of fisheries and wildlife, an environmental police officer or deputy environmental police officer or a fish and game warden". Note that this power of the Director of MassWildlife is in addition to those provided in M.G.L. c. 131 §§ 1G and 4.

Sections 16 through 20 are known as the Massachusetts Slash Law, and includes provisions for handling slash from logging and land clearing, including clearing transmission line rights of way. Enforcement of these sections is given to the DCR and local fire officials. Sections 21-22 require spark arresters on machinery operating near forests and grasslands and allows DCR to inspect such machinery. Section 23 allows towns to construct fire towers under the direction of DCR.

Section 24 allows local fire officials to expend money preventing forest fires, including taking woodland by eminent domain, trimming brush from woods roads, maintaining fire lines, for fire patrols, and in "other ways adapted to prevent or check the spread of fire." Section 24 also allows DCR to take over a fire that gets beyond the control of the local forest warden and to split the cost of firefighting in that case.

Section 25 gives local fire officials "sole charge" for extinguishing forest fires, unless DCR takes over a fire under Section 24. It requires local fire officials to investigate forest fires and to post warnings provided by DCR. Since section 15 also requires other state entities to fight forest fires that they find and to notify the town forest warden, the implication is that those entities would have control of firefighting efforts until local fire officials arrive on scene. Section 26 provides penalties for destroying such warning notices, and section 27 says that local and state fire officials are not liable for trespass when performing their duties under chapter 48, chapter 131 (MassWildlife), chapter 132 (DCR), and chapter 148 (state fire marshal and local fire departments).

Section 28 and 28B requires the state fire warden appointed under M.G.L. c. 21 § 5 to aid and advise local fire wardens, however M.G.L. c. 21 § 5 was repealed in 2003, so the current effect of those sections is unclear. The remainder of the chapter contains detailed laws regarding local fire departments.

Air quality permitting related to prescribed fire is governed by M.G.L. Chapter 111 and 310 CMR 7.

310 CMR 7.07 "U¹ Open Burning" is the section of the regulations applicable to prescribed fire, as it restricts the open burning of any combustible material. Certain uses, listed in 310 CMR 7.07(2), are exempt: fighting existing fires, cooking, and blowtorches or welding torches. A small number of additional allowed cases are listed in 310 CMR 7.07(3):

- a. Training or research in fire protection or prevention, with DEP approval.
- b. Normal pursuit of agriculture.
- c. Agricultural land clearing.
- d. Disposal of fungus-infected elm wood. Brush burning (not allowed for commercial or institutional land clearing, or in certain cities or town). Grass, hay, leaves and stumps excluded.
- e. Brush burning (not allowed for commercial or institutional land clearing, or in certain cities or town). Grass, hay, leaves and stumps excluded.
- f. Disposal of combustible material "after demonstration to the Department that no alternative suitable method of disposal is available." All of these cases require that a permit has been issued under M.G.L. c. 48 § 13.

The process for obtaining MassDEP approval for prescribed burning, is generally pursuant to options "a" and "f," and described in Section II.C.

310 CMR 7.07(3): "g" requires that open burning as described in 310 CMR 7.07(3): (a) through (f) must be conducted:

1. During periods of good atmospheric ventilation
2. Without causing a nuisance

¹ "U" is defined as Universal, All District

3. With smoke minimizing starters if starters or starting aids are used
4. Under provisions of a properly executed permit issued under provisions of MGL c 48, s 13.

Pursuant to M.G.L. c. 111 Section 31C, local boards of health may additionally regulate atmospheric pollution with local rules and regulations approval by DEP. In municipalities where such rules have been promulgated, MassWildlife will obtain required local approvals.

The Massachusetts Endangered Species Act (MESA) establishes jurisdiction by MassWildlife NHESP, and applies only for prescribed burns which occur in priority habitat or which might result in a take of a state-listed rare species. Habitat management plans shall be developed in coordination with NHESP to ensure that agency activities do not result in a take under MESA. Under MESA regulations 321 CMR 10.14(15), active habitat management for the benefit of listed species is exempt from formal MESA filing requirements (321 CMR 10.20) provided that management is carried out in accordance with a habitat management plan approved by NHESP. MassWildlife will only conduct prescribed burning in priority habitat after completion of such a plan. See process for obtaining NHESP approval in section II.C. In rare cases, prescribed fire may occur in habitat for a species listed under the Federal Endangered Species Act (ESA). To ensure ESA compliance in such cases, MassWildlife will consult with the U.S. Fish and Wildlife Service before implementing a prescribed burn .

The Massachusetts Environmental Policy Act (MEPA; M.G.L. c. 30 s. 61 through s. 62I, 301 CMR 11) establishes jurisdiction by the Secretary of Energy and Environmental Affairs (EEA), and requires that "All agencies, departments, boards, commissions and authorities of the commonwealth shall review, evaluate, and determine the impact on the natural environment of all works, projects or activities conducted by them and shall use all practicable means and measures to minimize damage to the environment." All MassWildlife prescribed burns are carried out in accordance with required approvals under the WPA, MESA, the FCPA, and an approved Prescribed Fire Plan, and no MEPA review thresholds, as defined in 301 CMR 11.03, will be exceeded for MassWildlife prescribed burning activities. Therefore, review under MEPA will not be required.

The Wetlands Protection Act (WPA) governs activities which alter vegetation within a wetland resource area, or potentially within the buffer zone of such an area. This section establishes jurisdiction at the municipal level by local conservation commissions and at the state level by MassDEP. Any prescribed fire planned in or within the buffer zone of a jurisdictional wetland resource area should be reviewed to determine if there is a potential to alter the area under the meanings of the WPA (see permitting requirements in section II.C).

The Forest Cutting Practices Act (FCPA) establishes jurisdiction by DCR on land devoted to forest growth in 304 CMR 11.02(1). Any forest cutting on MassWildlife land, including activities associated with prescribed fire pre-treatments, will be conducted in accordance with a DCR approved forest cutting plan, as applicable.

II. Prescribed Fire Priorities, Planning, and Documentation

A. Prescribed Fire Priorities on MassWildlife and Other Public and Private Lands

Prescribed burning is an essential tool for managing and restoring habitat and natural communities on Wildlife Management Areas administered by MassWildlife. As a result, it is anticipated that most prescribed burn activities carried out by MassWildlife staff will occur on WMAs. However, as described in Section I.A., MassWildlife is responsible for the conservation of all wild amphibians, reptiles, birds, mammals, and freshwater and diadromous fishes in the state, as well as all endangered, threatened, and special concern species, including native wild plants and invertebrates. Fulfilling MassWildlife's mission of conserving the Commonwealth's flora and fauna will at times require burning cooperatively with partners on lands owned by federal, other state, or municipal governments, as well as assisting private landowners (e.g. land trusts) at their request. Similarly, other partners such as employees of the Massachusetts Department of Conservation and Recreation (DCR) may participate in prescribed burns on MassWildlife managed land. These scenarios are collectively referred to as "cooperative burning."

MassWildlife staff may participate in cooperative burning to:

- a) Meet MassWildlife's habitat and wildlife management goals, including but not necessarily limited to participation in landscape scale efforts to restore and maintain important habitat across property ownerships;
- b) Provide training opportunities for MassWildlife staff; and
- c) Participate in reciprocal agreements involving the sharing of personnel and equipment.

Meeting Habitat and Wildlife Management Goals

MassWildlife is charged with managing and protecting the full diversity of native plants and animals found in the Commonwealth, with a focus on Species of Greatest Conservation Need (SGCN), as articulated in the State Wildlife Action Plan (SWAP). A great diversity of game and non-game species benefit from prescribed fire, and many state-listed species and other SGCN depend on fire-influenced natural communities. Meeting MassWildlife's mission and landscape goals for fire-influenced natural communities (e.g., sandplain grasslands, pitch pine and scrub oak barrens) and wildlife habitats require partnership with other landowners; and prescribed burning is no exception. For example, critically important conservation areas such as the Southeastern Massachusetts Pine Barrens, centered on Myles Standish State Forest, and the Mashpee Pine Barrens are complex mosaics of landownership including DCR, MassWildlife, U.S. Fish and Wildlife Service and land trusts. Sharing staff resources and equipment when planning and implementing prescribed burns will enable all conservation partners to accomplish more and meet landscape scale management objectives for restoration and long-term maintenance of important habitats.

Staff Training

Staff training and development of a variety and number of qualifications is critical to meeting MassWildlife prescribed fire goals and objectives on MassWildlife property and elsewhere. See Section I. A. Goals and Objectives. In an effort to grow and maintain MassWildlife prescribed burn capacity, training opportunities may be provided on lands owned or managed by other entities. This includes not only sending staff to formal training and classes, but also providing experiential training through participation in burn crews supervised by other agencies and organizations. As all MassWildlife prescribed fire staff are required to maintain specific certifications and currency, MassWildlife may elect to have staff participate in prescribed burns on various properties to facilitate training and experience. All employees who participate in MassWildlife prescribed fire

activities shall adhere to the requirements of this handbook to ensure the safety of staff, cooperators, and the general public; and to protect property and resources.

Memoranda of Agreement

Sharing of prescribed burn equipment and staff through cooperative burning provides mutual benefits to partnering organizations. This is particularly important for more complex burns with large crews, where multi-agency crews are the norm, and where most organizations would otherwise lack the capacity to carry out such burns. Burning pursuant to reciprocal agreements will also fulfill MassWildlife habitat and training objectives.

All cooperative burning in which MassWildlife is a participant will be governed by formal Memoranda of Agreement (MOA) signed by the cooperating parties (or substantially equivalent formal agreements). A possible exception may be participation by local fire departments in prescribed burns (Section III.G). MassWildlife is currently a party to a MOA governing the Mashpee National Wildlife Refuge which contemplates joint prescribed burns with multiple government and private partners. MassWildlife anticipates becoming a partner of the Stafford Act Interagency Master Agreement for wildfire and prescribed fire cooperation. This agreement includes state agencies in Massachusetts, Rhode Island, and Connecticut, and federal entities such as the U.S. Fish and Wildlife Service, National Park Service, U.S. Forest Service, Bureau of Indian Affairs and the Massachusetts Army National Guard. Additional MOAs will be executed to define the terms of other cooperative prescribed fire partnerships as further discussed in Section III.G.

B. Setting Prescribed Fire Priorities

MassWildlife is engaged in a variety of habitat management and restoration projects throughout the state to conserve biological diversity. Priorities for prescribed fire are based on resource inventories of fire-influenced natural communities and wildlife habitats. MassWildlife has developed a set of criteria to assist in prioritizing all habitat management projects including prescribed fire sites and projects. Prioritization involves assessing the “importance” of a project or site based on consideration of (1) biological resources, (2) restoration potential, and (3) other programmatic values. The second step in the prioritization process involves a feasibility analysis or consideration of how likely MassWildlife is to achieve its management goals. As priority sites are identified, MassWildlife works closely with public and private partners and other prescribed fire experts to develop a realistic conservation vision for these sites and set priorities for fire planning and the safe and effective implementation of prescribed fire. Setting clear and measurable conservation goals and objectives is an essential part of the planning process.

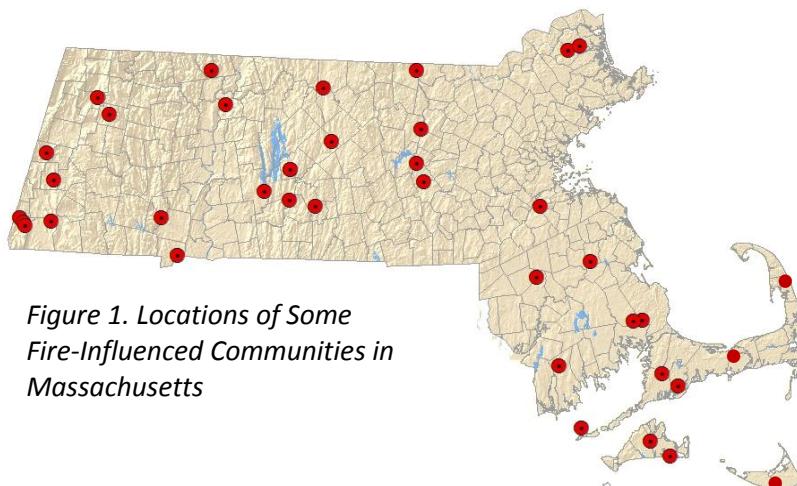


Figure 1. Locations of Some Fire-Influenced Communities in Massachusetts

The following elements provide the framework for site selection and prioritization of MassWildlife prescribed fire projects.

Biological Resources & Restoration Potential

- Quality, number, and juxtaposition of priority fire-influenced natural communities to be maintained, improved or restored
- Number of target species benefiting; importance, quality, and restoration potential of the individual populations, with special emphasis on declining populations of fire-influenced species
 - Federally listed or candidate species; globally rare species (G1-G3)
 - State listed species and other Species of Greatest Conservation Need (SGCN) as identified in State Wildlife Action Plan (SWAP)
 - Other game species in addition to those listed as SGCN
- Urgency: conservation targets (species, natural communities) may be lost in Massachusetts or highly degraded if restoration is not implemented in the next five to ten years
- Area size and condition are adequate to allow for management and support target resources
- Improvement of conditions to control
 - invasive plant species
 - insect damage and disease
- Germination, recruitment, and long-term viability of forest resources are enhanced (e.g. oak regeneration)
- Improvement of habitat conditions for species vulnerable to climate change
- Landscape goals are enhanced and the prescribed fire unit is adjacent to or in close functional proximity to other managed landscape units
 - Meets one or more landscape goals for MassWildlife's grassland, shrubland, and young forest habitat initiative
 - Meets goals of Northeast Region Cohesive Wildland Fire Management Strategy to restore and maintain resilient landscapes, create fire adapted communities, and respond to wildfires. Website: <http://wildfireinthene.blogspot.com/>
 - Benefits resources within a regional context
 - The project involves a partnership with other agencies, organizations, and private landowners ensuring sound risk management and leveraging scarce conservation dollars and administrative oversight

Other Programmatic Goals and Considerations

- Reduces hazardous fuels and improves safety within the wildland urban interface
- Protects and/or enhances scenic, cultural, and/or historic resources
- Enhances compatible wildlife recreational opportunities including hunting, fishing, and trapping
- Provides favorable potential for demonstration of stewardship activities, public outreach, and education
- Supports on-going long term research and/or biological monitoring
- Provides training opportunities

Feasibility

- The project is logically feasible (access, public safety, proximity to resources at risk in event of escape)
- Environmental and other permitting is in place to allow activities
- Reasonable likelihood for availability of funding and staff resources for start-up, short-term restoration, and long-term management
- Potential for a successful outcome in a reasonable time frame

C. Permits and Approvals

DEP Prior Approval for Open Burning

Most prescribed burning conducted by MassWildlife will fall under the “training/research” and “no alternative suitable method” options under Air Pollution regulations at 310 CMR 7.07 (see above). Both options require prior approval by MassDEP. As of 2016, MassDEP does not provide either online application forms or an eDEP application for this approval, and not all MassDEP regional offices have developed forms or procedures for such approval. Appendix 3b: MassDEP Application Forms and Permits Related to Open Burning includes examples of application forms used by the Southeast and Western Regional Offices of MassDEP and illustrate the different procedures followed within each region. The application format used in the Western Region was jointly developed by MassWildlife and MassDEP Western Region staff. MassWildlife should contact the MassDEP regional office well in advance of any anticipated burning to determine what procedures to use for prior approval under 310 CMR 7.07. Applications must be submitted annually (or as otherwise required by MassDEP, e.g. SE Regional Office is every two years) to the MassDEP office for the region within which prescribed burning is proposed.

Local Fire Permit

All fires in the open air require a permit from the local forest warden/fire chief. Appendix 3: Sample Request to Local Fire Chief for Permission to Burn includes sample text for a letter requesting permission and a sample permit form, although many local fire officials will have simple verbal or online procedures. MassWildlife staff should first discuss the proposed burning verbally with the local fire officials, to determine to whom written requests should be sent, and whether the department has its own permit application form or other process. Many fire chiefs require a verbal request the night before or the morning of the burn, and will issue only a verbal permit. Discussions with the local fire chief and staff usually begin well before the actual burn day, as the local fire department is involved in the planning phases of the project. MassWildlife will follow the submission requirements of the local fire department, which often includes the following: After MassDEP approval has been received (see above), MassWildlife should submit a request to the local fire official, indicating the MassDEP permit is in hand, details of the proposed burning, and indicating the method that the fire official has requested for final permit delivery (verbal/written). The fire department should be called by phone on the schedule requested by local fire officials (but generally not more than two days before a burn) to confirm permission. The date and time of any verbal permit should be logged on the prescribed burn log.

NHESP Request for Review and Approval under MESA

All Site Resource Management Plans, Fire Management Plans, and Prescribed Fire Plans (see subsection D, below) that include Priority Habitat are submitted to NHESP Environmental Review staff with a request for review and approval (Appendix 3d) as soon as the plans are completed and in advance of implementing prescribed burns. Environmental Review staff provide an approval letter that may include specific conditions that need to be met during prescribed burning to conserve listed species. Individual prescribed burns are then conducted in accordance with the NHESP approval letter.

If anything changes relative to how a prescribed burn will be conducted between the time the approval letter is issued and the time of the actual burn, the Prescribed Fire Plan needs to be amended and returned to NHESP for further review prior to conducting the burn

Wetlands Protection Act Permitting

If there is a potential to alter a wetland resource area under the meaning of the Wetlands Protection Act, MassWildlife staff should first discuss the proposed burning verbally with the local Conservation Commission

to determine which form the commission would prefer that MassWildlife submit (see forms listed in Appendix 3: Forms applicable to Wetlands Protection Act Permitting. If a Request for Determination of Applicability (RDA) is requested, that form should include all details requested by the commission. (An RDA response does not allow additional conditions to be attached to the Determination of Applicability except for projects in buffer zones).

Federal Permitting and Compliance

To satisfy any applicable federal review, permits, and compliances, the Prescribed Fire Program Manager or his/her designee must submit the following documentation to the MassWildlife Federal Aid Coordinator, or his/her designee, at least 60 days prior to the anticipated start date of any on-the-ground activities.

- 1 – 2 paragraph project description that includes all treatment types to be applied within the footprint of the management unit(s)
- Total area for each treatment type (e.g. acres, linear feet)
- USGS topographic map at a scale of 1:20,000 delineating all treatment types described in the project description
- If necessary, additional USGS topographic maps at smaller scales to delineate specific locations of certain treatment types (e.g. fire breaks, access points, etc.)

D. Prescribed Fire Planning and Documentation

Prescribed burns must be implemented in compliance with a written plan. A Prescribed Fire Plan is the document that guides the Burn Boss, the individual qualified to lead a prescribed burn. MassWildlife follows a standardized, reproducible template for Prescribed Fire Planning developed by the National Wildfire Coordinating Group (NWCG), Appendix 4a. This planning template contains 21 critical elements, and involves team input and analysis to develop the Prescribed Fire Plan. Plans may vary in their degree of detail based on the size and complexity of a prescribed fire project. A Wildlife Management Area with multiple fire-influenced communities comprising numerous fuel types may typically have more than one Prescribed Fire Plans to cover all portions (logistical units) of the property that will be managed using prescribed fire.

Individual Prescribed Fire Plans are supported by (nested within) a higher level Site Resource Management Plan (Site Plan), or a Fire Management Plan (FMP) or by both. Site Plans are prepared for all WMAs where active management occurs, regardless of whether or not prescribed fire is part of that management. For those WMAs where prescribed fire is appropriate, the overall direction for prescribed fire management is established by the Site Plan. For WMAs with fire-influenced natural communities, the Site Plan serves as the document to initiate, analyze, and provide the basis for using prescribed fire to meet resource management objectives.

FMPs are warranted for properties that contain extensive fire-influenced natural communities with relatively high fuel loads, high fire frequency, and high fire complexity, especially when such properties occur in a landscape setting where wildfire risk to adjacent human life and property is substantial. FMPs may be warranted for areas that cross ownership and jurisdictional boundaries. Examples include the Southeast Pine Barrens WMA, Maple Springs WMA, Myles Standish State Forest, and the adjacent Camp Cachalot Wildlife Conservation Easement. These properties support potentially volatile fire-influenced barrens communities of global significance adjacent to extensive human development. In this type of situation, extensive and on-going coordination between public land management agencies, private land managers, and local fire departments is warranted through a FMP.

Prescribed Fire Plan Review and Approval

Prior to burning on MassWildlife lands, the Prescribed Fire Plan must be approved by MassWildlife as the landowner, and permits must be obtained from any state and local agencies with regulatory authority.

Prescribed Fire Plan Elements

1. *Signature Page and Project Summary*
2. *A. Ignition Authorization*
B. Go/No Go Checklist & Signature
3. *Complexity Analysis Summary*
4. *Description of Prescribed Fire Area*
5. *Goals and Objectives*
6. *Funding*
7. *Prescription*
8. *Scheduling*
9. *Pre-Burn Considerations*
10. *Briefing*
11. *Organization and Equipment*
12. *Communications*
13. *Public and Personnel Safety and Medical*
14. *Test Fire*
15. *Ignition Plan*
16. *Holding Plan*
17. *Contingency Plan*
18. *Wildfire Declaration and Conversion Plan*
19. *Smoke Management and Air Quality*
20. *Monitoring*
21. *Post Burn Activities*
Maps and Appendices

MassWildlife Prescribed Fire Plans follow the federal guidelines set by NWCG and address the elements identified in the *Interagency Prescribed Fire Planning and Implementation Procedures Guide*, PMS 484 and subsequent updates. Appendix 4a includes a NWCG Prescribed Fire Plan Template and general guidance for completing the 21 elements of the plan.

It should be noted that burning of debris piles and spot burning of invasive plants is covered under separate guidance in Appendix 6: Guidelines for Burning Debris Piles and Spot Burning Invasive Plants.

All Prescribed Fire Plans for MassWildlife lands must be signed and dated by a qualified Prescribed Fire Planner and a separate qualified Technical Reviewer, both of whom are currently, or have formerly been qualified at the NWCG Burn Boss 2 (RXB2) level. The person who authors a Prescribed Fire Plan for MassWildlife lands cannot be the sole reviewer. If the MassWildlife Prescribed Fire Program Manager is the author of a Prescribed Fire Plan, that plan must receive a technical review by another qualified Burn Boss or Prescribed Fire Planner familiar with the fuel type of the planned burn area and the complexity level of the burn. The qualified Technical Reviewer does not have to be a MassWildlife representative; staff from another agency are acceptable if they are familiar with the fuel type and are experienced in leading burns similar to the one being planned. The technical reviewer must complete and sign the Technical Reviewer Checklist attached to the Prescribed Fire Plan and included in Appendix 4b: Technical Reviewer Checklist.

The Fire Planner who signs the Prescribed Fire Plan is responsible for obtaining appropriate input from other MassWildlife staff, resource specialists, landowners, foresters, local fire departments and Massachusetts Department of Conservation and Recreation, Bureau of Forest Fire Control district fire warden. The MassWildlife Prescribed Fire Program Manager or their designee is responsible for obtaining the local fire department permit and the DEP Air Quality permit.

The MassWildlife Prescribed Fire Administrator is the final approver for the Prescribed Fire Plan. The MassWildlife Prescribed Fire Administrator is appointed by the Director pursuant to the MassWildlife Prescribed Fire Policy (Section III.F. of this plan outlines the duties of the MassWildlife Prescribed Fire Administrator). The MassWildlife Prescribed Fire Administrator signs the Prescribed Fire Plan after consultation with the Prescribed Fire Program Manager and the technical review is completed. The signature of the MassWildlife Prescribed Fire Administrator provides ignition authorization and conveys approval of the Prescribed Fire Plan for a specified time period. If ignition does not occur prior to the expiration date set by the MassWildlife Prescribed Fire Administrator, a new authorization will be required. Every Burn Boss must complete and sign a pre-burn Go/No-Go Checklist prior to igniting a burn unit as determined in an approved Prescribed Fire Plan. Most approved Prescribed Fire Plans will remain in effect for up to three to five years. Updates may be required sooner based on ground truthing prior to burning and in response to changes in resources, fuels, safety, surrounding land uses, or other conditions.

Documentation and Project Files

All prescribed burns must have a project file that will be maintained at MassWildlife Field Headquarters by the Prescribed Fire Program Manager. Copies of these prescribed burn project files and pertinent contents will be provided to the MassWildlife Prescribed Fire Administrator, District Supervisor, and the fire management team as needed and appropriate to ensure proper coordination, communication, and sharing of resources. Information related to MassWildlife burn crew qualifications will be managed confidentially in separate files by the MassWildlife Fire Program Manager.

The project electronic files shall contain the following information:

1. Fire Management Plan – original
2. Prescribed Fire Plan – original
3. Complexity Analysis – as appended to Prescribed Fire Plan
4. GO/NO-GO Checklist signed by Burn Boss
5. Ignition Authorization page signed by the MassWildlife Prescribed Fire Administrator
6. Fire Event Log (See Appendix 7) including monitoring data such as weather, fire behavior, fire effects, smoke effects, photos, maps of areas burned, pre-burn checklist
7. Fire Summary Report
8. Maps and GIS data of prescribed burn and mechanical treatments, fuels, vegetation, hazards, special resources
9. Weather forecast requests, and responses
10. Keetch Byram Drought Index Tabulation sheets
11. Appropriate permit applications, approvals and compliances
12. Landowner notifications and letters, Public Service Announcements
13. Escaped Fire Reports, Reviews, and Documentations
14. Amendments to the Prescribed Fire Plan

Other information which may be included in these project files:

15. After Action Review notes
16. Incident Action Plans and Reports
17. Safe Communication Reports
18. Media inquiries and coverage
19. Long Term Monitoring Reports
20. Research
21. Photo Documentation
22. Lessons Learned to assist the team in future planning and implementation

E. Complexity Analysis and Guidance

All burns conducted on MassWildlife property or led by MassWildlife staff or contractors, even if in cooperation with another agency or entity, must have an approved Complexity Analysis, as well as a Prescribed Fire Plan. The Complexity Analysis helps define areas of increased complexity that can or cannot be further mitigated. It provides a process of assessment, mitigation, and increased awareness to address outcomes appropriately. The results of a preliminary complexity analysis are usually completed early in the planning process and may help determine any needed pre-burn mitigation of fuels (e.g., mechanical treatment such as mowing or mulching) and help determine what equipment, strategies, and staffing levels are needed to burn safely.

Items needing further mitigation should be clearly identified and included in the final complexity determination which is incorporated in the Complexity Analysis Summary, Element 3 of the Prescribed Fire Plan. Understanding the issues of complexity and the potential outcomes increases the awareness and ability of the prescribed Burn Boss and line supervisors to address actions for appropriate outcomes. Appendix 5 of this handbook, the *Complexity Analysis Guidelines* provide further guidance regarding the complexity analysis. MassWildlife has adopted the NWCG “*Prescribed Fire Complexity Rating System Guide*” (PMS 424, January 2004) as the MassWildlife standard for rating prescribed fire complexity. This guide is expected to be revised in 2017. MassWildlife will include an annual summary of changes to the handbook to reflect this and other updates and/or changes to the handbook.

A complexity rating must be completed for each Prescribed Fire Plan. The “Prescribed Fire Complexity Rating System Guide” was developed to:

- Assist personnel in identifying values and characterizing risk to those values
- Assess the technical difficulty or complexity of work involved to mitigate adverse impacts to values
- Identify where prescribed fire plan changes may be prudent to mitigate or eliminate these problems or concerns
- Provide a standardized approach for evaluating common elements encountered both within and beyond the burn units to determine a final complexity that identifies the required Burn Boss qualification level

Determination of complexity is based on three factors:

- 1) Risk - the probability or likelihood that an adverse event or situation will occur
- 2) Potential Consequences - a measure of the cost or result of an adverse event or situation occurring
- 3) Technical Difficulty - the skills needed to implement the project and deal with unexpected or adverse events

Risk and Potential Consequence ratings can be used to help determine an overall management risk associated with the project, and **Technical Difficulty** ratings can be used to facilitate the planning process and help identify prescribed fire positions and skill levels necessary to safely and successfully implement the prescribed fire.

An initial complexity rating must be completed during the project development stage to identify items needing mitigation. These items can then be addressed during the development of the Prescribed Fire Plan. Once the Prescribed Fire Plan is near completion a final complexity rating is made and the summary worksheet is completed and inserted into Element 3, the Complexity Analysis Summary, within the Prescribed Fire Plan and the full complexity analysis is appended to the burn plan. The final rating considers any mitigation factors identified in the Prescribed Fire Plan.

Note: In the case of adjacent fuels, seasonal vegetation cover and changing land use need to be evaluated and may change the complexity rating, e.g. bare soil, agricultural fields, logging operations, agricultural residue, cut hay field etc.

Based on the complexity guide, which rates 14 variables, three prescribed fire complexities are possible and are described briefly as containing any of the following:

Low: Few personnel are required, low threat of escape, minimal risk to the people involved in the operation.

Moderate: May require staffing a significant number of the prescribed fire positions, potential for spot fires that will spread moderately but can be taken care of by prompt holding action, safety issues have been identified that may require mitigation or use of special briefings to raise awareness.

High: May require staffing of all primary prescribed fire positions with a potential for multiple levels of supervision to maintain span of control, use of several different ignition devices (ground and aerial), possibility of multiple spot fires and slop-overs that may exceed the holding forces, or complex safety and public impact issues exist.

The NWCG “Prescribed Fire Complexity Rating System Guide” (2004) can be found at:
<http://www.nwcg.gov/sites/default/files/products/pms424.pdf>. The Complexity Rating Worksheet and Complexity Rating Summary Form (used for insertion within the Prescribed Fire Plan) can be found in Appendix 5. The updated complexity analysis guide, which will be available in 2017, contains a crosswalk between

elements of the complexity guide and the prescribed fire plan to ensure that elements rated in the complexity analysis are addressed in the Prescribed Fire Plan.

F. Crew Briefing and Assignments on Day of Burn

A day of burn briefing is a standard practice on prescribed burns and wildfire suppression incidents. The briefing explains to the burn crew what is planned, what might happen, and what their roles will be. A thorough briefing to all personnel involved with the burn is extremely important. The Burn Boss must brief the crew on the details of the burn operations including but not limited to:

- crew organization
- equipment assignments
- objectives of the burn
- a description of the burn area & walk of the perimeter
- special features and values at risk
- expected weather
- communications
- ignition, holding, and contingency plans
- escape and wildfire conversion plans
- hazards, safety and medical plans
- questions or concerns, and opportunities to decline participation



Figure 2: Preburn Briefing

The Burn Boss may also choose to have a smaller breakout briefing and use the chain of command to have the Firing Boss and Holding Boss disseminate additional specific information to their respective crew members. Utilizing a smaller breakout briefing to key personnel can increase efficiency and make sure lines of communication are clear. To ensure crew safety and understanding of the burn's operations, the Burn Boss should exercise clear and strong leadership during the briefing. Investigations of escaped prescribed burns (declared wildfire incidents) have revealed several common concerns, including inadequate burn briefings, crew member absence from burn briefings, and lack of burn operation understanding by crew members. At the end of the crew briefing, the Burn Boss should ask crew members to provide feedback regarding any items of concern, to identify topics not covered in the briefing, and to inform the Burn Boss of any safety concerns and if they wish to decline participating in the burn.

Samples of the prescribed burn briefing checklist and the crew organization chart are included within Appendix 4c: Prescribed Burn Briefing Checklist. The Burn Boss may choose to use alternate forms and should include those within the Fire Summary Report.

G. Communications – Radio Use, Frequencies, Cell Phone Use, Hand Signals

Communication is the key to safety. A site specific Communications Plan will be included in Element 12 of the Prescribed Fire Plan. Lookouts, Communications, Escape Routes, and Safety Zones (LCES) will be discussed at each briefing and all crew members will be informed of what radio frequencies and/or other methods of communication will be used on the prescribed burn. It is recommended that all crew members have a radio assigned to them. At a minimum, the Burn Boss, Holding Boss, Ignition Boss, Squad Boss, Weather and Fire Effects Monitor (FEMO), lookouts and all ignitors will have a radio assigned to them, unless specified otherwise in the Prescribed Fire Plan.

If crew members are working in a situation where radio communication is difficult or prohibited, for example pump operations, an agreed upon set of hand signals can be used. Additionally, hooting or whistles should be used during ignitions on large units where ignitors cannot see each other and need to maintain awareness of each other's location. All crew members who are assigned radios will complete a radio check prior to

reporting to their work assignment. Radio communications will be as brief and concise as possible to reduce traffic and keep communication lines open in case of emergency or a higher priority situation. Face-to-face communication is preferred and should be utilized as often as is feasible. Cell phones may be used as determined by the Burn Boss to communicate with resources that are off site or out of radio range, in an emergency, or in other situations determined by the Burn Boss. In remote sites, clear communications with a dispatch center must be available via radio and/or satellite phone and included in the Prescribed Fire Plan.

It is essential for crew members to maintain Situational Awareness (SA) through the entirety of the burn and while cell phones are not prohibited they should only be used in an emergency or as determined by the Burn Boss. At no time during a burn is it acceptable for crew members to use social media outlets or conduct personal business by phone. If a crew member has a personal issue that needs immediate attention they will notify their supervising crew member who will, if necessary, make arrangements for their position to be covered while they are excused to deal with the personal matter.

Currently, MassWildlife depends on partner agencies and organizations for the shared use of their frequencies for radio communication on prescribed burns. As the MassWildlife Prescribed Burn Program expands in capacity it may be beneficial for MassWildlife to consider acquiring and maintaining MassWildlife-specific frequencies or entering into frequency sharing agreements with interagency partners. The Prescribed Fire Program Manager will designate two crew members as primary and secondary radio (and other communication devices as applicable) program and maintenance personnel. These designated crew members will be responsible for maintaining an up-to-date list of all partner agency frequencies and frequency sharing agreements, and for ensuring that all fire radios are properly programmed and in good working order. They will also maintain a communication device inventory log that will include each individual piece of communication equipment (including chargers, spare clamshells and harnesses), record of any damage and repairs, and any information necessary to order replacement parts. All repairs or purchasing of additional radio or communication equipment will be coordinated by the primary and secondary communication personnel and the Prescribed Fire Program Manager. All communication devices will have a unique identifier to ensure user accountability. Radios will be assigned to most crew members at the beginning of the operational period on a given burn day, with the exception of primary crew members who may sign out a radio for an extended time period. Radios will be returned to the cache at the end of the operational period and inspected for damage by the communication personnel prior to the next prescribed burn. Sign-out sheets for all communication devices will be kept with the Fire Event Log and may be saved in the project file. Radio communication training for burn crew members must be conducted periodically and may be covered at annual safety refreshers or other appropriate events.

H. Spot Weather Forecast and On-site Weather Monitoring

The Prescribed Fire Plan must identify the method and frequency for obtaining weather and smoke management forecast(s). A spot weather forecast should be requested the day prior to the burn if possible and updated the morning of the burn. Spot weather forecasts can be requested through the National Weather Service website or the local forecast office. The Burn Boss should have the local forecast office contact information programmed in their cell phone for the day of the burn and should keep that office apprised of any unexpected or unpredicted weather conditions. An updated spot weather forecast should be requested for each operational period related to a particular prescribed burn including mop-up extending beyond the initial operational period. The Burn Boss (or designated crew member) must obtain a spot forecast to help inform decisions related to holding, mop up or patrol staffing needs. A smoke management forecast should be obtained when residual smoke has potential to impact smoke-sensitive areas. A copy of the forecasts will be included as part of the Fire Summary Report and included in the project file.

During a prescribed burn, a crew member will be designated by the Burn Boss as a Fire Effects Monitor (FEMO) or FEMO trainee to obtain readings and record on-site fire weather, fire behavior, and fire effects data and record information as part of the Fire Event Log, Appendix 7. The designated crew member will be assigned a weather kit including a sling psychrometer, compass, flagging, Kestrel Pocket Weather Meter, anemometer, fuel moisture meter (optional) and charts and recording sheets. Fire weather readings will include: wet bulb, dry bulb, relative humidity (RH), wind speed, wind direction, % cloud cover and level, and probability of ignition (PIG). The designated crew member will report over the radio, on a frequency and at times designated by the Burn Boss, the dry bulb, RH, wind speed and direction, PIG and any change in those numbers from the previous reading to the crew. In addition, any significant or unexpected changes in fire behavior or weather conditions should be reported on an as needed basis, including but not limited to sustained changes in wind direction, development of cumulonimbus clouds, unexpected rates of spread and/or flame length, fire whirls, or issues related to smoke lift and dispersal.

The Burn Boss and all Holding and Ignition Bosses should acknowledge over the radio that they copy these radio transmissions to confirm that the information was received. On-site fire weather readings will be reported prior to and during the test fire, and continue through the remainder of the burn, at least every 60 minutes or at an appropriate interval determined by the Burn Boss. The recorded readings should be provided to the Burn Boss at the end of the prescribed fire to be included in the Fire Event Log, Appendix 7 and summarized within a prescribed fire summary report. In addition, when possible, these readings may be provided to the National Weather Service, as this information helps them improve their modeling, which in turn directly benefits our prescribed fire program.

I. Fire Effects Monitoring

Prescribed burn monitoring is defined as the collection and analysis of repeated observations and measurements to evaluate changes in the condition and progress toward meeting management objectives and ensuring safety during and after burning operations. Minimum requirements for burn monitoring before, during, and after prescribed burns are outlined here. Some form of monitoring is recommended for all prescribed burns. Monitoring plans should be based on project objectives as outlined in Prescribed Fire Plans and Site Resource Management Plans. Objectives may dictate more comprehensive monitoring than the minimum requirements outlined below (Table 2). The MassWildlife Prescribed Fire Program Manager is responsible for assuring that fire effects monitoring is carried out and reported, and that results are coordinated with resource managers, biologists, and ecologists from affected disciplines within MassWildlife. The Fire Event Log in Appendix 7 provides forms for use by the Burn Boss (or the assigned Fire Effects Monitor) to collect data and complete monitoring during the burn and immediately post burn.

Table 2. Minimum Levels of Prescribed Burn Monitoring

| Phase | Data Collected |
|---|---|
| Inventory and Landscape Scale Mapped Data | <ul style="list-style-type: none">Project maps including vegetation cover type and structural stage of natural communitiesVegetation description obtained from walk through or intensive data plotsMaps of project area showing burn unit boundaries, fuel types, plant communities and any sensitive plant or animal species locations (including rare species and invasive species) that require special actions to be taken |
| Pre–Burn Data | <ul style="list-style-type: none">Live and dead fuel moisture informationInstallation of pre-burn photo points or vegetation plots, as determined by objectives in the Prescribed Fire Plan and Site Resource Management Plan |
| During Burn Data often includes fire behavior, weather and smoke characteristics | <ul style="list-style-type: none">Weather observations recorded at least every hour to include: temperature, relative humidity, wind speed and direction, reference fine dead fuel moisture, probability of ignitionTest Fire observations and documentationFire behavior: rate of spread, flame length, other specific prescription elements related to time and location of weather observationsSmoke dispersal direction and height related to time and location of weather observationsLive and dead fuel moisture samples collected on site the day of burn for later comparisonFiring pattern and type of ignition used must be documented |
| Post-Burn Data <ul style="list-style-type: none">Data collected immediately post burn, but occasionally up to 1 year post-burn | <ul style="list-style-type: none">GPS perimeter of burn and mapNumber of burned and unburned acres in the unit, mappedRetakes of photo points if established prior to burnFirst Order Fire Effects - Burn Severity Form in Fire Event Log |
| Long Term Data <ul style="list-style-type: none">Data often collected up to 1, 3, and/or other appropriate interval post-burn | <ul style="list-style-type: none">Retakes of photo points post-burn on appropriate schedule1- and/or 3-year post-burn walk-through to detect new invasive species presence, and further monitoring if invasive species are detected and require controlLong-term monitoring of specific conservation targets response to management including wildlife resources, plant communities, and rare species as outlined in the Prescribed Fire Plan and Site Resource Management Plan |

Monitoring Goals & Objectives

Setting clear objectives will help determine appropriate monitoring protocols and sampling techniques. The following are specific objectives for fuels and fire effects monitoring:

- Use monitoring results to determine whether the project meets management objectives.
- Document and analyze both short-term and long-term effects of prescribed fire and mechanical fuels treatments on vegetation.
- Document fire behavior to allow managers to validate burn prescriptions to determine if they achieve the fuels and resource objectives.

- Document efficacy of fuel treatments if a wildfire burns through the project area.
- Track the longevity of fuels treatment effectiveness.
- Detect unforeseen results of prescribed fire.
- Follow trends in plant communities where fire effects literature exists or research has been conducted.
- Determine if the project moves the area towards desired conditions.
- Identify areas where new hypotheses and scientific research warrant testing and implementation.

A monitoring plan, outlining the monitoring requirements of the prescribed burn, is described in Element 20 of the Prescribed Fire Plan. Monitoring plans should include the following:

- a) Map(s) of burn unit showing and describing vegetation cover type and structural stage.
- b) Measurable monitoring objectives tiered to management objectives in the Prescribed Fire Plan.
- c) GPS locations and descriptions of monitoring plots and/or photo points.
- d) Description of monitoring methods used.
- e) Schedule for recommended monitoring

Test Fire Documentation

Every prescribed burn will include a test fire as described in Element 14 of the Prescribed Fire Plan. The purpose of the test fire is to verify that the prescribed fire behavior characteristics will meet management objectives and to verify predicted smoke dispersion. Element 14 of the Prescribed Fire Plan includes a guide and example of the type of information documented during the test burn including location of test fire, date and length of time of the test fire, % cloud cover, temperature, relative humidity, fine dead fuel moisture, wind speed and direction, fuels, and fire behavior results such as flame length, rate of spread, smoke dispersion, and other pertinent information. If an alternate test fire report form is used, the results must be attached to the Prescribed Fire Summary Report.



Figure 3: Test Burn and Fire Behavior Monitoring

Results of the test fire, fire behavior, and the first order fire effects must be summarized by the Burn Boss in the Prescribed Fire Summary Report. Applicable forms for recording this information are available in the Prescribed Fire Plan (Appendix 4) and Fire Event Log (Appendix 7).

Links to pertinent internet resources such as the *Fire Effects Information System* (FEIS), US Fish and Wildlife Service's *Fuel and Fire Effects Monitoring Guide*, the National Park Service's *Fire Monitoring Handbook*, the *Fire Effects Monitoring System* (FIREMON), and photo point monitoring protocols are included in Appendix 8: Resources and Pertinent References.

J. Smoke Management and Monitoring

Smoke from a prescribed burn can pose numerous risks to human health and safety and it is critical for those conducting burns to be aware of these risks. Smoke management is the most challenging aspect of prescribed burning in the highly-developed Northeast. Minimizing the negative impacts of smoke to people in neighborhoods, community centers, hospitals, schools, elderly housing facilities, transportation corridors, non-attainment areas as identified by MassDEP, and other smoke sensitive areas is a primary consideration. Special considerations must be taken to address smoke when the project is in a non-attainment area for a National

Ambient Air Quality Standards. States develop State Implementation Plans (SIPs) that define and describe customized programs that the state will implement to meet requirements of the Clean Air Act.

Smoke created during a prescribed burn is made up of a complex mixture of gases, water vapor, fine particles, and varying amounts of potentially hazardous air pollutants produced when wood and other organic material are combusted. The major pollutant of concern during a prescribed burn is fine particulate matter smaller than 2.5 micrometers in diameter (also known as PM 2.5). When a person is exposed, these microscopic particles can get into eyes, lungs, and even the blood stream. Symptoms from short-term exposures (hours or days) to PM 2.5 can range from scratchy throat, cough, irritated sinuses, headaches, runny nose, and stinging eyes. Far more serious reactions can occur to people with asthma, emphysema, heart disease, and other existing medical conditions. Children and older adults are also at a greater risk of serious health impacts. Personnel in close proximity to smoke from prescribed burns are at the highest risk for exposure to carbon monoxide and toxins such as acrolein, formaldehyde, and acetaldehyde. An equally important consideration is minimizing negative impacts of smoke to personnel implementing a burn.

Some of the risks include:

- **Loss of visibility on nearby roads and other transportation corridors.** Although managers may take all the necessary precautions and steps to direct smoke away from roads and airport runways, smoke will often travel in unanticipated directions during a burn. When burning close to roads or airports, it should be expected that smoke may drift into a road or runway for at least short durations. It is critical to anticipate this, and have a plan for managing traffic in the event visibility is significantly degraded by smoke from a prescribed fire. If burning alongside major roads and airport runways, coordination with the local or state police and airport authorities is required.
- **Night-time down drainage of smoke into sensitive areas.** Mapping sensitive sites down drainage from the burn unit such as highways, which are within a distance that smoke can “flow” to during the night (the steeper the topography - the further smoke can travel) is important to understanding smoke dispersion problems and mitigating risks. Openings (e.g., fields, power lines) next to a burn unit should be noted as they may funnel smoke toward a highway or other smoke sensitive area.
- **Increased potential for fog from late fall to late spring.** During this time of year when ground and water temperatures remain warmer than the cooling air temperature, conditions for creating fog are higher and may lead to smoke dispersion problems.
- **Potential for local weather phenomena.** Sea breezes, fog near cooled water surfaces or bare ground, atmospheric walls forming over water, and inversions can affect burning and cause problems with smoke dispersal.
- **Pockets of heavy fuels (e.g. masticated fuels, logging slash).** These areas burn longer and smolder for long periods.
- **Heavy duff layers or organic soils.** Understanding the moisture levels within the duff layer or organic soils is important to avoid long periods of smoldering.
- **Large burn unit size.** Understanding burn unit size in relation to smoke outputs and effective methods to stop or shut down a burn as needed must be addressed in the Prescribed Fire Plan.

Managing smoke in ways that prevent serious effects on smoke sensitive areas requires knowledge of fuels and weather conditions that will affect smoke emissions, trajectories, and dispersion. Not only is it necessary to anticipate weather ahead of time through use of climatology and forecasts, but it is also essential to monitor conditions before, during, and after a burn with regional forecasts, local forecasts, and on-site observations.

Screening for smoke sensitive features can be accomplished in a number of ways. For detailed planning of larger and more complex burns, smoke sensitive features within 0.5, 1, and 5 miles should be mapped using

GIS or similar mapping software. Generally, smoke sensitive features can be readily identified on air photography by an individual familiar with the area. Features not readily visible on air photography, such as point locations for schools or other facilities with particular sensitivities to smoke, can be mapped by hand with input from local partners such as fire department personnel.

An online simple smoke screening tool (<http://shrmc.ggy.uga.edu/maps/screen.html>) is an easy-to-use application that relies on Google maps: and the methodology laid out in the Southern Forestry Smoke Management Guide (<http://www.srs.fs.usda.gov/pubs/viewpub.php?index=683>). It highlights the critical smoke impact area and the smoke impact area of concern downwind from a fire. This tool was developed and is hosted online by the Forest Service Southern Research Station. By entering information about fire location, acres to burn, fuel type (grass, shrubs, litter, slash), ignition method (backing fire, heading fire), and wind direction, the application will identify the potential downwind smoke impact area. Zoom and pan capabilities, used to identify smoke sensitive receptors such as towns, highways, schools, etc., are provided with this Google map application. Actual ground level impact will vary based on mixing height and other meteorological conditions and topographical elements influencing the burn, but the tool provides an excellent first step in understanding potential levels of smoke impacts from a proposed prescribed burn.

The Prescribed Fire Plan will require screening for all smoke sensitive features and identification of measures for minimizing negative impacts of smoke to these features, taking into account the day of the burn project and several days following. Element 7 of the Prescribed Fire Plan addresses prescription parameters designed to mitigate smoke. Element 19 of the Prescribed Fire Plan addresses smoke management planning including identification of day time and night time smoke sensitive areas, smoke management and mitigation practices, compliance and notifications related to burning and air quality.

Burning will not be conducted in a project area, if the Air Quality Index (AQI) forecast is above the following:

- Ozone Air Quality Index is predicted to be greater than 50
- PM 2.5 Air Quality Index is predicted to be greater than 70, and/or
- Red Flag Warning has been posted

The appropriate AQI forecast for a particular project area can be found online by contacting the regional MassDEP office.

In addition, burns should not take place when the predicted night-time Low Visibility Occurrence Risk Index (LVORI) is 7 or higher for the night immediately following a burn.

Adequate time must be provided to MassDEP to process a request to conduct prescribed burns and issue an air quality control permit. These permits generally include useful information regarding forecasting tools and pertinent documents related to smoke management guidelines. The following publications provide more information on managing smoke: *Managing smoke at the wildland-urban interface*, General Technical Report SRS-103 http://www.srs.fs.usda.gov/pubs/gtr/gtr_srs103.pdf, *Smoke Management Guide for Prescribed and Wildland Fire*, PMS 420-2, <http://www.nwrgov/sites/default/files/products/pms420-2.pdf>, and the *Prescribed Fire Smoke Management Pocket Guide* <http://smokeapp.serppas.org/index.html>.

The Fire Event Log (Appendix 7) contains forms for collecting weather, fire behavior, and smoke observations during a prescribed burn. Smoke behavior during all phases of the burn should be captured (e.g., during the burn, during the smoldering phase, and after dark). This will help to inform future managers how smoke behaves at the site. This information should be summarized within the Prescribed Burn Summary Report along with the Weather Forecast, AQI Forecast, Keetch-Byram Drought Index (KBDI), and Smoke Emission Estimates from FOFEM.

A Notice of Violation (NOV) issued by an air quality regulatory agency for a prescribed burn will initiate a formal review by that agency. In addition, the elements below, which are unique to smoke incidents affecting air quality, must be addressed. The review may use the Guidance for After-Action-Review of Smoke Impacts found at the National Interagency Fire Center site <http://www.nifc.gov/smoke>.

At a minimum, the NOV review will include:

- A discussion of the smoke-sensitive receptors, estimated smoke effects including modeling, identified in the prescribed fire plan, and any actual smoke monitoring observations and effects related to the prescribed fire project.
- A discussion of predicted versus actual ambient air quality using best on-site fuels information available (for example, fuel conditions, fire behavior, fuel consumption), emissions production (quantity and duration) and weather.
- If needed, a comparison between pre-prescribed fire smoke dispersion modeling and post-prescribed fire modeling using best on-site information available.
- Discussion of the smoke management practices used for the prescribed fire and the role of cumulative smoke impacts from other prescribed fire activities regarding how they affected the issuance of the NOV.

A separate review of all or some of the following items may be required by MassWildlife or local policy:

- An assessment of the smoke management training of personnel,
- Policies for smoke management,
- Performance of the smoke management elements of the prescribed fire plan for the prescribed fire under review

K. Mop-up Procedures

Mop up is the final stage of the prescribed burn operation and refers to activities used to suppress any remaining fire after burn objectives have been met. Each Prescribed Fire Plan should include guidance on mop up standards. Depending on the size of the prescribed burn and the fuel type, extinguishing all material within the burned area may be impractical. Generally, the greatest concern is securing the edge of the unit within a specific distance of the perimeter. However, some sites may warrant a 100% mop-up. The extent of mop-up necessary will be determined by the Burn Boss.

Fuel type affects mop up standards. Light fuels, such as grass and blueberry usually burn thoroughly enough that mop up is completed the same day as the burn. Mop up of heavier fuels such as logging slash, timber litter, duff, and organic soils can take days. Important factors to consider when planning mop up:

- Is the weather getting hotter and drier?
- Will winds pick up?
- Is rain expected?
- Are there homes, businesses, or roads nearby that may be affected by smoke?
- How many people are available to monitor the fire?

- Are there hazards like snags and stump holes that the mop up crew needs to know about?

Depending on the site-specific KBDI, or time since last significant rain, the duration or difficulty of mop will change, sometimes quite dramatically. Carefully evaluating the burn unit and ensuring that mop up is complete will prevent both prolonged smoke issues for abutters and unintentional flare ups.

Crew members will be trained in dry and wet mop-up and cold trailing to ensure efficient and adequate completion of required mop-up. Hand tools, water, pumps, hoses, and engines can be used to suppress fire along the perimeter of the burn unit. Special mop up kits may be necessary for mopping up duff fires.

Mop up and patrol of a prescribed burn is considered complete after the crew has not seen smoke within a given period of time as determined by the specifications of post-burn activities in Element 21 of the Prescribed Fire Plan, onsite inspection of fuels and duff layer, and an evaluation of the weather forecast.

L. Procedures for After Action Reviews and Lessons Learned

After Action Reviews assess and identify areas to improve the safety and effectiveness of Prescribed Fire Planning and implementation. The primary purpose of this review is to assist continuous program improvement by promoting individual and organizational learning through the sharing of lessons learned. Prescribed burn crew members are encouraged to review prescribed burn events whenever a learning opportunity presents itself regardless of the outcome, either positive or negative. When lessons learned and recommendations are incorporated into practice in a timely manner, individual and organizational learning is improved.

After Action Reviews

Each prescribed burn (or operational shift on a multi-day prescribed burn) should have an After Action Review (AAR). An AAR is a professional discussion of a burn event, held in the field immediately after the activity is completed. The review is led by the Burn Boss or his/her designee, and their role is to ensure skilled facilitation of the review. An AAR involves *all* of the burn crew, and provides an effective tool to enable discussion and agreement on what the prescribed burn partners, agencies, and/or organizations need to maintain, change or improve for operations on subsequent prescribed burns. Regular and immediate AARs help ensure that significant operational details are communicated and don't slip through the cracks.

A prescribed burn AAR focuses on performance standards and identifies successes and failures. This enables burn crew members to discover, for themselves, what took place; as well as why and how to maintain strengths and improve upon weaknesses. The climate surrounding an AAR must be one in which the participants openly and honestly discuss what transpired, in sufficient detail and clarity, so everyone understands what did and did not occur and why. In addition to a Prescribed Burn AAR, a Safety Communications Form (SAFECOM) is found in Section IV. D. *"Fireline Safety"* as a means to communicate and mitigate safety related concerns such as accidents, near accidents, and equipment failures. Most importantly, participants should leave the AAR with a strong desire to improve their proficiency.

The AAR should:

- Reinforce that respectful disagreement is welcome.
- Keep the focus on the "what happened", not the "who".
- Ensure participation by all crew members.
- Close the AAR on a positive note.

Questions to discuss in an AAR:

1. What did we set out to do?

- Review the primary objectives and expected action plan
- List key tasks involved and conditions under which they were performed

2. What actually happened?

- Review the day's actions
- Identify and discuss effective and ineffective performance
- Identify barriers that were encountered and how they were handled
- Discuss all actions that did not meet standard operating procedure or that presented safety problems

3. Why did it happen?

- Discuss the reasons for ineffective or unsafe performance

4. What should and should not be changed next time?

- Identify/sustain strengths demonstrated during the day's actions
- Identify/correct weaknesses demonstrated during the day's actions
- Identify how and why problems occurred, then develop solutions that can be understood by all crew members.
- Focus on the things which can be fixed, rather than external forces outside anyone's control.

The AAR should feel informal enough to encourage participation by all crew members. The AAR guide in the Incident Response Pocket Guide (NFES 1077) may be used for field reference. Additional information on AAR facilitation can be found at the Wildland Fire Leadership website <http://www.fireleadership.gov> or the Wildland Fire Lessons Learned Center. The AAR also provides a reference aid to the Burn Boss that can be used to complete the Fire Summary Report.

An AAR-related to an adverse smoke event is different than a standard AAR, because the smoke impact could be reported during the night or up to several days after the burn. Guidance for this type of review is provided within Section II. J. *"Smoke Management and Monitoring"* of this Handbook.

Escaped Prescribed Burn Reviews also follow a specific review process, based on guidance within the Interagency Prescribed Fire and Implementation Procedures Guide (PMS 484) and Section II. O. *Declared Wildfire Reviews* of this Handbook. The Declared Wildfire Review is a more formal process involving an independent technical review team.

Lessons Learned

A variety of methods and techniques have been used to review and analyze outcomes and identify "Lessons Learned". To promote organizational learning and improve both organizational and individual performance in Prescribed Fire Planning, Lessons Learned should be incorporated into the AAR and other subsequent reviews of the prescribed burn implementation. The Lessons Learned are not all-encompassing but should represent a synthesis of significant events, interactions and discussions with individual Burn Bosses and other experts familiar with fire behavior, fuels, and burn operations. Valuable Lessons Learned should be gathered and



Figure 4: After Action Review

shared with burn crew members. The Prescribed Fire Program Manager may wish to share and review important Lessons Learned with the Prescribed Burn Crew on an annual basis.

Three categories of problems can arise on prescribed burns:

- 1) Problems resulting from poor planning of a prescribed burn.
- 2) Lack of understanding of contingencies needed related to long-term indicators of fire behavior potential, including extended drought, unusual weather trends, fuel moisture deficits, and abnormal heat releases.
- 3) Problems that occur during implementation of the prescribed burn.

The effect of all errors related to these categories is cumulative. When combined, these errors can decrease the probability of success. Planning problems are often the easiest to overcome because they are typically not time sensitive.

If there are Lessons Learned that should be shared with the burn crew, fire managers, and partners, the following guidance may help to summarize that information:

- What was the most notable success at the Incident that others may learn from?
- What were some of the most difficult challenges faced and how were they overcome?
- What changes, additions, or deletions are recommended for future trainings and refreshers?
- What issues were not resolved and warrant further review by team of experts?

Certain events or a culmination of events that may affect future prescribed burn implementation or policy (or both) can be submitted via the Rapid Lesson Sharing found on the Wildland Fire Lessons Learned Center Web site. This may provide further discussion and guidance. Also, additional prescribed fire Lessons Learned and other materials to improve organizational learning are available from the Wildland Fire Lesson Learned Center at <http://www.wildfirelessons.net>.

M. Fire Event Log, Prescribed Fire Summary Report, and Annual Burn Accomplishment Report

The Fire Event Log is a compilation of data prior to, during, and immediately after a burn and provides pertinent information for the Prescribed Fire Summary. The Fire Event Log is completed by the Burn Boss within one-to-several weeks post burn. No burn is fully completed until observations and monitoring data are collected and data have been summarized in a Prescribed Fire Summary Report. Describing site conditions prior to a burn, collecting weather data, measuring fire behavior during a burn, and measuring first order fire effects after a burn are all part of finishing the job.

The Fire Event Log found in Appendix 7 provides a template for collection of data prior to, during, and immediately after a burn. The Fire Event Log may be completed by the Burn Boss and sections may be completed by her/his designee such as the Fire Effects Monitor.

Pertinent information generally included within the **Fire Summary Report** are:

- Burn Unit and size
- Acres burned
- Date(s) burn was conducted
- Author of summary and date prepared
- Overview of the burn

- Observations and recommendations from the After Action Review and other sources including a synopsis of command and personnel, logistics, planning, operations, safety, smoke management, incidents, and constraints
- Burn Unit Map and delineation of areas burned by date
- Summary of burn goals and objectives and noticeable short term results and accomplishments
- Summary of burn events and time log
- Tables, graphs, and/or data regarding weather observations, fuel conditions, drought indices, days since significant precipitation, smoke emissions, burn severity/first order fire effects, supplies used, resources and equipment used, time and effort breakdown

The Fire Event Log and the Fire Summary become part of the project file documentation and is kept readily accessible for reference in planning future burns.

An **Annual Prescribed Burn Accomplishment Report** will be completed by the Prescribed Fire Program Manager with the assistance of Burn Bosses and other designated staff and will be shared with the MassWildlife Prescribed Fire Administrator, District Supervisors, and prescribed fire partners. A sample form is included in Appendix 7c.

N. Wildfire Declaration and Conversion

A prescribed fire must be declared a wildfire: 1) when it has spread outside the prescribed fire project area, as identified in the Prescribed Fire Plan; or 2) is expected to do so, and cannot be contained by the on-site initial attack resources and the specified contingency resources. In addition, regardless of on-site resource capacity, a prescribed burn must be declared a wildfire if it has exceeded the MassWildlife or cooperating landowner's property boundaries, the project area boundaries, or is expected to exceed those boundaries. Due to the nature of prescribed burn activities, some fire outside of unit control lines but within the project area may be expected. Quick and decisive action on the part of the Burn Boss and/or the holding resources will usually mitigate any potential problems. Specific trigger points and associated follow up actions will be specified in the Prescribed Fire Plan. The Prescribed Fire Plan will specify all individuals who have the authority to declare a prescribed fire a wildfire.

In the event that a fire escapes the burn unit boundaries, threatens the project area boundaries, and overwhelms both the resources on hand and the contingency resources, the Burn Boss must declare the prescribed burn a wildfire. Escape fire response procedures will be outlined in each Prescribed Fire Plan. On the day of a prescribed burn, a qualified "on-site Incident Commander" (IC), this may be the Burn Boss or another qualified incident commander, will be designated to take over command of suppression efforts in the event of a wildfire. Prior to the start of the prescribed burn, the crew will be briefed on the organizational structure that will apply should the prescribed burn become a wildfire.

The Burn Boss or their designee shall immediately notify the local fire chief (if not already assisting with the prescribed burn) and appropriate DCR Bureau of Forest Fire Control staff. As soon as it is practical to do so, without compromising safety or suppression efforts, the MassWildlife Prescribed Fire Administrator, District Supervisor, and Prescribed Fire Program Manager (if they are not already on site) will also be notified. Once the local fire department or their designee (i.e. DCR or other mutual aid) arrives on scene, the "on-site IC" will immediately transition all command authority to the incoming IC, provide as much pertinent information as possible, confirm accountability of all prescribed fire resources, and announce the transition to the prescribed burn crew. The prescribed burn crew will assist with suppression efforts as directed by the incoming IC.

Each Prescribed Fire Plan will include a Contingency Plan, Element 17, including Management Action Points and an associated map. All crew members will be briefed on secondary control lines and water sources prior to

the start of the prescribed burn. Contact information for all entities that must be contacted in the event that a prescribed burn becomes a wildfire will be included in the Prescribed Fire Plan and will be in possession of the Burn Boss on the day of the burn. See Section IV of this Handbook and Appendix 4: Prescribed Fire Plan, Elements 17 and 18 for further guidance.

MassWildlife, local fire departments, and the district fire warden will be in possession of a Fire Management Plan, if one exists, and the Prescribed Fire Plan for the burn project area. Regardless of whether or not a Fire Management Plan has been developed, MassWildlife will provide local fire departments and the district fire warden a property map featuring roads and access points for firefighters and contact information pertinent to the site, Appendix 8 of this Handbook includes sample maps.

O. Declared Wildfire Reviews

The MassWildlife Prescribed Fire Administrator and Prescribed Fire Program Manager will be notified by the Burn Boss of a declared wildfire resulting from a prescribed burn. The MassWildlife Prescribed Fire Administrator is required to make the proper notifications to the Director, District Supervisor, Office of General Counsel within the Department of Fish and Game, and other Senior Staff in a timely manner after the event. All prescribed burns declared a wildfire will have an investigative review initiated by the MassWildlife Prescribed Fire Administrator.

Since all prescribed burns are planned management actions, an escape that leads to a declared wildfire may lead to a tort claim and liability issues. Special attention to documentation is critical. An independent external review team is recommended for conducting declared wildfire reviews. The number of individuals assigned to the team and their functional expertise should be commensurate with the scope and focus of the review. Interagency participation is highly recommended for all declared wildfire reviews.

Guidance for conducting a wildfire review is provided within the *Interagency Standards for Fire and Aviation Operations Guide* (Red Book) and the NWCG *Interagency Prescribed Fire Planning and Implementation Procedures Guide*, PMS 484, and subsequent updates. The goal of the review process is to guide future program actions by minimizing resource damage, preventing future wildfire declarations by gathering knowledge and insight for incorporation into prescribed fire plans, and disseminating the analyses and lessons learned for the benefit of the prescribed fire community.

A new **Declared Wildfire Review File**, completed by the Prescribed Fire Program Manager and Burn Boss, should be assembled and include:

- Chronology of events
- Approved Prescribed Fire Plan and related fuel model Fire Behavior Runs
- Fire Event Log and Prescribed Fire Summary Report
- Individual statements
- Weather observations on site
- Remote Automated Weather Station (RAWS) data (if available)
- National Fire Danger Rating System (NFDRS) indices and Keetch Byram Drought Index (KBDI) for day of the wildfire declaration from nearest station
- Photos and other info not contained in the existing project file

The **Declared Wildfire Investigative Team** will analyze information, interview pertinent individuals, and conduct site visits to produce a **Wildfire Review Report** including the following analyses and information:

- Analysis of seasonal severity, weather events, and on-site conditions leading up to the wildfire declaration.

- Analysis of the Prescribed Fire Plan for consistency with MassWildlife policy and guidance related to prescribed fire planning and implementation.
- Analysis of the prescribed fire implementation for consistency with the prescription, actions, and procedures in the Prescribed Fire Plan.
- Review of the approving MassWildlife Prescribed Fire Administrator and qualifications, experience, and involvement.
- Review of the qualifications and experience of key personnel involved.
- Determine the level of awareness and the understanding of the personnel involved, regarding procedures and guidance.
- Summary of causal agents contributing to the wildfire declaration.
- Summary of Lessons Learned

P. Equipment Inventory, Storage, and Maintenance

Proper inventory, storage and maintenance of all MassWildlife prescribed fire equipment is essential for safe and efficient operation and use during prescribed burns. MassWildlife maintains a cache of prescribed fire equipment to support prescribed burns on MassWildlife lands and lands of partner agencies and organizations. The MassWildlife Prescribed Fire Program Manager will oversee these tasks and will work with District Supervisors and crew members to ensure that all equipment is properly maintained and stored through an equipment accountability system that will include:

- An up-to-date inventory system, including maintenance records and schedules
- An equipment sign-out and tracking system. Sign-out sheets will be stored with equipment so that crew members assigned to signing-out and retrieving equipment the day of a prescribed burn will have everything they need to track each piece of equipment used.

The Prescribed Fire Program Manager, with assistance from District Supervisors, Burn Bosses, and crew members as assigned, will also be responsible for ensuring that the following tasks are completed:

- Annual, or more frequent if required, inspection of equipment for disrepair or maintenance issues
- Removal of unsafe equipment from service
- Ensuring that fuel and drip torches are stored properly (i.e. in a flammable fuels cabinet when not in use, torches stored empty if not being used consecutive days, transported in proper containment and never stored for any length of time within the enclosed equipment trailer)
- Servicing, repairing, and proper winterization of tools and equipment
- Cleaning, maintenance and organization of storage areas, prescribed fire trailer, and support vehicles
- Maintenance of a current list of available equipment in a location accessible to all staff fire planners
- Ordering of new equipment in coordination with administrative and fiscal staff
- Coordinating equipment loans to partner agencies and organizations
- Proper care of equipment loaned to MassWildlife from other partners and organizations
- Ordering and tracking of rental of equipment
- Disposal of expendable supplies and hazardous waste per state regulations.

III. Prescribed Burn Qualifications, Agreements, and Contracts

A. Qualifications

This section describes required qualifications for all MassWildlife prescribed fire (Rx) positions. Qualifications include the minimum acceptable levels of training, experience, currency and physical fitness needed for each position. MassWildlife used the National Wildfire Coordinating Group (NWCG) qualification standards and the Incident Qualifications Certification System (IQCS) supplement as a guide. While there are a few limited prescribed fire positions specific to MassWildlife, most follow the *National Incident Management System: Wildland Fire Qualification System Guide* (PMS 310-1), *Federal Wildland Fire Qualifications Supplement*, *Interagency Prescribed Fire Planning and Implementation Procedures Guide* (PMS 484), *Interagency Fire Program Management Qualification Standards and Guide* (IFPM, 2008) and other appropriate federal guidance in setting MassWildlife standards and qualifications. When federal position qualifications and standards are used by MassWildlife, they may be updated to meet federal wildland fire standards and MassWildlife directives as determined by NWCG and the Incident Qualifications Certifications System (IQCS).

MassWildlife prescribed fire positions are shown in Table 3, and each position is described in subsection F. Not all positions in Table 3 are mandatory on a prescribed burn. Prescribed burn position responsibilities are assigned by the Burn Boss to qualified crew members or are undertaken by the Burn Boss depending on prescribed burn complexity (Table 4), assigned resources, and burn plan requirements. For example, on low to moderate complexity burns, the Burn Boss may assume the duties of a Holding Specialist or the Ignition Specialist. If this is the case, it must be clearly stated in the Prescribed Fire Plan.

The complexity of each prescribed burn will dictate the minimum organizational structure that is needed to safely achieve the objectives that are specified in the Prescribed Fire Plan. The prescribed fire complexity rating is determined using the required Prescribed Fire Complexity Rating System Guide.

All Prescribed Fire Plans must, at a minimum, identify the following positions, how they will be staffed, and how they will fit into the organization:

- MassWildlife Prescribed Fire Administrator (MA)
- Burn Boss (RxB1, RxB2 or RxB3 as appropriate)
- FFT1 or MWRx FFT1*
- Rx Burn Crew Members or FFT2 including Fire Effects Monitor

Table 3. MassWildlife Prescribed Fire Position Titles and Training Required to Meet Qualifications*

| Position | Position Abbreviation | Task Book | Pre Qualification | Minimum Physical Fitness Level | Required Training |
|---|-----------------------|-----------|----------------------------|--------------------------------|--|
| Prescribed Burn Crew Member | RxCM | N | None | Moderate | ICS-100, L-180, S-190, S-130 and Field Exercises, IS – 700, Safety Refresher/RT- 130 |
| Firefighter Type 2 | FFT2 | N | None | Arduous | |
| Basic Faller | FAL3 | NWCG | RxCM or FFT2 | Moderate/Arduous | S-212, Safety Refresher/RT- 130 |
| Fire Effects Monitor | FEMO | NWCG | RxCM or FFT2 | Moderate/Arduous | S-290, Safety Refresher/RT- 130 |
| UTV Operator | UTVOP | N | RxCM or FFT2 | Moderate/Arduous | Safety Refresher/RT- 130 |
| Public Information Rep | MWRx PIR | N | RxCM or FFT2 | Moderate | Safety Refresher/RT-130 |
| Advanced Burn Crew Member | MWRx - FFT1 | MWRx | RxCM or FFT2 | Moderate | S-131, Safety Refresher/RT-130 |
| Advanced Firefighter | FFT1/ICT5 | NWCG | FFT2 | Arduous | S-131, RT-130, ICS-200 (ICT5 only) |
| Prescribed Burn Holding Specialist | MWRx - Holding | MWRx | MW-Rx-FFT1 | Moderate | Safety Refresher/RT- 130, S211 Experience on Engine Crew |
| Prescribed Burn Ignition Specialist | MWRx – FIR1 | MWRx | MW Rx-FFT1 Or FFT1 | Moderate | Safety Refresher/RT- 130, S219 |
| Rx Engine Operator | MWRx – ENOP | MWRx | MWRx-FFT1 | Moderate | Safety Refresher/RT- 130, S211, |
| Engine Operator | ENOP | NWCG | FFT1 | Arduous | Experience on Engine Crew |
| Engine Boss/Single Res. Boss | ENGB | NWCG | FFT1 | Arduous | S-230, Safety Refresher RT- 130, ICS-200 |
| Firing Boss/Single Resource Boss | FIRB | NWCG | FFT1 | Moderate | S-290, S-230, Safety Resresher/RT- 130, ICS-200 |
| Safety Officer Line | SOFR | NWCG | ICT4 or Strike Team Leader | Moderate | ICS-300, ICS-400, Safety Refresher/RT-130 |
| Burn Boss RxB3 Low Complexity | RxB3 | NWCG | FFT1 + FIRB or ICT5 | Moderate | S-290, RT- 130 |
| Burn Boss RxB2 Low to Moderate Complexity | RxB2 | NWCG | FIRB, ICT4 | Moderate | S-390, RT-130, RT-300 |
| Burn Boss RxB1 High Complexity | RxB1 | NWCG | RxB2 | Light | S-490, RT- 130, RT-300 |
| Prescribed Fire Prog. Manager | MWRxFPM | N | RxB2 | None | Familiarity w/ MassWildlife Prescribed Fire Handbook and Policy is required |
| MassWildlife Prescribed Fire Administrator | AADM | N | None | None | Familiarity w/ MassWildlife Prescribed Fire Handbook and Policy is required |

*Positions utilized depend on complexity of prescribed burn and resources needed as determined by the Prescribed Fire Plan. Position descriptions are provided in Subsection F.

In order to support an expanding prescribed fire program and increase its capacity to burn state-wide, MassWildlife will support the development of NWCG RxB2 Burn Boss, Firing Boss (FIRB), and Advanced Firefighter (FFT1) positions over time to complement important MWRx advanced crew member positions.

To develop these positions, MassWildlife will identify capable personnel and provide opportunities for NWCG training and experience, ensuring a workable schedule in which these individuals are available during local fire seasons to respond when wildfire training opportunities become available.

All positions that involve direct participation on the fireline closely follow federal standards with the exception of the MassWildlife Advanced Crew Member Position (MWRx) and the associated Holding Specialist, Ignition Specialist, and Engine Operator positions. The Holding, Ignition, and Engine Operator Specialist positions require qualification as an Advanced Crew Member plus additional specialized training (see Table 3 and Subsection F). MassWildlife standards for the Advanced Crew Member position closely parallel NWCG standards, but substitute applicable prescribed fire experience for wildfire suppression tasks and experience.

After consultation with Massachusetts prescribed fire experts from federal and other state agencies, and from the private sector, MassWildlife determined that appropriate prescribed burn experience on the fireline may be substituted for certain wildfire experiences applicable to these positions when MassWildlife conducts low to moderate complexity prescribed burns. This approach is consistent with approaches taken by a variety of other states that have jurisdictional responsibility for land management and use prescribed fire as a resource management tool. Any Burn Boss (RxB) conducting a prescribed burn on MassWildlife lands must meet NWCG Standards for Burn Bosses as there are no separate agency tracks for these high-level positions.

All MassWildlife personnel, co-operators, and contractors who function in a prescribed fire position on MassWildlife lands must be judged by the Burn Boss to be technically and physically qualified to fill their assigned positions. Indicators of qualification include the successful completion of training, the completion of an applicable Position Task Book (PTB), additional experience, and physical fitness (PTBs provide a formal framework for gaining and documenting adequate experience during an appropriate number of evaluation assignments before advancing to a new position).

Qualifications for positions identified in Table 3, and the corresponding position description provided in Subsection F depend on proven ability. The position descriptions identify required training, experience, fitness, as well as recommended training and currency. Training that is “recommended” is not required but recommended as supplemental to support knowledge and skills. Many positions require completion of a PTB. Notable exceptions are the entry level “Crew Member” position, MassWildlife Prescribed Fire Administrator, UTV Operator, and Public Information Representative, which have other training and experience requirements. Prerequisites for more advanced positions are also shown in Table 4. For example, before opening a Burn Boss PTB (RxB2), an individual must be certified as an NWCG-qualified Firing Boss (NWCG FIRB) and Single Resource Boss.

Minimum Burn Boss qualifications required to implement a burn will be determined by analyzing the complexity of each prescribed fire. Complexity is determined by using the NWCG Prescribed Fire Complexity Rating System Guide and resources will be assigned based on Table 4.

Table 4. Qualification requirements related to Prescribed Fire Complexity (*Interagency Prescribed Fire Planning and Implementation Procedures Guide - PMS 484*)

| Position | High Complexity | Moderate-Low Complexity | Low Complexity |
|----------|-----------------|-------------------------|----------------|
| RxB1 | Required | Optional | Optional |
| RxB2 | Not Allowed | Required | Optional |
| RxB3 | Not Allowed | Not Allowed | Required |
| FIRB | Optional | Optional | Optional |

As stated in PMS 310-1, successful completion of position tasks and training courses does not guarantee an individual will be qualified to perform in a position. Ultimately, MassWildlife is responsible for certifying and re-certifying prescribed fire staff on an annual basis, based on task evaluations, position performance evaluations, and the quality and extent of an individual's experience.

Although certification will almost always rely on completion of the requisite PTB's and training courses for a specific position, NWCG establishes a framework for agencies to evaluate individuals who may have equivalent experience (PMS 310-1, p. 6). For example, an individual may have relevant experience that pre-dates the establishment of the NWCG system and PTB's, may be an experienced structural firefighter with substantial wildfire experience, or may have been certified in a state or agency with independent standards. In the event that MassWildlife is considering approval of equivalent experience, MassWildlife will convene a panel of outside experts to assist in review of qualifications; however, as specified in PMS 310-1, ultimate responsibility for all certification decisions rests with MassWildlife.

The Prescribed Fire Program Manager shall be responsible for certifying and recertifying prescribed fire personnel qualifications in consultation with the MassWildlife Prescribed Fire Administrator, who shall review all certification recommendations prior to finalization by the Prescribed Fire Program Manager or other qualified staff appointed by the Director to fulfill these functions pursuant to the MassWildlife Fire Policy.

B. Certification

Procedures

MassWildlife intends to use the Incident Qualifications System (IQS) and Incident Qualifications Certification Systems (IQCS) databases in conjunction with DCR to track individual crew member training and experience. When using the IQS, the Prescribed Fire Program Manager will take an IQS training course. IQS users that have undergone the training will sign a "Statement of Responsibility". All Agency employees who have authorized access to IQS or an alternative tracking system shall maintain strict access/security protocol. If they are found in violation of the protocol, their access will be suspended.

Electronic file records with paper back up must be maintained for each employee for records related to certification in prescribed fire positions. Paper records must be centrally located at MassWildlife Field Headquarters and readily accessible to the Prescribed Fire Program Manager. The Prescribed Fire Program Manager shall maintain a database of employee records, determine the centralized location of paper records, and provide direction to district supervisors, unit supervisors, and prescribed fire personnel on how and when to submit certification records and documents for database entry. The database shall include:

- a) All relevant evidence of course completion related to position qualifications. Relevant evidence may consist of training certificates, copies of course completion rosters and/or completed training forms, or other third party validation that the training has been successfully completed. Documents from the course lead instructor or course coordinator,

certifying that the employee successfully completed the training are acceptable. Only the lead instructor, course coordinator, or an individual who can validate the responder's successful completion of the training can provide third party evidence to substantiate course completion. An individual who also attended the course is not acceptable third party evidence.

- b) Prior to the implementation of Position Task Books in February 1994, individual states and private organizations had a variety of documentation and certification methods. If an Individual Performance Rating recommending the individual for certification cannot be located for the periods prior to February 1994, verification can be accomplished with a letter or e-mail from the final evaluator validating:
 - (1) A recommendation that the individual be considered for certification.
 - (2) A list of the incident(s) and date(s) when the final evaluation and previously recommended certification was completed.
- c) If no copy of a qualifying position task book verification page can be located (the inside front cover of task book, showing recommending final evaluator and Certifying Official's signatures and dates), verification may be accomplished with a letter or e-mail from the final evaluator validating:
 - (1) Satisfactory completion of all tasks.
 - (2) A recommendation that the individual be considered for certification.
 - (3) A list of the incident(s) and date(s) when the final evaluation and previously recommended certification was completed.
- d) Other Documented Evidence of Continued Certification. When course completion and position task book verification evidence is missing, the certifying officials must also document that the employee was eligible for certification and their decision to continue to certify the employee in the position. In each case, the certifying officials must document their rationale to retain the employee's qualification.
- e) Yearly updated Incident Qualifications and Certification System Responder Master Record (RPTC028) from IQCS, or equivalent information from a comparable database.
- f) If an individual has a Federal or MassWildlife Task Book open, and an amendment to that task book is issued, the position standards contained in the amendment apply.
- g) Detailed information on refresher training should be maintained for employees within their qualification records.

Currency

- a) Currency requirements are generally outlined in the *National Incident Management System: Wildland Fire Qualification System Guide* (PMS 310-1) and outlined in the position descriptions.
- b) Position experience is considered as qualifying only if the individual has previously met all prerequisite requirements for the position assignment.
- c) If a position currency on an individual's Qualifications Card expires while they are performing that position on an assignment, the individual shall be allowed to complete the assignment. However, they shall not be reassigned in any expired position by the incident or home unit

until they have re-established currency through a Qualification Review Committee for that position.

Re-Certification

- a) Management evaluation of an individual's competency is key to recertification where qualifications have expired.
- b) If currency has lapsed, the individual shall revert to the trainee level in the position for which currency has lapsed and shall be issued a position task book for the position, complete on-the-job-training if needed, complete any additional required training courses which have been added to the position for which they are attempting to recertify and re-qualify in the related position performance assignment.

De-certification

- a) Decertification of an individual's ability to perform is the responsibility of an employee's supervisor and the Prescribed Fire Program Manager in consultation with the MassWildlife Prescribed Fire Administrator.
- b) Decertification records shall be maintained in the IQS, IQCS or another Masswildlife database.

C. Position Task Books (PTBs)

Most prescribed fire positions (Table 3) have an associated PTB, which identifies all critical tasks required to perform that position. PTB responsibilities are contained within the MassWildlife Prescribed Fire Handbook or the NWCG website at <https://www.nwcg.gov/publications/position-taskbooks>.

An individual may not have more than three active PTBs at one time. No more than two of the three allowed PTBs may be in a single functional area, including prescribed fire positions. The functional areas include:

- a. Command and General Staff
- b. Finance
- c. Logistics
- d. Operations
- e. Air Operations
- f. Planning
- g. Prescribed Fire
- h. Incident Support and Associated Activities (examples include Expanded Dispatch or Wildland Fire Investigation).

In a few instances, MassWildlife or interagency PTBs have been developed for positions outside those identified in PMS 310-1. Where these PTBs exist, and have a MassWildlife or federal agency logo (such as the Forest Service Logo) on the front page, they shall be used to complete performance evaluations. The PTBs will be reviewed for qualification using the same procedures as those sponsored by NWCG.

Task Book expiration procedures:

PTBs have a limited time in which they can be completed: Each PTB is valid for three years from the day it is initiated. Upon documentation of the first task in the PTB, the three-year time limit is set from that date of documentation. If the PTB is not completed within three years from documentation of the first task the PTB will no longer be valid and considered expired. If a new PTB is initiated within that same year to replace the expired PTB, the two task books may be merged; otherwise only current qualification standards will apply.

D. Physical Fitness Standard

MassWildlife currently uses the Work Capacity Test (WCT) to measure physical fitness. This test will be carried out in accordance with NWCG standards and is often administered by federal or state cooperators at S130/190 courses and Fireline Refreshers (RT130). MassWildlife prescribed burn crew are required to pass the WCT at the moderate level to ensure personnel safety and effective completion of all tasks on a prescribed burn.

This requires walking on level ground for 2 miles in 30 minutes or less while carrying a 25-pound pack. Those MassWildlife employees participating on wildland firefighting deployments with other public agencies are required to meet the arduous level of physical fitness. A qualified pack test administrator and appropriate medical personnel must be on-site to administer a WCT, as specified by NWCG in the Work Capacity Administrator's Guide (PMS 307).

MassWildlife requires all potential prescribed burn crew members to complete a Health Screening Questionnaire (HSQ) before participating in a WCT and prescribed burns. The HSQ must be completed in advance of the WCT. Appendix 9 includes an example HSQ and information regarding the WCT. Employees must pass the WCT at the moderate level to participate on the active fireline of MassWildlife prescribed burns. The HSQ and WCT will be completed annually by all burn crew members. Confidentiality regarding the HSQ and results will be maintained, as described on the HSQ.

A doctor's exam may be required when the health questionnaire is returned with medical issues checked to determine if the individual is in a condition to take the WCT and/or participate in prescribed burn activities. The individual's doctor should be made aware of what the WCT will require and/or what activities and medical issues are of concern when the individual participates on burns to cover MassWildlife liability.

Employees are responsible for informing their supervisor of any condition the employee is aware of that may preclude them from performing a job on a prescribed burn or wildfire.

It is the responsibility of the employee's supervisor and the Prescribed Fire Program Manager to confidentially take preventative action in situations where an employee appears physically incapable of performing without risk of physical injury due to work demands.

E. Agreements and Contracts

In order to achieve MassWildlife Prescribed Fire Program Goals and broader MassWildlife objectives (Sections I.A and II.A of this Handbook), MassWildlife relies on assistance from cooperating partners to facilitate prescribed burning on agency lands. Likewise, MassWildlife prescribed fire staff participate in prescribed burns on lands not managed or owned by MassWildlife. This may include prescribed burns on land owned by federal, other state, or municipal governments, as well as private land (e.g., land trusts). Similarly, non-MassWildlife staff such as employees of the Massachusetts Department of Conservation and Recreation (DCR), the U.S. Fish & Wildlife Service, US Forest Service, and the National Park Service may participate in prescribed burns on MassWildlife lands. These two scenarios are collectively referred to as "cooperative burning."

MassWildlife will enter a formal agreement such as a Memorandum of Agreement (MOA) with other cooperating partners to facilitate cooperative burning. For example, MassWildlife is a party to the MOA governing the Mashpee National Wildlife Refuge which contemplates joint prescribed burns with multiple government and private partners. Additional MOAs will be executed to define the terms of other cooperative prescribed burn partnerships, especially those involving private sector partners. MassWildlife and its state

and federal cooperators may all be signatories to a Stafford Agreement that functions as a master MOA and would preclude the need for separate agreements with the signatories. As described below, burns on property owned or managed by other landowners may be under the leadership of a MassWildlife Burn Boss or a partner organization's Burn Boss.

Guidelines and Procedures for Cooperative Burning

- A. In evaluating whether or not to enter into a MOA, to participate in a specific cooperative burning opportunity, or in determining which MassWildlife staff should participate, agency decision-makers shall consider the factors described in Section III.E.1. and document their decisions in Prescribed Burn Program Records.
- B. Cooperative burning will be governed by an MOA or equivalent, formal cooperative agreements between the cooperating parties, except for the following:

Training – Often, training programs include live fire exercises or wildfire deployment. MassWildlife staff participation in formal training programs, classes, and exercises will not require a MOA provided that the MassWildlife Prescribed Burn Program Manager has evaluated the program content and trainers and determined that it is appropriate for MassWildlife participation. This determination will be documented in Prescribed Burn Program records. A wildfire assignment/deployment or a prescribed burn may serve as training.

Individual, non-staff participation in MassWildlife burns – in some circumstances, it may be appropriate for qualified individuals who are not employees of MassWildlife, and not covered by a MOA, to participate in MassWildlife led burns.² Such participation will be allowed, on a case by case basis provided that: (a) the MassWildlife Prescribed Burn Program Manager has reviewed the qualifications of the individual, determines that the qualifications meet MassWildlife and/or NWCG standards, assigns the individual to crew tasks commensurate with the individual's qualifications, and documents these decisions in Prescribed Burn Program Records; (b) the individual signs a release form (Appendix 14) acknowledging willingness to participate and accepting all liability in the event of injury or damage to equipment; and (c) the Burn Boss accepts the individual as part of the burn crew.

Participation by local fire department personnel – local fire department employees who have learned skills from sources outside the wildland fire management curriculum may not be required to complete specific NWCG courses to qualify for a prescribed fire position. These personnel may participate in a prescribed burn under the supervision of the local fire chief or his or her designee to act as "Chief of Party" on a given assignment. The Chief of Party shall be responsible for his staff, and will coordinate all activities with the designated Burn Boss. It is the responsibility of the Burn Boss to communicate with the Chief of Party and clarify roles and responsibilities prior to ignition.

Contractors –MassWildlife often procures the services of a private-sector contractors to carry out a variety of habitat restoration and management operations on MassWildlife lands (e.g., tree clearing, mowing/mulching, invasive plant control), and prescribed burning is treated similarly. Private-sector involvement with prescribed burn activities on MassWildlife lands shall be governed by a state contract rather than an MOA. Contractors may provide Burn Boss services, other burn crew members, and equipment. When MassWildlife enters into contracts with private sector vendors for prescribed burning on MassWildlife lands, the contractor shall be responsible for the safety, training,

² For example, prescribed fire professionals from another state may be visiting for a prescribed fire workshop that includes live fire, or a MassWildlife board member with burn crew qualifications may wish to volunteer on an agency burn.

and certification of the qualifications of the contractor's employees. MassWildlife shall retain the option to review each potential contractor's safety, training, and certification qualifications and experience in writing Prescribed Fire Plans and bossing burns, to determine whether or not an individual contractor is qualified to operate on MassWildlife lands.

- C. In the event that MassWildlife staff are to participate in a prescribed burn off of MassWildlife managed property:
 - 1. The MassWildlife Prescribed Fire Program Manager shall obtain and file the burn plan, along with a fire summary report in the Prescribed Burn Program records unless otherwise specified in an MOA.
 - 2. Additional terms of participation shall be governed by any relevant MOA.
 - 3. When MassWildlife partners with a private landowner(s) to conduct a burn on private land, a form granting MassWildlife permission to burn on private lands not administered by MassWildlife (Appendix 14) must be signed by the landowner, approved by the MassWildlife Prescribed Fire Administrator, and retained with the Prescribed Fire Plan in appropriate project files by the Prescribed Fire Program Manager. Examples include a private parcel that lies within or adjacent to state land or a privately-owned parcel containing a fire influenced natural community.
- D. In the event that MassWildlife staff are to participate in a prescribed burn that will be bossed by non-MassWildlife staff:
 - 1. The MassWildlife Prescribed Fire Program Manager shall review the credentials of the Burn Boss to ensure consistency with MassWildlife standards.
 - 2. Pursuant to the relevant MOA, a MassWildlife Chief-of-Party may be designated to work closely with the Burn Boss. If the Chief-of-Party determines that the proposed burn is unsafe or has serious concerns about the advisability of burning, and is unable to reach a satisfactory agreement with the Burn Boss to rectify the situation, she/he retains the option of withdrawing MassWildlife's resources before or during the crew briefing and/or test fire.

F. Principal Positions

The following pages contain descriptions of fire management positions identified in Table 3. These position descriptions are modeled after qualification descriptions found within the National Incident Management System: Wildland Fire Qualification System Guide (PMS 310-1), the Federal Wildland Fire Qualifications Supplement (2016), the NWCG Incident Business Committee Administratively Determined (AD) positions website, and the Interagency Prescribed Fire Planning and Implementation Procedures Guide (PMS 484). It should be noted that training that is “recommended” is not required but recommended as supplemental to support knowledge and skills.

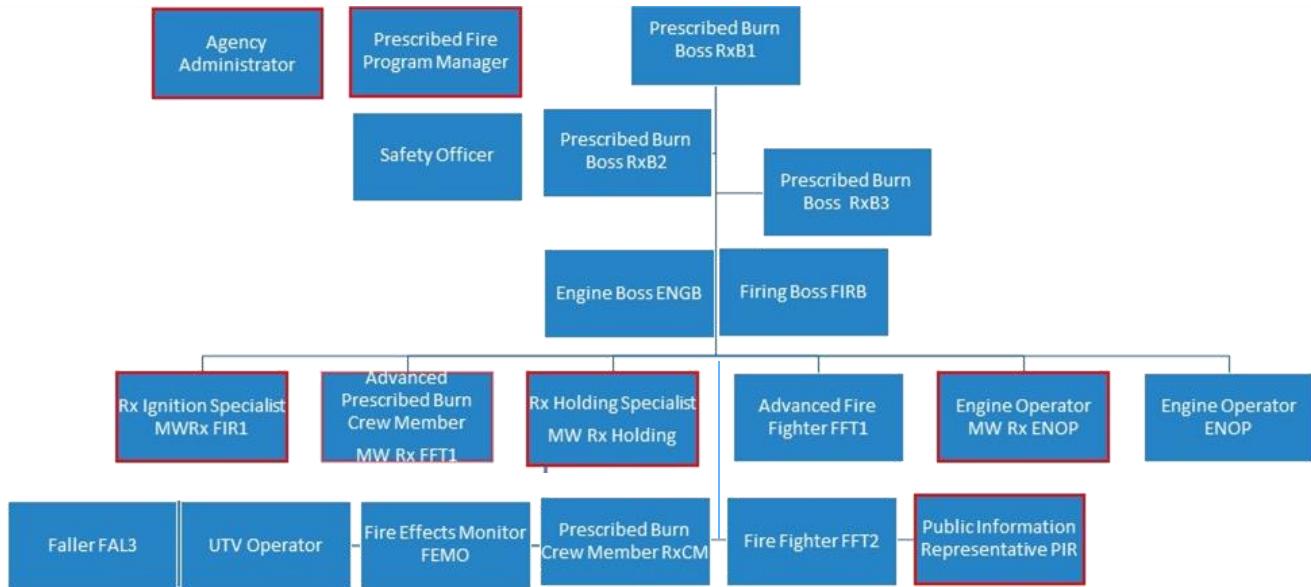


Figure 5. Position Flow Chart featuring typical hierarchy within prescribed fire operations. Positions outlined in red are specific to MassWildlife

Prescribed Burn Crew Member (RxCM):

| | |
|-----------------------------------|--|
| Responsibilities: | The Prescribed Burn Crew Member participates in prescribed fire and other wildland fire operations, including: line preparation, ignition, holding, control, mop-up, suppression, monitoring, etc. All MassWildlife staff participating on a prescribed burn must meet the RxCM qualifications or higher. |
| Pre-Qualifications: | None Required |
| Required Trainings: | ICS-100 Intro to Incident Command System IS-700 Intro to National Incident Management System L-180 Human Factors on the Fireline S-190 Intro to Wildland Fire Behavior S-130 Firefighter Training RT-130 Annual Fireline Safety Refresher* |
| Recommended Training: | Basic First Aid and CPR |
| Required Experience: | Field Day associated with S130/190 |
| Fitness: | Moderate Level as determined by Work Capacity Field Test * * |
| Currency: | Complete Recurrent Training- Annual Fireline Safety Refresher Complete Annual Physical Fitness Work Capacity Test Successfully performs the position (or another position that maintains currency as identified in PMS 310-1) within a five (5) year timeframe |
| Position Documentation: | Responsible for maintaining awarded training certificates, fitness test documentation, and a log or record of fire experience. Copies of this documentation are made available to the MassWildlife Prescribed Fire Program Manager for the MassWildlife Qualification Files. Appendix 12 contains a Prescribed Fire and Wildfire Experience Log to track individual experiences. |
| Other Agency Endorsements: | US Forest Service (RxCM) – Moderate Fitness Level NWCG Firefighter Type 2 (FFT2) – Arduous Fitness Level |

* Annual Fireline Safety Refresher (RT-130) is not required for the first year; however, is required in subsequent years.

** MassWildlife staff participating in Wildfire Deployments as an FFT2 with DCR or Federal Partners must meet the Arduous Physical Fitness Level.

Basic Faller (FAL3)

| | |
|-----------------------------------|--|
| Responsibilities: | The Basic Faller's job involves incidental falling, bucking and/or de-limbing of trees with a chainsaw during prescribed burn operations. The Faller determines how to apply safe cutting practices and communicates with the prescribed Burn Boss and other crew members about safety and work progress. Requires special safety clothing and precautions. |
| Pre-Qualifications: | RxCM or FFT2 |
| Required Trainings: | S-212 Wildland Fire Chain Saws RT-130 Annual Fireline Safety Refresher |
| Required Experience: | Satisfactory performance as FFT2 on 6 or more prescribed burns Completion and Certification of Position Task Book as a Basic Faller (FAL3) * |
| Fitness: | Moderate RxCM/Arduous FFT2 |
| Recommended Trainings: | S-211 Portable Pumps and Water Use Basic First Aid and CPR |
| Currency: | Complete Recurrent Training- Annual Fireline Safety Refresher Complete Annual Physical Fitness Work Capacity Test Successfully perform the position or another position that maintains currency as identified in PMS 310-1 within a five (5) year timeframe |
| Position Documentation: | Responsible for maintaining awarded training certificates, fitness test documentation, and a log or record of fire experience. Copies of this documentation are made available to the MassWildlife Prescribed Fire Program Manager and/or the designated Record Keeper for the MassWildlife Qualification Files. Appendix 12 contains a Prescribed Fire and Wildfire Experience Log to track individual experiences. |
| Other Agency Endorsements: | National Wildfire Coordinating Group (NWCG) |

**The use of the approved NWCG PTB for the FAL3 position is highly encouraged. However, agency specific evaluation processes that document Completion and Certification of PTB skills can be used in lieu of the PTB for this position.*

Fire Effects Monitor (FEMO)

| | |
|-----------------------------------|---|
| Responsibilities: | The Fire Effects Monitor collects on-site weather, fire behavior, fuels, smoke, and fire effects information needed to ensure safety and assess whether the prescribed burn is achieving established resource management objectives. This crew member reports directly to the Prescribed Burn Boss. The Burn Boss or their designee defines objectives, priorities, and deadlines, and assists with unusual situations that do not have clear precedents or do not conform to established policies, practices, or procedures. The FEMO may also plot the prescribed burn perimeter and summarize information for inclusion in the Fire Event Log and Burn Summary Report as directed by the Prescribed Burn Boss. |
| Pre-Qualifications: | RxCM or FFT2 |
| Required Trainings: | S-290 Intermediate Wildland Fire Behavior RT-130 Annual Fireline Safety Refresher |
| Required Experience: | Satisfactory performance as Burn Crew Member on 10 or more prescribed burns General knowledge of fire behavior, weather, and mapping Experience may be met in part by completion and certification of Position Task Book for Fire Effects Monitor (FEMO) on wildfire or prescribed fire incident. |
| Fitness: | Moderate RxCM and FFT2 |
| Recommended Trainings: | S-310 Introduction to Fire Effects or Local Fire Effects Workshop S-244 Field Observer/Fire Effects Monitor and Self Study Supplements |
| Currency: | Complete Recurrent Training - Annual Fireline Safety Refresher Complete Annual Physical Fitness Evaluation WCT Successfully performs the position (or another position that maintains currency as identified in PMS 310-1) within a five (5) year timeframe |
| Position Documentation: | Responsible for maintaining awarded training certificates, fitness test documentation, and a log or record of fire experience. Copies of this documentation are made available to the MassWildlife Prescribed Fire Program Manager for the MassWildlife Qualification Files. Appendix 12 contains a Prescribed Fire and Wildfire Experience Log to track individual experiences. |
| Other Agency Endorsements: | National Wildfire Coordinating Group (NWCG) |

UTV Operator – Prescribed Fire (UTVOP)

| | |
|--------------------------------|--|
| Responsibilities: | Operate UTV (an off-road utility vehicle used to carry supplies and/or equipment for a specialized use) on the fireline assisting with the transport of crew and equipment, and depending on the UTV set up and assignment, assist with ignition or holding. |
| Pre-Qualifications: | RxCM or FFT2 |
| Required Training: | RT-130 Annual Fireline Safety Refresher |
| Required Experience: | Must be 18 Years of Age and Have Valid Driver's License Basic Orientation regarding UTV Operation |
| Fitness: | Moderate RxCM and FFT2 |
| Recommended Training: | S-211 Portable Pumps and Water Use S-219 Firing Operations UTV Operation Class or Workshop Basic First Aid and CPR |
| Currency: | Complete Recurrent Training- Annual Fireline Safety Refresher Complete Annual Physical Fitness Evaluation WCT |
| Position Documentation: | Responsible for maintaining awarded training certificates, fitness test documentation, and a log or record of fire experience. Copies of this documentation are made available to the MassWildlife Prescribed Fire Program Manager for the MassWildlife Qualification Files. Appendix 12 contains a Prescribed Fire and Wildfire Experience Log to track individual experiences. |

Public Information Representative – Prescribed Fire (MWRx PIR)

| | |
|------------------------------|---|
| Responsibilities: | The Public Information Representative coordinates inquiries from the public, press, and others during a prescribed burn. This crew member keeps the prescribed Burn Boss informed of activities related to public inquiries and may escort individuals or press representatives pre-approved by the Burn Boss to visit the prescribed burn project area during operations. The MW Rx PIP strives to keep communications knowledgeable, open, and demonstrative of project goals and objectives. |
| Pre-Qualifications: | RxCM or FFT2 |
| Required Training: | RT-130 Annual Fireline Safety Refresher |
| Required Experience: | Satisfactory performance as a burn crew member on five or more prescribed burns |
| Fitness: | Moderate |
| Recommended Training: | S-203 Introduction to Information Officer Basic UTV Operation Workshop Basic First Aid and CPR |
| Currency: | Complete Recurrent Training- Annual Fireline Safety Refresher Complete Annual Physical Fitness Evaluation |
| Position | |
| Documentation: | Responsible for maintaining awarded training certificates, fitness test documentation, and a log or record of fire experience. Copies of this documentation are made available to the MassWildlife Prescribed Fire Program Manager for the MassWildlife Qualification Files. Appendix 12 contains a Prescribed Fire and Wildfire Experience Log to track individual experiences. |

Higher qualifications such as a Public Information Officer (PIOF) may be required for higher complexity incident.

Advanced Prescribed Burn Crew Member (MWRx FFT1)

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|------------------------------|--|
| Responsibilities: | The Advanced Prescribed Burn Crew Member may lead a squad of 3-7 crew members in prescribed fire activities such as holding and ignitions as directed by a Single Resource Boss or Prescribed Burn Boss, or other incident command position. Responsible for good communications and situational awareness. |
| Pre-Qualifications: | RxCM or FFT2 |
| Required Trainings: | S-131 Advanced Firefighter (S-133 and 134 are now combined in S-131) RT-130 Fireline Safety Refresher |
| Recommended Training: | S-211 Portable Pumps and Water Use S-219 Firing Operations Pump Familiarization Workshop Mass Custom Suppression Exercises/Workshop Basic First Aid and CPR |
| Required Experience: | Satisfactory participation on 12 or more prescribed burns Completion of MWRx – FFT1 Task Book or NWCG FFT1 Task Book Knowledge and skills of local pumps Demonstrated skills and use of drip torches and firing techniques |
| Fitness: | Moderate |
| Position Currency: | Complete Recurrent Training Annual Fireline Safety Refresher Complete annual Physical Fitness testing Successfully performs the position (or another position that maintains currency for the position within a five (5) year timeframe |
| Documentation: | Responsible for maintaining awarded training certificates, fitness test documentation, and a log or record of fire experience. Copies of this documentation are made available to the MassWildlife Prescribed Fire Program Manager for the MassWildlife Qualification Files. Appendix 12 contains a Prescribed Fire and Wildfire Experience Log to track individual experiences. |

Firefighter Type 1/Incident Commander Type 5 (FFT1/ICT5)

| | |
|------------------------------|---|
| Responsibilities: | The Firefighter Type 1 may lead a squad of crew members in prescribed fire activities such as holding and ignitions as directed by a Single Resource Boss or Prescribed Burn Boss, or other incident command position. Responsible for good communications and situational awareness. ICT5 is the command qualification position used in the lowest complexity incident. Type 5 incidents typically require less than 6 fire fighters to control, and single engine crews are typically assigned to these types of incidents. These NWCG positions require completion of a combined NWCG task book on wildfire incidents. * |
| Pre-Qualifications: | FFT2 |
| Required Trainings: | S-131 Advanced Firefighter (S-133 and 134 are now combined in S-131) ICS 200 Incident Command (ICT5 only) RT-130 Fireline Safety Refresher |
| Required Experience: | Satisfactory performance as FFT2 and Completion of NWCG FFT1 Task Book on a wildfire incident Completion of NWCG ICT5 Task Book on a wildfire incident |
| Recommended Training: | S-211 Portable Pumps and Water Use S-212 Wildland Chainsaws S-219 Firing Operations Basic First Aid and CPR |
| Fitness: | Arduous |
| Position Currency: | Complete Recurrent Training Annual Fireline Safety Refresher Complete annual Physical Fitness testing Successfully performs the position (or another position that maintains currency for the position within a five (5) year timeframe |
| Documentation: | Responsible for maintaining awarded training certificates, fitness test documentation, and a log or record of fire experience. Copies of this documentation are made available to the MassWildlife Prescribed Fire Program Manager for the MassWildlife Qualification Files. Appendix 12 contains a Prescribed Fire and Wildfire Experience Log to track individual experiences. |
| Agency Documentation: | NWCG |

- * Note: The NWCG Firefighter Type 1 (FFT1) and Incident Commander Type 5 (ICT5) PTBs are combined. However, the positions are not combined. The FFT1 tasks are completed only once; additional tasks must be completed to meet the ICT5 level. The FFT1 and ICT5 tasks can be completed simultaneously. The required experience is satisfactory performance as a Firefighter Type 2 (FFT2).

Prescribed Burn Holding Specialist (MWRx-Holding Specialist)

| | |
|--------------------------------|--|
| Responsibilities: | The Prescribed Burn Holding Specialist reports to the Prescribed Burn Boss or assigned level of organization as determined in the Prescribed Fire Plan. This supervisory crew member may lead a squad of 3 – 7 crew members on holding operations. This person is responsible for briefing personnel on holding objectives, coordinating holding operations with ignition operations, confining the burn to a predetermined area, overseeing mop up and patrol of unit boundaries. This person maintains communication with an assigned supervisor, the Burn Boss, and adjacent resources regarding holding progress and problems. This is a skilled member of the burn crew that performs assignments requiring water delivery, holding, and other prescribed burn functions. |
| Pre-Qualifications: | MWRx FFT1 or NWCG FFT1 |
| Required Training: | RT-130 Annual Fireline Safety Refresher |
| Recommended Training: | S-211 Portable Pumps and Water Use S-215 Fire Operations in the Wildland Urban Interface Basic First Aid and CPR |
| Required Experience: | Satisfactory performance as MW-Rx FFT1 or NWCG FFT1 Demonstrated knowledge and skills of local pumps Experience on Engine Crew |
| Fitness: | Moderate |
| Currency: | Complete Recurrent Training- Annual Fireline Safety Refresher Complete Annual Physical Fitness Evaluation Successfully perform the position (or another position that maintains currency) within a five (5) year timeframe |
| Position Documentation: | Responsible for maintaining awarded training certificates, fitness test documentation, and a log or record of fire experience. Copies of this documentation are made available to the MassWildlife Prescribed Fire Program Manager for the MassWildlife Qualification Files. Appendix 12 contains a Prescribed Fire and Wildfire Experience Log to track individual experiences. |

Ignition Specialist (MWRx FIR1)

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| Responsibilities: | The Ignition Specialist is responsible for supervising and directing ground firing operations per established standards in the Prescribed Fire Plan and under the direction of the Prescribed Burn Boss. Key duties and responsibilities include instructing crews of 3 - 7 individuals on project objectives and ignition operations and conducting ignition operations in a safe manner according to the ignition plan at the direction of the Prescribed Burn Boss. This crew member is responsible for coordinating ignition operations with Holding Resources and the Prescribed Burn Boss. |
| Pre-Qualifications: | MWRx FFT1 or NWCG FFT1 |
| Required Training: | S-219 Firing Operations RT-130 Annual Fireline Safety Refresher |
| Required Experience: | Satisfactory performance as MWRx FFT1 or NWCG FFT1 Demonstrated skill and use of drip torches and firing techniques |
| Recommended Training: | S-290 Intermediate Wildland Fire Behavior S-310 Introduction to Fire Effects |
| Fitness: | Moderate |
| Currency: | Complete Recurrent Training- Annual Fireline Refresher Complete Annual Physical Fitness Evaluation Successfully perform the position (or another position that maintains currency within a five (5) year time frame. |
| Position Documentation: | Responsible for maintaining awarded training certificates, fitness test documentation, and a log or record of fire experience. Copies of this documentation are made available to the MassWildlife Prescribed Fire Program Manager for the MassWildlife Qualification Files. Appendix 12 contains a Prescribed Fire and Wildfire Experience Log to track individual experiences. |

Rx Engine Operator (MWRx ENOP)

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| Responsibilities: | The MWRx Engine Operator is responsible for water delivery, pumping operations, water supply, drafting, and engine operations on a prescribed burn. This individual identifies the capability of an engine and assigned personnel (usually one to three individuals). Performs or directs others in starting pump engine, priming pump, adjusting engine speed and pump valves, laying hose, appropriate nozzle use, and effective use of water. This is a skilled member of the crew who performs assignments requiring water delivery, holding, and other prescribed burn functions. |
| Pre-Qualifications: | MWRx FFT1 or NWCG FFT1 |
| Required Training: | S-211 Portable Pumps and Water Use RT-130 Annual Fireline Safety Refresher |
| Recommended Training: | S-290 Intermediate Wildland Fire Behavior Completion of PTB for MWRx Engine Operator or NWCG ENOP |
| Required Experience: | Satisfactory performance as MWRx FFT1 or NWCG FFT1 Experience on Engine Crew or Completion of Local Engine Academy |
| Fitness: | Moderate |
| Currency: | Complete Recurrent Training- Annual Fireline Refresher Complete Annual Physical Fitness Evaluation Successfully performs the position (or another position that maintains currency within a five (5) year timeframe |
| Position Documentation: | Responsible for maintaining awarded training certificates, fitness test documentation, and a log or record of fire experience. Copies of this documentation are made available to the MassWildlife Prescribed Fire Program Manager for the MassWildlife Qualification Files. Appendix 12 contains a Prescribed Fire and Wildfire Experience Log to track individual experiences. |

Engine Boss/Single Resource Boss (NWCG ENGB)

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| Responsibilities: | Engine Boss directs an engine and single resource crew on the fireline. This individual reports to the Prescribed Burn Boss. |
| Required Training: | ICS-200 ICS for Single Resources and Initial Action Incidents S-230 Crew Boss, Single Resource |
| Experience: | Satisfactory performance as a Fire Fighter Type 1 (FFT1) Completion and Certification of PTB as an Engine Boss, Single Resource (ENGB) on a wildfire incident |
| Recommended Training: | S-270 Basic Air Operations S-231 Engine Boss (Single Resource) S-219 Firing Operations L-280 Followership to Leadership S-260 Interagency Incident Business Management |
| Fitness: | Arduous |
| Currency: | Complete Recurrent Training- Annual Fireline Refresher Complete Annual Physical Fitness Evaluation Successfully perform the position (or another position that maintains currency as identified in PMS 310-1) within a five (5) year timeframe |
| Position Documentation: | Responsible for maintaining awarded training certificates, fitness test documentation, and a log or record of fire experience. Copies of this documentation are made available to the MassWildlife Fire Program Manager for the MassWildlife Qualification Files. Appendix 12 contains a Prescribed Fire and Wildfire Experience Log to track individual experiences. |
| Other Agency Endorsements: | NWCG |

Firing Boss, Single Resource (NWCG FIRB)

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| Responsibilities: | The Firing Boss directs ignition and a single resource crew on the fireline as determined by the prescribed burn and complexity analysis. This individual reports to the Prescribed Burn Boss. |
| Required Training: | ICS-200 ICS for Single Resources & Initial Actions S-230 Crew Boss (Single Resource) S-290 Intermediate Wildland Fire Behavior RT-130 Annual Fireline Safety Refresher |
| Required Experience: | Satisfactory performance as a Firefighter Type 1 (FFT1) and Completion and Certification of PTB as a Firing Boss, Single Resource (FIRB) on a wildfire incident |
| Fitness: | Moderate |
| Recommended Training: | S-270 Basic Air Operations (S-270) S-219 Firing Operations L-280 Followership to Leadership S-280 Interagency Incident Business Management First Aid and CPR |
| Currency: | Complete Recurrent Training- Annual Fireline Refresher Complete Annual Physical Fitness Evaluation Successfully perform the position (or another position that maintains currency as identified in PMS 310-1) within a five (5) year timeframe |
| Position Documentation: | Responsible for maintaining awarded training certificates, fitness test documentation, and a log or record of fire experience. Copies of this documentation are made available to the MassWildlife Fire Program Manager for the MassWildlife Qualification Files. Appendix 12 contains a Prescribed Fire and Wildfire Experience Log to track individual experiences. |
| Other Agency Endorsements: | NWCG |

Prescribed Burn Boss Type 3 (RxB3)

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| Responsibilities: | The Burn Boss Type 3 directs prescribed fire operations on low complexity burns and non-broadcast burn operations as determined through the prescribed fire planning process and complexity analysis. This individual is responsible for safe and effective unit preparation, crew and equipment organization, and effective and safe fire operations from ignition to mop-up as determined by the Prescribed Fire Plan. In addition, this individual is responsible for coordinating with fire management partners regarding burn operations, conducting an after action review, and completing a fire summary report for each burn. RxB3 may serve as instructor at appropriate wildland fire courses. |
| Required Training: | S-290 Intermediate Fire Behavior RT-130 Annual Fireline Safety Refresher Standard First Aid and CPR |
| Required Experience: | Satisfactory performance as an Incident Commander, Type 5 (ICT5) AND Completion and certification of PTB for Prescribed Fire Burn Boss Type 3 (RxB3) OR Satisfactory performance as a Firefighter Type 1 (FFT1) and FIRB AND Completion and certification of PTB for Prescribed Fire Burn Boss Type 3 (RxB3) |
| Fitness: | Moderate |
| Recommended Training: | Rx-341 Prescribed Fire Burn Plan Preparation L-280 Followership to Leadership |
| Currency: | RT-130 Complete Annual Fireline Refresher RT-300 Burn Boss Safety Refresher every two years Complete First Aid and CPR certification every two years Complete annual fitness requirement Successfully lead a prescribed burn within a five (5) year timeframe |
| Position Documentation: | Responsible for maintaining awarded training certificates, fitness test documentation, and a log or record of fire experience. Copies of this documentation are made available to the MassWildlife Fire Program Manager and/or the designated Record Keeper for the MassWildlife Qualification Files. See Appendix 20 for a typical fire experience log. |
| Other Agency Endorsements: | US Fish and Wildlife Service, Bureau of Land Management, Bureau of Indian Affairs, U.S. Forest Service |

Burn Boss Type 2 (RxB2)

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| Responsibilities: | The Burn Boss Type 2 directs prescribed burn operations on low to moderate complexity burns as determined through the prescribed fire planning process and complexity analysis. The RxB2 is responsible for safe and effective unit preparation, crew and equipment organization, and effective and safe fire operations from ignition to mop-up as determined by the Prescribed Fire Plan. In addition, this individual is responsible for coordinating with fire management partners regarding burn operations, conducting an after action review, and completing a fire summary report for each burn. RxB2 may prepare and provide technical review of low to moderate complexity Prescribed Fire Plans and Fire Management Plans. RxB2 may serve as instructor at appropriate wildland fire courses. |
| Required Training: | RT-130 Annual Fireline Safety Refresher S-390 Introduction to Wildland Fire Behavior Calculations Standard First Aid and CPR |
| Required Experience: | Satisfactory performance as a Firing Boss, Single Resource (FIRB) and Satisfactory performance as an Incident Commander Type 4 (ICT4) Completion and Certification of PTB as a Prescribed Fire Burn Boss Type 2 (RxB2) on appropriate prescribed fire incident |
| Fitness: | Moderate |
| Recommended Training: | L-380 Fireline Leadership Rx-301 Prescribed Fire Implementation Rx-310 Introduction to Fire Effects Rx-341 Prescribed Fire Burn Plan Preparation or equivalent required to approve burn plans and provide technical review of plans |
| Currency: | RT-130 Complete Annual Fireline Safety Refresher RT-300 Burn Boss Safety Refresher every 2 yrs. Complete annual fitness requirement Successfully lead a prescribed burn within a 5-year timeframe |
| Position Documentation: | Responsible for maintaining awarded training certificates, fitness test documentation, and a log or record of fire experience. Copies of this documentation are made available to the MassWildlife Prescribed Fire Program Manager for the MassWildlife Qualification Files. Appendix 12 contains a Prescribed Fire and Wildfire Experience Log to track individual experiences. |
| Other Agency Endorsements: | NWCG |

Burn Boss Type 1 (RxB1)

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| Responsibilities: | The Burn Boss Type 1 directs prescribed burn operations on low, moderate, and high complexity burns as determined through the prescribed fire planning process and complexity analysis. The RxB1 is responsible for safe and effective unit preparation, crew and equipment organization, and effective and safe fire operations from ignition to mop-up as determined by the Prescribed Fire Plan. In addition, this individual is responsible for conducting an after action review and completing a fire summary report for each burn. RxB1 may prepare and provide technical review of Prescribed Fire Plans and Fire Management Plans. RxB1 may serve as instructor at appropriate wildland fire courses. |
| Required Training: | RT-130 Annual Fireline Safety Refresher S-490 Advanced Wildland Fire Behavior Calculations Standard First Aid and CPR |
| Experience: | Satisfactory performance as RxB2 and Completion and Certification of PTB as a Prescribed Fire Burn Boss Type 1 (RxB1) on appropriate prescribed fire incidents |
| Fitness: | Light |
| Recommended Training: | L-380 Fireline Leadership Rx-510 Advanced Fire Effects Rx-410 Smoke Management Techniques M-581 Fire Program Management |
| Currency: | RT-130 Complete Annual Fireline Refresher RT-300 Burn Boss Safety Refresher every 2 yrs. First Aid and CPR certification every 2 yrs. Complete annual fitness requirement Successfully lead a prescribed burn within a 5-year timeframe |
| Position Documentation: | Responsible for maintaining awarded training certificates, fitness test documentation, and a log or record of fire experience. Copies of this documentation are made available to the MassWildlife Fire Program Manager for the MassWildlife Qualification Files. Appendix 12 contains a Prescribed Fire and Wildfire Experience Log to track individual experiences. |
| Other Agency Endorsements: | NWCG |

Safety Officer Line (SOFR)

Responsibilities:

The Safety Officer develops and recommends measures for assuring personnel safety on the fireline. This individual is responsible for assessing and/or anticipating hazardous and unsafe situations on a prescribed burn. Having full authority of the Incident Commander, the Safety Officer can exercise emergency authority to stop or prevent unsafe acts. Only one Safety Officer will be assigned for a prescribed burn or incident. The Safety Officer may have Assistant Safety Officers as necessary, and the Assistant Safety Officers may also come from assisting agencies or jurisdictions as appropriate.

Required Training:

ICS 300 Intermediate ICS for Expanding Incidents
ICS 400 Advanced ICS
RT 130 Annual Fireline Safety Refresher

Experience:

Satisfactory performance as Strike Team Leader including (STCR, STEQ, STEN) and
Completion and Certification of PTB as a Safety Officer, Line (SOFR) on a wildfire or prescribed fire incident
OR
Satisfactory performance as an Incident Commander Type 4 (ICT4)
Completion and Certification of PTB as a Safety Officer, Line (SOFR) on a wildfire or prescribed fire incident

Fitness:

Moderate

Currency:

RT-130 Complete Annual Fireline Refresher

Position Documentation:

Responsible for maintaining awarded training certificates, fitness test documentation, and a log or record of fire experience. Copies of this documentation are made available to the MassWildlife Prescribed Fire Program Manager for the Agency Qualification Files. Appendix 12 contains a Prescribed Fire and Wildfire Experience Log to track individual experiences.

Other Agency Endorsements:

NWCG

Prescribed Fire Program Manager (MWRx M)

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| Responsibilities: | The Prescribed Fire Program Manager administers all aspects of the MassWildlife Prescribed Fire Program, including but not limited to coordinating Inter-agency contacts, securing permits, overseeing fire planning, operations, database management, personnel record maintenance, permitting, scheduling, and training. The Prescribed Fire Program Manager is expected to function as a current or former burn boss and this MassWildlife position does not track similarly named NWCG positions. The Prescribed Fire Program Manager works closely with the Agency Administrator to ensure safe and effective implementation of prescribed fire procedures and ensures fire personnel are trained, certified, and prepared for prescribed fire implementation. |
| Required Training: | RT-130 / Annual Fireline Safety Refresher |
| Experience: | Satisfactory performance as a Prescribed Fire Burn Boss Type 2 (Rx2B) or higher, experience in writing Prescribed Fire Plans, experience in developing cooperative agreements and working with a variety of partners. |
| Fitness: | None |
| Recommended Training: | S-200 Initial Attack Incident Commander Rx – 510 Advanced Fire Effects M – 580 Ecosystem Management Rx-410 Smoke Management Techniques I-400 Advanced ICS L-380 Fireline Leadership L-381 Incident Management |
| Currency: | RT-130 / Complete Annual Fireline Refresher |
| Position Documentation: | Responsible for maintaining awarded training certificates, fitness test documentation, and a log or record of fire experience. Copies of this documentation are made available to the MassWildlife Fire Program Manager and Prescribed Fire Administrator for the Agency Qualification Files. |
| Other Agency Endorsements: | NWCG |

MassWildlife Prescribed Fire Administrator

Responsibilities:

The Agency Administrator has final approval authority for all MassWildlife prescribed burning. The Agency Administrator ensures that Prescribed Fire Plans meet agency policy, undergo technical review, reflect conditions specified in permits, and necessary agreements are in place for burning. This person works closely with the Prescribed Fire Program Manager and is responsible for coordinating critical incident management and interagency reviews associated with prescribed burning and wildfire incidents.

Recommended Training:

IS 700 National Incident Management System, Introduction
ICS 100 Introduction to ICS
Agency Administrator Workshop hosted at Local Level

Experience:

Knowledge of MassWildlife Prescribed Fire Policy and Handbook, other MassWildlife/Agency policies and guidance, Interagency Prescribed Fire Planning and Implementation Guide (PMS 484), NWCG Agency Administrator's Guide to Incident Management (PMS 926).

Fitness:

None

IV. Safety

A. Prescribed Fire Planning and Operations

Firefighter and public safety is the priority of every fire management activity. Actions to provide for safety must be identified in every Prescribed Fire Plan and followed in the operations of the burn to reflect this commitment. Every person involved in a prescribed burn project is responsible for identifying safety issues and concerns. It is the responsibility of everyone participating in prescribed burn activities to let the Burn Boss know if they do not understand their assignment or have a safety concern related to the assignment.

The Prescribed Fire Plan is approved and signed by a Prescribed Fire Plan Preparer who is qualified or previously qualified as a Prescribed Burn Boss (RxB Type 1 or 2) at or above the level of project complexity, see Section II, III, and Appendix 4 of this Handbook. It is required that another qualified person, other than the one writing the plan provide a technical review of the plan. This will help ensure that safety is planned for accordingly. The Technical Reviewer should be a current or former Prescribed Burn Boss Type 1 or 2 that is qualified for the complexity level and familiar with the fuel types included in the plan. Prescribed Fire Plans written by a Prescribed Burn Boss Type 3 (RxB3) are required to be reviewed and approved by a Burn Boss Type 2 (RxB2) prior to execution.

Prescribed Fire Plans include a “Go/No Go Checklist” (See Element 2B of Appendix 4) and specific sections of the plan address ignitions, communications, holding, safety zones, escape routes, unusual hazards, hazard mitigation, and emergency medical procedures.

B. Risk Management and Hazard Mitigation

Sound risk management is the foundation for all fire management activities. Risks and uncertainties relating to fire management operations must be understood, analyzed, communicated, and managed by fire planners and the Burn Boss as they relate to the cost of either doing or not doing an activity. A “risk” is the likelihood or possibility of hazardous consequences in terms of severity or probability. Risk Management consists of mitigation strategies and implementation actions to improve outcomes and minimize negative consequences. The *Incident Safety Analysis* (ICS 215A / NFES 2221), found in Appendix 16 of this Handbook, is an example of a form that can be used for risk analysis.

Safety hazards associated with the prescribed burn unit and project area are evaluated and mitigated through the complexity analysis, risk management assessments, and other appropriate tools such as the Lookouts, Communications, Escape Routes and Safety Zones (LCES) system. All of these tools contribute to the Prescribed Fire Planning process and allow for hazard mitigation. Protective equipment and modified work procedures needed to mitigate hazards are identified and addressed in the Prescribed Fire Plan.

During the implementation phase of prescribed burns, personnel may encounter uncertain and dynamic conditions where they must continuously evaluate risks with an eye toward maintaining a safe work environment, meeting the prescribed fire objectives and addressing social and political concerns. The risk management process identified in the *Incident Response Pocket Guide* (IRPG), PMS 461 (NWCG 2010), helps identify, evaluate, and mitigate time-sensitive risks and hazards associated with prescribed fire. All crew members receive an IRPG at their initial training but may request one at subsequent refreshers if this guide needs replacement over time.

C. Contingency Planning

Contingency planning is the determination of what additional actions or additional resources (or both) are needed to keep the prescribed fire within the scope of the Prescribed Fire Plan. At a minimum, this element will address contingency options related to maintaining the prescribed fire within the ignition unit and or

prescribed fire project area. Contingency planning can also address not meeting prescribed fire objectives, critical holding points, smoke management considerations such as impacts to critical smoke receptors, staffing, accidents, and other unanticipated events.

Contingency planning considers what might happen if two or three things go wrong at the same time. The probability of such an occurrence will be very low, but the impact can be extreme. Almost every major prescribed fire disaster involved multiple failures. Element 17 of the Prescribed Fire Plan (Appendix 4) addresses contingency planning.

The contingency plan establishes Management Action Points (MAPS) or limits that indicate when additional actions (tactical and non-tactical) or resources, or both, will be needed. If it is determined that contingency resources are not needed, the rationale should be documented in this element of the Prescribed Fire Plan. Contingency needs should be based on the tactics to mitigate events or impacts to prescribed fire objectives or values at risk.

These resources may be on- or off-site as required by the Prescribed Fire Plan. If the identified contingency resources will not be on-site, the maximum acceptable response time for those resources must be identified. Separate contingency plans may be developed to address seasonal differences, types of ignitions or phases of implementation (for example, active ignition, mop up, holding, monitoring, etc.). Contingencies for unplanned smoke impacts need to consider both the day and days following active ignition. Many smoke related problems occur at night (post ignition) or days following ignition when most resources have been demobilized. Consider what might happen if two or three things go wrong at the same time. The probability will be very low, but the impact can be extreme. Almost every major prescribed fire disaster involved multiple failures.

Contingency planning identifies trigger points and associated actions needed, secondary control lines, on and off site fuels, back-up water sources, and more. It will also state actions that may be taken if the unforeseen happens (e.g. the burn exceeds the prescription or equipment fails). A contingency map will be included in the Prescribed Fire Plan that shows access points, secondary holding lines, and possible barriers for emergency access (e.g. bridges out). See Appendix 14 for a sample map.

D. Crew Safety and Smoke Considerations

Exposure to smoke during prescribed burn operations can be a significant safety concern. MassWildlife will take precautions to minimize staff exposure to smoke during prescribed burns. There are many things that Prescribed Fire Planners and Burn Bosses can do to help reduce the impact of smoke on burn crew personnel, including but not limited to:

- Place firelines in areas of lighter fuels or adjacent non-burnable areas, which allow more efficient holding, patrol, and mop-up.
- Consider using or changing ignition techniques to minimize smoke.
- Conduct black-lining operations during conditions less likely to produce heavy smoke.
- Regularly rotate crew members from work sites with moderate to high smoke levels to areas of less smoke or smoke-free areas.
- If necessary, order additional personnel to relieve crews assigned to high-smoke-level areas.
- Instruct personnel to take breaks in smoke-free or low-smoke areas, when possible.
- Locate safety zones or staging areas free of smoke to maximize recovery from potential CO exposure.
- Restrict workers from driving a vehicle if they display symptoms or behavior of heavy smoke exposure.
- Evaluate any personnel who display the symptoms of smoke exposure and determine if they are fit for duty before their next work assignment.

Smoke exposure is addressed in the job hazard analysis or its equivalent and incorporated into the applicable sections of the Prescribed Fire Plan. Public safety impacts from smoke should be addressed in Element 13 of the Prescribed Fire Plan: Public and Personnel Safety, Medical.

E. Safe Ignition Operations

The ignition plan as detailed in Element 15 of the technically reviewed and approved Prescribed Fire Plan should include which ignition devices will be used, ignition techniques, and special safety considerations for ignitions. All of these must be followed the day of the burn. Ignitions should take place only at the direction of a Burn Boss or a Firing Boss under the direction of the Burn Boss, either of whom can be expected to understand fire behavior and recognize changing fire behavior that indicates potential dangers to fireline personnel. The *Interagency Ground Ignition Guide*, PMS 443 (NWCG, 2011) was developed to ensure that all ground ignitions are performed safely and efficiently. It includes information on types of ground ignition devices, standards and specifications for equipment, normal and emergency operating procedures for use, qualifications for operators, job hazard analyses, and material safety data sheets for the fuels used during ignition.

General safety considerations for ignitors include but are not limited to:

- Ignitors must be in radio or direct communication with either the Firing Boss or Burn Boss at all times during the burn so they can receive direction as to timing and implementation of ignitions as well as emergency instructions.
- Ignitors must be familiar with the prescribed burn site, escape routes and safety zones, which may change during the burn.
- Physical stamina of ignitors should be monitored throughout the burn, as accidents are more likely to occur when firefighters are fatigued.
- Ignitors should be briefed on their roles should contingency plans be implemented for spot fires or escaped fires.

F. Safety Responsibility, Analysis, and Briefing

All fireline personnel are responsible for safety during the course of a prescribed burn. The Burn Boss is responsible for supervising safety on all burns. Use of a Safety Officer whose sole responsibility is fireline safety is encouraged on large scale burns with higher complexity of fire operations and larger number of fireline personnel. All fireline personnel should carry with them a copy of the Incident Pocket Response Guide (IRPG) and reference it as necessary for hazard and risk assessment. All fireline personnel receive an IRPG at S130/190 training, and should be familiar with sections pertaining to risk management and hazard assessment, and a review of these sections should be included in annual refresher trainings. The guide provides guidance on Lookouts, Communications, Escape Routes and Safety Zones (LCES). Use of LCES will minimize the potential for injury or entrapment. The IRPG also includes the 10 Standard Fire Orders and 18 Watch Out Situations on the back cover. It is an excellent resource to help ensure that prescribe fire operations are conducted with minimal risk to the safety of the crew.

The Burn Boss will conduct a safety briefing before each burn to communicate safety issues, Section II F. of the handbook. The briefing will include communications, predicted weather and fire behavior, planned operations, and other safety concerns. The briefing explains to the burn crew what is planned, what might happen, what their roles will be, and what hazards they might encounter and how to mitigate them. A briefing check list to address this and other issues is included in the Prescribed Fire Plan, Appendix 4. The Burn Boss gives all crew members the opportunity to decline participation in the burn during the pre-burn briefing. Any concerns should be recorded by the Burn Boss in the Fire Event Log and Fire Summary Report.

G. Personal Protective Equipment

The following items will be worn on any prescribed burn done by MassWildlife personnel, or by anyone working on MassWildlife prescribed burns. Personal Protective Equipment (PPE) required for prescribed fire is designed to help protect crew members when and if it is properly used and maintained. Prescribed burn crew members will be trained to use safety equipment effectively. Proper use in conjunction with skill and common sense can prevent injuries. In addition, a first aid kit must be available on all burns.

Required PPE includes:

- Flame resistant shirt and pants, or coveralls
- Leather gloves
- Hard hat
- Eye protection
- Fire/heat resistant boots
- Fire Shelter: All employees must carry (unless the Prescribed Fire Plan states otherwise and justifies that they are not necessary) a fire shelter unless specifically assigned to an engine, in which case they must carry a shelter when away from that vehicle or when beyond the protective reach of water hoses from that vehicle.

The following are further detailed recommendations for crew member PPE.

1. Flame-resistant clothing (shirt and pants or coveralls):

Wear loose fitting shirt and pants or coveralls made of National Fire Protection Association (NFPA) 1977 compliant flame resistant fabric. Flame resistant fabric is not fireproof. It offers no insulation to protect against burns. Wearing flame resistant fabrics may add to body heat stress. Electrolytes (potassium, sodium and chloride) and water should be replaced in the body. Flame resistant fabrics should be kept clean since it loses its fire retardant capabilities if foreign substances are on or in the fibers. Wash per instructions, separate from other clothing. Replace fire resistant clothing if ripped or torn.

Trousers should have a loose and comfortable fit so that they do not restrict movement. Trousers need to be the proper length. They need to fall over the boot tops to keep out embers. They should not be cuffed, so embers do not get hidden in the folds of the fabric. Do not cut the bottom of the trousers off. Doing so will cause fraying which is dangerous around open flame.

Wear a long-sleeved flame-resistant shirt that will secure at the collar and wrists for maximum protection. Shirt sleeves should not be rolled up when on the fireline. Both shirts and coveralls should be kept buttoned to protect the exposed body parts.

It is recommended that employees wear a t-shirt, underwear and socks under fire clothing and boots. T-shirts and underwear should be 100% cotton or a 100% flame-resistant blend. Socks should be cotton, wool or a blend of flame resistant fibers. Avoid undergarments and socks made of polyester, nylon or acrylic as per the Interagency Standards for Fire and Aviation Operations. Cotton, wool, or 100% flame resistant long underwear can be used in colder temperatures.

If personnel need to wear a jacket on the fireline, they should wear a flame-resistant brush jacket. Never wear non-flame-resistant synthetic windbreakers or jackets over flame-resistant shirts. If flame-resistant shirts are large enough, personnel can layer cotton or non-synthetic clothing under the shirt.

2. Boots

Heavy duty, leather, laced boots with a minimum 8-inch top and skid resistant soles made of hard-rubber with non-slip lugs or tractor tread such as a Vibram sole. This will allow for maximum traction and prevent melting upon exposure to normal fireline conditions. Soles should not be made of composite rubber or plastic which have low melting points. Laces are recommended, but not required, to be made of leather or "rawhide" or flame-resistant material. Steel-toe (metal cup) footwear is not recommended for prescribed burning.

3. Hard Hat

Hard hats will provide protection when properly worn with the internal suspension. Do not wear hard hats backwards. Never wear metal hard hats. Hard hats should be equipped with chin straps. Headbands and chin straps should be kept clean. Do not clean headbands or plastic hard hats with solvents. Use soap and water.

4. Other Required Personal Protective Equipment

- Eye protection such as goggles or safety glasses are required on the fireline.
- Hearing protection, such as Earplugs or ear "muffs", is required when working around chain saws, pumps, helicopters and other very noisy equipment and areas where sound levels exceed 85 decibels.
- Leather gloves are required on the fireline, and are standard for most work. Gloves should fit properly to prevent blisters.

5. Fire Shelter

All persons required to carry fire shelters will be training in their use and shall receive an annual refresher training. Each crew member is responsible for inspecting all fire shelters when issued to them. In addition, inspection of fire shelters is recommended at the beginning and end of each fire season and every 14 days during the fire season. The inspection process outlined in the publication, *The New Generation Fire Shelter- PMS 411 – NFES2710* (or most recent version) should be followed. Shelters should be kept away from sharp objects that could puncture them. Do not load heavy objects on top of them or sit on them. Do not lean against objects when wearing the shelter. Always use the hard plastic liner in the carrying case.

6. Canteens or Water Bottles

Crew members should always keep well hydrated when conducting a prescribed burn. During work shifts, crew members should drink often and keep their water bottles filled. During hot work it is common to lose more than a quart of sweat/ hour.

7. Other Important Reminders

- Crew members should not begin an operational period with clothing or PPE that has gas, oil, or other flammable material on it.
- Chain saw chaps, hearing, eye, and face protection are required whenever an individual is assigned to operate a chain saw.
- Head lamps or an adequate light source will be provided for crew members working at night.
- All employees are responsible for the proper use and maintenance of issued property.
- MassWildlife will not be held responsible for any personal gear not necessary for use in fire activity.

Additional PPE Considerations

Neck Protection

Face and neck shrouds are not required PPE. The use of shrouds is not required, but should be used when appropriate as a result of on-site risk analysis. If used, face and neck shrouds shall meet the

requirements of FS specification 5100-601 or *NFPA 1977 Standard on Protective Clothing and Equipment for Wildland Fire Fighting*. Shrouds should be positioned in a manner that allows for immediate use. For additional information see MTDC Tech Tip *Improved Face and Neck Shroud for Wildland Firefighters, 2004* (0451-2323-MTDC).

<https://www.fs.fed.us/t-d/pubs/pdfpubs/pdf04512323/pdf04512323dpi300.pdf>

Face Protection

Face protection in the form of a face shield that meets compliance with MassWildlife specifications shall be worn when working in any position where face protection has been identified as required in the job specific Job Hazard Assessment or Risk Assessment (e.g. batch mixing for Terra-Torch®, chainsaw operations, etc.).

H. Operating and Working Around Equipment

All burn personnel will be notified of all equipment to be used on a prescribed burn and will be given the appropriate safety procedures to follow when working around that equipment. When working around any type of mechanized equipment be sure to maintain eye contact with the operator. Stay out of operator blind spots to ensure safe operations. All crew members should have appropriate PPE.

Chainsaws

During non-fire operations (this includes site preparation and fireline construction for prescribed burns) MassWildlife requires that OSHA guidelines (such as 29 CFR 1910) are followed. Standard Personal Protective Equipment for non-fire operations will be consistent with internal MassWildlife chainsaw guidelines, and generally include the following:

- Hard Hat that meets ANSI Z89.1 - face shield highly recommended (must be labeled)
- Safety Glasses or Goggles that meets ANSI Z87.1 (must be labeled)
- Hearing Protection (plugs or muffs, rated for 85 decibels and higher)
- Gloves (cut resistant)
- Chain Saw Chaps (recommended to overlap boots by at least 2 inches and serviceable)
- Foot Protection (cut-resistant material, ankle support, and good tread – reference ASTM F1818)
- Long-sleeved Shirt and Trousers (loose fitting that can be tucked into boots)

During prescribed burn operations, chainsaw use shall be subject to the above guidelines, and to NWCG applicable guidelines for chainsaw operations, including appropriate personnel training such as NWCG Wildland Fire Chain Saws, S-212, which identifies standards and safety issues related to chainsaw operation.

Ignition Devices

Safe use of ignition devices such as flare launchers require ear protection as well as eye protection, gloves, and other standard personal protective equipment. *The Interagency Ground Ignition Guide PMS 443* (NWCG 2011) provides basic guidance on safe use and required personal protective clothing for burn crew members using these devices. The guide also includes material safety data sheets for different devices.

Transport and Handling of Ignition Devices and Hazardous Materials

Crews should not transport petroleum products inside the enclosed passenger area of vehicles. Basic knowledge of how to safely handle and transport a variety of flammables, oxidants, cleaners, etc., will be taught to all fire personnel. Transportation and use of any product containing chemicals (drip torch fuel,

aviation gas, sphere dispensers, fusees, fuel thickener, etc.) must follow the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (29 CFR 1910.1200 (OSHA, 2012)), Department of Transportation regulations (49 CFR Part 171 (Department of Transportation, 2013)), and MassWildlife-specific guidance. Material Safety Data Sheets (MSDS) for hazardous materials used on projects should be reviewed when developing the job hazard analysis. The *Interagency Transportation Guide for Gasoline, Mixed Gas, Drip Torch Fuel, and Diesel*, PMS 442 (National Wildfire Coordinating Group, 2011), provides interagency guidance for the ground transportation of gasoline, mixed gas, drip-torch fuel, and diesel in government vehicles driven by government employees. The PMS 442 is based on the U.S. Department of Transportation (DOT) and OSHA regulations.

Pumps and Water Use

Eye protection such as goggles, safety glasses, or face shields are needed when working with nozzles to prevent back splash of hot or burning debris in the eyes and are used along with other personal protective clothing. A portable eye wash kit must be on site and kept accessible with the first aid kit. The noise level produced by most portable pumps is in the 95 to 110 decibel range which requires wearing ear protection such as ear plugs or ear muffs.

Heavy Equipment

MassWildlife adheres to all licensing standards, laws, and regulations as outlined by the Commonwealth of Massachusetts' Department of Public Safety's Hoisting Program. Details can be found at <http://www.mass.gov/eopss/consumer-prot-and-bus-lic/license-type/hoisting/>.

Utility Vehicles

An operator must be at least 18 years of age, familiar with laws and regulations, familiar with safety operation of the vehicle, be familiarized to the vehicle by an experienced operator, and be authorized by MassWildlife to operate the vehicle. Below are several courses that address UTV operation and safety.

- Recreational Off-Highway Vehicle Association FREE E-Course <http://www.rohva.org/>
- Massachusetts Environmental Police Online/Onsite Course <https://www.offroad-ed.com/massachusetts/>
- National Park Service Occupational Safety and Health Program Reference Manual 50B Section 6 <https://www.nps.gov/policy/RM50bsection6.pdf>

Trucks and Other Passenger Vehicles

Vehicle Licenses for MassWildlife staff operating vehicles and trailering equipment for prescribed fire activities will follow Massachusetts Registry of Motor Vehicle Guidelines for those vehicles and trailers. Massachusetts Registry of Motor Vehicles information can be found at <https://www.massrmv.com/LicenseandID.aspx>.

OSHA

All work conducted shall adhere to applicable OSHA standards. Detailed information on OSHA standards can be found at <https://www.osha.gov/>.

I. Public Safety, Visitation Restrictions, Road and Trail Closures, Signs

The safety of the general public, MassWildlife employees, and employees of other agencies and organizations working on a prescribed fire shall be taken into consideration with every planning and operational decision. During prescribed fire operations, the area in and around the burn units shall be closed to the extent necessary to protect public and employee safety as outlined in the Prescribed Fire Plan. The extent of the closure shall be determined based on burn unit objectives and anticipated fire behavior, and shall be coordinated with the

MassWildlife District Supervisor and/or other appropriate land managers or owners. Temporary closure signs and additional informational signs shall be posted at parking areas, kiosks, and along roads and trails leading into the closure area.

Figure 6 shows two sample closure signs. The first is an existing sign that has been used in the past. The second is a proposed ANSI Z535.2 and ISO 38640-1 compliant safety sign. The “safety alert symbol” (exclamation point inside a triangle) and signal word “Warning” indicate the potential for serious personal injury. To comply with M.G.L. c. 149 § 6-1/2 and OSHA regulations, MassWildlife intends to move to an ANSI-compliant safety sign.



Figure 6. Sample trail closure signs

Visits to fire operations by individuals without appropriate fire training (e.g. MassWildlife Prescribed Fire Administrator, Senior Staff, Information and Education staff, press, legislators) must be pre-approved by the Burn Boss. Said individuals must wear appropriate personal protective equipment approved by the Burn Boss, and shall be assigned trained personnel to accompany them.

If it is anticipated that prescribed fire operations may necessitate the closing of a public way, MassWildlife staff will coordinate this request in advance with local highway and fire department personnel.

When burning in MassDOT road right of ways, Prescribed Fire Planners should contact the appropriate District Highway Director during the planning phase in the MassDOT District where the burn is planned, to determine what permitting is needed. The following website provides contact information for MassDOT District Offices <https://www.massdot.state.ma.us/highway/AbouttheDistricts.aspx>.

Prescribed burns that occur along road right of ways or adjacent to roads may need signs posted to alert drivers either to potential smoke on the highway or that there are personnel working along the roadway. While MassWildlife employees have the responsibility to warn the public of hazardous traffic conditions, they do not have the authority to enforce traffic laws (i.e. stopping traffic). If prescribed burn operations (e.g. equipment or smoke) are predicted to impact roadways, local law enforcement, fire, and highway departments shall be included in burn planning to determine appropriate actions to be taken in traffic control planning. Local law enforcement officials can be of great assistance as they have training and authority related to traffic control or temporary road closures. In the event there are unexpected impacts to roadways, local law enforcement officials should be notified for assistance in traffic control.

Traffic Control Signs

When prescribed burning on a conventional highway right-of-way occurs, a sign indicating a prescribed burn is ahead should be installed prior to the point where traffic will enter the burn area. In the event winds blow smoke over the roadway, a sign indicating smoke over the road should be installed in the appropriate location downwind of the prescribed burn prior to the point where traffic will enter the smoke area.

All traffic control signs and devices should be constructed to yield upon impact so they do not inflict any undue damage to a vehicle that strikes them. All signs must be reflective and meet state or federal signage size and wording requirements. Cones only need to be reflective if used at night.

Text for existing traffic control signs may include but is not limited to:

“Prescribed Burn Ahead”, “Caution Smoke Ahead”

General Responsibilities for Traffic Control

1. All traffic control devices (signs) must be kept clean and in proper position to insure optimum effectiveness.
2. Remove traffic control equipment (signs) when it is no longer required or appropriate.
3. Keep proper records of traffic control including resources directing traffic control, the starting and ending times, location, type of traffic control used etc. The method of record keeping may vary from a sentence in the Prescribed Burn Unit Plan to a complete Traffic Control Plan. A summary of results should be included in the prescribed burn summary report.

J. Emergency Medical Response

Prescribed Fire Plans include a medical plan that states actions that will be taken if someone is injured. Contact information for local emergency services and the nearest hospital and burn center are included.

MassWildlife is not an ambulance service in the Emergency Medical Services (EMS) System under 105 CMR 170, but is required under M.G.L. c. 149 § 6-1/2 to provide employee protection consistent with OSHA standards, including workplace first aid. Because prescribed fires often occur in locations distant from infirmaries, clinics, or hospitals, and where local or regional EMS ambulance services may have extended response times, MassWildlife shall ensure that sufficient first aid supplies are readily available that meet or exceed the minimally acceptable number and type of first aid kits for logging operations under 29 CFR 1910.266 App A, and shall ensure that there is at least one person on scene at all times who is adequately trained to administer first aid consistent with 29 CFR 1910.151(b), 29 CFR 1910.266 App B, and the Occupational Exposure to Bloodborne Pathogens standard (29 CFR 1910.1030).

For any injury or medical issue requiring care beyond the level of first aid, the EMS system shall be activated.

Emergency Medical Action Plan

Each Prescribed Fire Plan shall include medical plan information consistent with the NWCG ICS-206-WF Medical Plan forms. This shall include relevant medical emergency procedures from the NWCG guidelines for Incident Management Teams. The required elements of these procedures (from NWCG memorandum NWCG #025-2010) shall be detailed in each Prescribed Fire Plan in Element 13: Public and Personnel Safety, Medical, and are:

1. Identify Options for Medical Evacuations: Identify and prioritize transport options in terms of efficiency, based on resource availability, proximity, and potential for success—with a contingency plan in case the preferred mode of transportation cannot be used.

2. Identify One On-Scene Point of Contact: At the scene of a medical emergency, an on-scene point of contact will be determined or designated by chain of command. This point of contact and the person assessing/treating the patient may or may not be the same person. The point of contact will:
 - Take charge of the scene and identify/determine who is in charge of assessing and treating the patient.
 - Use the Medical Incident Communication Protocol described below to relay critical information regarding patient assessment, transportation, and resource needs.
 - Coordinate the request for transportation and/or other resources based on patient assessment.
 - Ensure that information about patient assessment, transportation or other resource needs is transmitted directly to the Incident Command Post Communications in order to reduce the time it takes to communicate essential information and to limit the potential for miscommunication.

The safety briefing for each prescribed burn shall include information regarding emergency medical procedures. This portion of the briefing shall include at a minimum:

1. Overview of procedures for first-aid, determination of on-scene point of contact, medical emergency incident communications, and medical evacuations, including EMS activation.
2. Identification of the medical training level of all participants.
3. Location of first-aid kits.

EMS Training

To the extent possible, all participating personnel should be trained to at least the First Aid and Emergency Cardiovascular Care level as taught by instructors meeting the requirements for logging operations of OSHA Standard 29 CFR 19.10.266 App B (e.g., American Heart Association Heartsaver First Aid/CPR/ECC or American Red Cross First Aid/CPR/AED), or to the Massachusetts First Responder (MFR) level (105 CMR 171), or to the EMS First Responder (EFR) or Emergency Medical Technician (EMT-Basic) level (105 CMR 170) or higher. One or more persons trained to at least the First Aid and Emergency Cardiovascular Care level shall be available at all times during a prescribed burn on MassWildlife lands.

What is First Aid?

OSHA's Safety and Health Topics website (www.osha.gov/SLTC) says: "First aid refers to medical attention that is usually administered immediately after the injury occurs and at the location where it occurred. It often consists of a one-time, short-term treatment and requires little technology or training to administer. First aid can include cleaning minor cuts, scrapes, or scratches; treating a minor burn; applying bandages and dressings; the use of non-prescription medicine; draining blisters; removing debris from the eyes; massage; and drinking fluids to relieve heat stress. OSHA's revised recordkeeping rule, which went into effect January 1, 2002, does not require first aid cases to be documented."

Who May Provide Medical Care?

Any personnel may self-administer first-aid for self-determined minor injuries using available first-aid kits. No reporting is required for self-administered first-aid. If a patient requires assistance for self-determined minor injuries, or is unable to complete their duties while or after self-administering first aid, they shall notify their immediate supervisor in the prescribed fire chain of command. The supervisor will locate personnel trained in first aid and will locate a first aid kit, or will identify personnel to cover patient's duties during self-administration of first-aid.

Personnel shall only provide medical care to others that is consistent with their level of training and certification. In the case of EFRs and EMTs, they shall only provide care that is also consistent with their EMS service's policies and procedures, if any, for off-duty care as described in 105 CMR 170.800. There shall be no compensation, under the meaning of the Good Samaritan law M.G.L. c. 112 § 12V, for medical treatment provided by participants. In the event of a medical emergency requiring care beyond the level of training and/or resources available on-site, the local or regional Emergency Medical Services (EMS) system shall be immediately activated by the designated on-scene point-of-contact.

Medical Incident Communication Protocol and EMS Activation

At the request of a patient or after assessment by on-scene personnel determines that there is a medical emergency requiring care beyond self-administration of first aid, any participant may activate the local or regional Emergency Medical System for an injury or medical event requiring hospital care, using the activation procedure specified in the prescribed fire plan. When possible, EMS should be activated by a person who has direct access to the patient, in order to answer any questions from the EMS dispatcher.

The following steps adapted from NWCG#025-2010 shall be undertaken by personnel who are in immediate, on-scene contact with patient(s) requiring medical care. See the table below and the NWCG Medical Incident Report ICS-206-WF form in Appendix 16 for assessment strategies, record-keeping, and other key procedures.

1. Determine the nature of the emergency.
2. If the emergency is a medical injury/illness, determine if the injury/illness is life threatening. If the injury is life threatening, **activate EMS first**, then clear designated frequency for emergency traffic.
3. Identify the on-scene point of contact by position and last name (i.e. TFLD Smith).
4. Ensure that the individual responsible for medical emergencies in the burn plan and safety briefing (Medical Unit Leader, Safety Officer, Burn Boss) is contacted immediately.
5. Identify number injured, patient assessment(s) and location (geographic and/or GPS coordinates).
6. Identify on-scene medical personnel by position and last name (i.e. EMT Jones).
7. Identify preferred method of patient transport.
8. Determine any additional resources or equipment needed.
9. Document all information received and transmitted on the radio or phone.
10. Document any changes in the on-scene point of contact or medical personnel as they occur.

Because patient identities represent confidential patient information, anyone documenting medical emergencies or report emergencies on the radio (steps 2 through 7 above) should do so without disclosing patient identities (patients may, however, self-disclose). Radio notification of medical emergencies should include the name of the person activating EMS, the patient location, and the general nature of the emergency.

In the event of an injury or event that the patient determines may result in a worker's compensation claim, or in the event of EMS activation, the individual should also complete the appropriate sections of the Commonwealth of Massachusetts HRD Notice of Injury form linked to in Appendix 16, with the assistance of their supervisor as soon as feasible following receipt of medical attention.

Ongoing Prescribed Burn Operations and Shut-Down Decision

In the event of any medical emergency, including one requiring the activation of EMS, the Incident Commander/Burn Boss shall determine whether or not patient and public safety require the shut-down of ongoing burning. This decision shall be made on the basis of, among other considerations, the severity of the emergency, the number of personnel required to provide assistance, access to the patient, the current state of the operations, and any anticipated changes in fire behavior.

Communications and Services

Each Prescribed Fire Plan shall include a description of the communications methods to be used to activate local or regional EMS, and shall identify the EMS ambulance service for the area and the name and address of the nearest hospital.

Motor Vehicle Accidents

In the event of any incident involving damage to a state-owned vehicle, the driver shall follow Office of Vehicle Management accident procedures as linked to in Appendix 16.

Managing Critical Incidents Following a Prescribed Burn

A critical incident may be defined as an event such as a serious or life-threatening injury or death, which has the potential for producing serious long-term adverse effects on MassWildlife, its employees and their families or the community. The MassWildlife Prescribed Fire Administrator and the Prescribed Fire Program Manager are responsible for managing critical incidents, such as a serious injury resultant from a prescribed burn. Guidance to assist the MassWildlife Prescribed Fire Administrator in managing the difficult and chaotic days that follow a serious injury, or other critical or highly visible event, may be found in the NWCG publication *Agency Administrator's Guide to Critical Incident Management* (PMS 926). This guide is designed as a working tool to assist agency administrators with the chronological steps in managing a critical incident. This document includes a series of checklists which outline agency administrators and other functional area oversight and responsibilities. The guide is not intended to replace the Prescribed Fire Plan, other local emergency plans, or other specific guidance that may be available, but may be used in conjunction with existing standard operating procedures.

The MassWildlife Prescribed Fire Administrator and the Prescribed Fire Program Manager will follow agency guidance and record keeping protocols relative to critical incidents. The NWCG guide is available electronically at:

https://www.nifc.gov/PUBLICATIONS/acc_invest_march2010/resources/AgencyAdministratorsGuide2005PMS926-DRAFT.pdf Additional guidance regarding Critical Incident Stress Management, including the availability of CISM teams through the Massachusetts Emergency Management Agency (MEMA), is available at: <http://www.mass.gov/eopss/docs/dfs/emergencyresponse/activation-of-resources/cism-activation.pdf>.

K. Safety Communication

Every individual has the right to turn down unsafe assignments. When an individual feels an assignment is unsafe, they also have the obligation to identify, to the degree possible, safety alternatives for completing that assignment. The IRPG contains a process for "How to Properly Refuse Risk". Turning down the assignment is one possible outcome of risk management. A turn down is a situation where an individual has determined they cannot undertake an assignment as given and they are unable to negotiate an alternative solution. That turn down must be based on an assessment of risks and the ability of the individual or organization to control those risks. Individuals may turn down assignments as unsafe when:

- There is a violation of safe work practices.
- Environmental conditions make the work unsafe.
- They lack the necessary qualifications or experience.
- Defective equipment is being used.

The Burn Boss gives all crew members an opportunity to decline participation as part of the crew briefing and through the line supervisor during the test fire. An individual crew member may inform their supervisor such as a Chief of Party, their assigned Line Supervisor, or the Burn Boss that they are turning down an assignment as given. The supervisor notifies the appropriate section leader or Burn Boss. This provides accountability for decisions and initiates communication of safety concerns within the burn organization structure. These actions do not stop an operation from being carried out but provide an effective way to manage risk through the timely identification of hazards to the chain of command and promotion of accountability and mitigation of unsafe situations.

If an unresolved safety hazard exists, an individual may submit a Safety Communication form (SafeCom) in a timely manner. This form provides a method to assess accidents, near accidents, equipment failures, incidents, and other safety concerns, and to share these assessments with others. A SafeCom is not intended to replace the personal injury or vehicle damage reports found in Appendix 16. Rather, the SafeCom enables all crew members to bring up concerns and issues related to a prescribed burn in a constructive manner to correct actions, avoid accidents, and share safety concerns. Any person associated with the prescribed fire event can submit a SafeCom to the Prescribed Fire Program Manager, their supervisor, or a higher-level administrator. The recipient of the SafeCom will confer with the Prescribed Fire Program Manager, and the Prescribed Fire Program Manager will in turn respond as warranted to all persons involved with a summary of lessons learned. A copy of the form is found in Appendix 17.

Instructions for Completing the Form are as follows:

Name/Organization, Phone number and date: These fields are optional if the writer wishes to remain anonymous.

Event: Enter the date and time of the event. Indicate if there were injuries or damage. List the location of the event including the name of the Wildlife Management Area.

Narrative: Describe what happened using as much detail as possible.

Lessons Learned: Describe the steps needed to prevent the problem from occurring again. If you are unsure of this, the Prescribed Fire Program Manager will be able to assist.

Submission of Form: The completed form should be sent to the Prescribed Fire Program Manager and a copy to the author's supervisor.

Sharing Summary of Lessons Learned: The Prescribed Fire Program Manager will address issues and lessons learned, and distribute written lessons learned to crew, other appropriate staff, supervisors, and prescribed fire cooperators.

V. Notifications and Public Outreach

A. Neighbor and Community Notifications

Ensuring public safety and minimizing risks to health through careful planning is imperative with all prescribed burn operations. Making people aware that a prescribed burn is going to occur will prevent inadvertent encounters that could jeopardize the public, interrupt burning operations, and impact the prescribed burn program.

Beyond regulations, consideration for neighbours located near and far is important in Prescribed Fire Planning and implementation. Prior to conducting a prescribed burn, the Burn Planner, Burn Boss, or other designated staff person will notify neighbouring landowners, community officials, or other stake holders as determined through the Prescribed Fire Planning process. Those entities may be notified by letter, in person, by phone call,

email, or notice in local newspaper. Those notified may include the following as well as others identified through the Prescribed Fire Planning process:

- Neighbors directly abutting or in close proximity to a burn unit and others nearby may warrant contact (such as landowners within densely populated areas in the vicinity of complex fuel types)
- Public within smoke sensitive receptors in proximity to a burn unit (medical facilities, heavily trafficked areas, airports, etc.)
- Local fire departments, law enforcement officials, and other emergency services within a town
- Air regulators and public health officials
- Other prescribed fire managers sharing the air shed

Announcements, public notices, targeted mailings, and public information meetings and walks will not only help disseminate information about the prescribed burn activities, but will also provide a feedback loop to address concerns about burning operations and smoke management issues. Posting signs at key entrance points, trails, and roads will help inform the public about the prescribed burn and ensure safety.

Talking with public safety officials such as local fire departments, police, and other government entities will help inform, reach out to, and educate many individuals within a community. Information provided to the public should include the why, when, and how the burn will be conducted. The more information provided, the less likely unforeseen incidents will happen.

Burn Window Notification

The use of a burn window notification provides the public with background information about the prescribed burn. The notification should describe the general area of the planned burn, reasons for burning, and timing of the burn. A MassWildlife contact number should be provided in case a neighbour wants to be notified the day of the burn or has other questions related to the burning operations. This contact should be familiar with the MassWildlife Fire Policy and the particular burn project. Prior to the beginning of each burn season, a burn window notification should be provided to the broader community via mailings, newspaper, radio, television, or e-mail. This is particularly important when undertaking the use of prescribed fire at a property for the first time.

Day of Burn Notification

Day of burn notifications are much more focused on landowners who are in close proximity to the burn unit and have a need to know about burn management such as traffic and smoke management. Names, affiliations, and contact information for these people should be included in the Prescribed Fire Plan. Day of burn notifications ensure that people do not overreact to the sight or smell of smoke within the area. It is important to reach out to close abutters on the day of the burn with a note on their door or quick phone call as they are the most likely to see or smell smoke and call emergency services to report a fire or smoke incident of unknown origin. Notification to the local fire and police departments will ensure that calls are dealt with appropriately and landowners are informed of the prescribed burn activities. Some towns and municipalities may decide to use automated messaging to inform neighbors in specific areas of prescribed burning activities. Landowners within smoke sensitive areas (as identified within the Prescribed Fire Plan) should also be notified to ensure they have the ability to communicate directly with someone involved with the burn in the event of a smoke related issue.

B. National Weather Service Requests, Information Sharing, and Meetings

The National Weather Service (NWS) hosts an annual or biannual meeting with the fire management community in Massachusetts and surrounding states to discuss updates and additions to the Fire Weather Website and Spot Weather Forecasts. The MassWildlife Prescribed Fire Program Manager or her/his designee will participate in these meetings with NWS and other fire program managers from local, state, and federal agencies and private entities. Topics discussed may include fire weather website features, spot weather forecasting capabilities and changes, requests, smoke management tools, and potential sharing of onsite weather data with NWS to increase the accuracy and relevancy of spot weather forecasts. NWS in coordination with the fire management community will determine other appropriate and relevant topics to be covered as well as the frequency of these meetings. The MassWildlife Prescribed Fire Program Manager will share information updates on pertinent fire weather topics with burn crew members involved in Prescribed Fire Planning, operations, and fire effects monitoring. Data can be made available to NWS regarding pertinent information collected during burns and included within the Fire Event Log, Appendix 7.

C. Local Fire Department Notification and Coordination

All prescribed burns require an open air permit from the local fire chief, as summarized in Section I. C. *Permits and Approvals* of this Handbook. The permitting process, as outlined in that referenced section and in the Prescribed Fire Plan, addresses notification of local fire departments, rescue, and police. MassWildlife initiates discussions with the local fire chief and fire and rescue staff early in the planning phase of a prescribed burn project. This ensures that potential smoke sensitive areas, smoke management, holding, water sources, drop points, contingency, safety, and wildfire strategies applicable to the burn project area are addressed within the plan. As part of this cooperative process, MassWildlife develops a property map showing topographic features, structures, roads, access points, staging areas, and water sources for firefighters (Appendix 18). Often these discussions are conducted in coordination with DCR Bureau of Forest Fire Control, local fire department staff, and involve site evaluations by these partners, the Prescribed Fire Program Manager, burn planner, and other appropriate MassWildlife staff involved in planning and site preparations.

Notifications, compliance, and permits required in the Prescribed Fire Plan are addressed in *Element 9: Pre-Burn Considerations*, *Section C. Notifications* and *Element 19: Smoke Management and Air Quality Sections A – D* (Section B of Element 19 pertains to the local fire department permit). Notifications will include a list of agencies, organizations (including media), and individuals that are to be notified prior to ignition, with information necessary to make the contacts. Reasonable efforts will be made to notify adjacent land owners (or their agents) and other potentially impacted publics. Attempts or actual notifications (or both) will be documented with date and method and placed in the Project File.

D. Massachusetts DCR District Fire Warden Notification and Coordination

MassWildlife initiates discussions with the appropriate DCR Bureau of Forest Fire Control district warden early in the planning phase of a prescribed burn project. A list of district fire wardens can be found on the MA DCR Bureau of Forest Fire Control web page: <http://www.mass.gov/eea/agencies/dcr/conservation/forestry-and-fire-control/bureau-of-forest-fire-control.html>. Discussions with district fire wardens and local fire departments ensure that communications, holding, contingency, safety, resource allocation, and wildfire strategies applicable to the burn are addressed within the planning process and incorporated in the plan. As mentioned previously, these discussions involve site assessments by these partners and appropriate MassWildlife staff involved in planning and site preparation for burning. Element 9c of the Prescribed Fire Plan will identify DCR Fire Control contacts prior to and during prescribed fire planning and operations.

As the burn season approaches, regular and timely communication and information sharing with DCR and other fire management partners of proposed prescribed burn schedules and day of burn notifications will help partners within the same air shed manage prescribed burns effectively, minimize smoke impacts, and properly plan and allocate the use of limited resources. Appendix 19 includes an email format for burn crew and resource partner notifications.

Table 5. Example of Typical Notifications included within Prescribed Fire Plan

| Agency, Contact, Address | Method of Contact and Frequency | Phone Number/ Email |
|--|--|-------------------------------------|
| Local Fire Department | Prior to burn day, initiate public notifications as prescribed by permit and notify key individuals. Prior to ignition, request authorization to conduct prescribed fire and request surrounding fire departments are notified. | Office Phone Cell Phone Email |
| Local Police Department | Prior to Ignition | |
| Local EMS/Rescue Squad (if not fire dept.) | Prior to Ignition | |
| MA State Police | Prior to Ignition | |
| MA DEP Air Quality District | Initiate notification and follow up as prescribed by Air Quality Permit | |
| MA DCR Forest Fire Control District | Prior to burn day and Prior to Ignition | |
| Other Agency Partners | Prior to burn day and Prior to Ignition | |
| Neighboring Residents | Prior to burn day and Prior to Ignition | |
| Other | | |

E. Massachusetts Department of Environmental Protection (MassDEP) Air Quality Notifications and Year End Reports

The following practices and air quality notifications will be made once the MassDEP permit is in hand:

- Verbal/email notification to MassDEP of the intent to conduct a prescribed burn must be made in advance of any prescribed burn, as noted within the burn permit. (notification requirements vary within regions but are generally 2-3 business days prior to burning.) Each prescribed burn event within every permitted prescribed fire project area requires a separate notification.
- Notification shall be made to the assigned MassDEP contact listed on the current Burn Permit in the MassDEP Region in which the prescribed burn will take place.
- The Burn Boss assigned to the prescribed burn event, or a member of the burn crew assigned by the Burn Boss or the Prescribed Fire Program Manager, is responsible for contacting the appropriate MassDEP representative once the permit is in hand and the decision to burn has been made.
- Recordkeeping of weather, smoke, and fire behavior before, during, and after a prescribed burn as identified in the burn plan will provide documentation if air quality problems occur and will help analyze and address future air quality issues. Prescribed burn personnel related to training.
- On days where the AQI is predicted to exceed the set values for either Ozone or PM2.5, the burn shall be postponed until a day when the air quality improves below the stated value.
- If the predicted AQI is marginal or should the proponent want an updated forecast, the proponent may contact the appropriate MassDEP Air Quality Forecasting staff for additional guidance. If MassDEP Air

Quality forecasting staff is unavailable, the proponent shall rely solely on the AQI to determine whether the burn can proceed.

A Sample Email Prescribed Burn Notification Form to MassDEP and Partners is provided in Appendix 20.

Year End Reporting to MassDEP:

MassDEP requires a summary report of prescribed fire activity for each site in which an Air Quality Permit was issued. This report is generally due upon expiration of the permit. Each Air Quality Permit may require unique information, and the required information will be listed upon the permit. Typical requirements include:

- The date that the permit was issued
- The site for which the permit was issued (Site, Name, Town)
- The dates of prescribed burn activity
- The acres of prescribed activities and the fuels that were burned
- The names of all participants on the prescribed burn
- Goals achieved through the prescribed burn, problems with execution or nuisance conditions

The Burn Boss leading each prescribed burn event, or a member of the burn crew assigned by the Burn Boss, is responsible for compiling the information required to satisfy the site's annual permit report. MassWildlife's Prescribed Fire Program Manager, or a designated member of the burn crew assigned by the Prescribed Fire Program Manager, is responsible for the annual compilation and submission of these reports to MassDEP.

F. Crew and Regional Cooperator Post Burn Notifications, Summaries, and Meetings

The Prescribed Burn Boss with the assistance of the Fire Effects Monitor will document the results of every prescribed burn for which she/he is responsible for bossing. The Burn Boss shall submit a Fire Summary Report to the Prescribed Fire Program Manager and the appropriate District Supervisor within a few weeks of executing a prescribed burn and ensure this summary is retained within the prescribed burn project file. Most of this summary information will be gathered as part of the Fire Event Log and summarized within a Fire Summary Report as outlined within the Prescribed Fire Plan (Section II.D. and Appendix 4 of the Handbook).

Whenever schedules permit and as soon after a burn as possible, the Prescribed Fire Program Manager or a designated staff member will notify MassWildlife crew members, District Supervisors, MassWildlife Prescribed Fire Administrator, regional fire management cooperators, and other agencies and organizations (as appropriate) of post burn results in an email or other appropriate method. This post burn notification may include items such as a map of acres burned, pertinent information from the after action review, a thank you to cooperators, photo, and anything else that may help guide future cooperation and more successful prescribed burning. Because of the narrow seasonal windows in which prescribed burning occurs and the long hours and many responsibilities associated with these activities, it may not always be possible to send these short post burn notifications after each event but summarize results and pertinent info for a group of burns and send info out in a timely manner to interested parties and cooperators.

In order to facilitate regional success with prescribed fire and the best use of limited resources, the Prescribed Fire Program Manager and/or a designated staff person, will attempt to meet on a periodic basis with key fire officials, regulatory authorities, and prescribed fire managers from local, state, and federal agencies, private organizations, and individuals to discuss burn priorities, cooperative projects, issues, available resources, and schedules. These periodic meetings may occur prior to the burn season, within the post burn season, and other times determined as important and appropriate by the cooperators.

In addition, various prescribed fire working groups including representatives from MassWildlife will meet periodically throughout the year to foster exchange of information and technology, and address specific issues related to training, monitoring, and research related to prescribed fire.

G. Responding to Public Inquiries and Increasing Public Awareness

Communication plays an integral role in prescribed fire management. MassWildlife staff that receive public inquiries about prescribed burning have multiple existing sources of information they can use to respond to inquiries, including the Prescribed Fire page of the MassWildlife website, the Prescribed Fire Management Handbook, MassWildlife Press Releases, Neighbor Notification Letters, and Prescribed Fire Plans. Information on public inquiries and public awareness is provided below, and additional information is available online at: https://www.nifc.gov/PIO_bb/Background/NWCG-WFEWT-CommPlanning.pdf.

Public Inquiries

Questions from the public on the general subject of prescribed burning should be answered using information provided on the Prescribed Fire page of the MassWildlife website, and/or with information provided in this Handbook. If a specific question cannot be answered using existing information on the website or in the Handbook, the question will be referred to the Prescribed Fire Program Manager and the MassWildlife Prescribed Fire Administrator, and those two individuals will jointly determine how to respond to the inquiry. Inquiries from media outlets should be answered in accordance with the most current MassWildlife media protocols.

Questions from the public concerning a particular prescribed burn should be answered using existing information provided in either the Press Release for that burn, the Neighbor Notification Letter, or the Burn Plan itself. Appendix 18 includes sample abutter notification letters, a press release, and a spreadsheet of recommended newspapers and media outlets to send public service announcements (PSAs) and track notifications. If a specific question cannot be answered using existing information in these materials, the question will be referred to the Prescribed Fire Program Manager and the Masswildlife Prescribed Fire Administrator, and those two individuals will jointly determine how to respond to the inquiry.

Public inquiries concerning a particular prescribed burn that require input from the Prescribed Fire Program Manager may come into the MassWildlife Field Headquarters or a District office during the course of a burn when the Prescribed Fire Program Manager is unavailable. In that case, the MassWildlife staff person addressing the inquiry should let the individual making the inquiry know that their question will be passed on to the Prescribed Fire Program Manager at the conclusion of the burn, and in the meantime the individual should be referred to the Press Release, Burn Plan, webpage, and Handbook.

Public inquiries may sometimes be made “in person” at the burn site while the burn is in progress. For these cases, the Burn Boss will identify and direct a crew member or a Public Information Officer to speak with and escort the individual(s) making the on-site inquiry to a safety zone outside of the burn project area. No member of the public (including media) shall be allowed to enter the burn site unless they are escorted by trained staff assigned by the Burn Boss and wearing appropriate protective personal equipment (supplied by MassWildlife).

Increasing Public Awareness

Communicating the need, benefit, and process for prescribed fire to the public is essential for building public acceptance, understanding, and support for the MassWildlife prescribed fire program. Identification of target

audiences (specific components of the general public) is critical to the communication process. The Prescribed Fire Program Manager and the MassWildlife Prescribed Fire Administrator should work proactively with the MassWildlife Information & Education Section (I&E) and with District Supervisors to identify both local and regional target audiences, and tailor messaging procedures to those audiences.

A set of consistent and compelling messages should be developed regarding the need and process for prescribed fire at local, district, and statewide levels. These messages should be clearly communicated to all MassWildlife staff who may be responding to public inquiries. MassWildlife staff should be able to speak knowledgably and confidently about the ecological role that prescribed fire plays, and about the detailed planning and public safety considerations that go into conducting prescribed burning.

Informational messaging should extend to the individual burn sites. On the days prior to and following a prescribed burn, temporary informational signage designed by the Prescribed Fire Program Manager and the MassWildlife I&E Section should be posted at public access points and kiosks in a similar manner as is currently done for MassWildlife timber sales, brush mowing, and invasive plant control operations. On the day of a burn, the Information Officer(s) or crew member assigned by the Burn Boss should have interpretive material on prescribed fire in hand for members of the public (including media) visiting a burn site. MassWildlife I & E and EEA approval is needed for distribution of interpretive materials to media. Content of such interpretive material should be reviewed and approved by the Prescribed Fire Program Manager and the MassWildlife Prescribed Fire Administrator. Likewise, the Prescribed Fire Program Manager and the MassWildlife Prescribed Fire Administrator should coordinate with I&E to determine which prescribed burn sites are appropriate for installing a kiosk or other interpretive signage of more permanent construction which provide interpretive information and demonstrate the effectiveness of prescribed burning in managing wildlife habitats and restoring fire influenced natural communities.