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NWCG Incident Position Standards for Prescribed Fire Burn Boss Type 1 and 2

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The *NWCG Incident Position Standards for Prescribed Fire Burn Boss Type 1 and 2* establish national interagency standards for operations on prescribed fires. The standards are meant to ensure safe, efficient, and effective operations in support of agency goals and objectives and should serve as a guide to promote effective and consistent on-incident training. By definition, NWCG standards encompass guidelines, procedures, processes, best practices, specifications, techniques, and methods.

The National Wildfire Coordinating Group (NWCG) provides national leadership to enable interoperable wildland fire operations among federal, state, Tribal, territorial, and local partners. NWCG operations standards are interagency by design; they are developed with the intent of universal adoption by the member agencies. However, the decision to adopt and utilize them is made independently by the individual member agencies and communicated through their respective directives systems.

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General References

- *NWCG Incident Response Pocket Guide (IRPG)*, PMS 461, https://www.nwcg.gov/publications/461
- *NWCG Standards for Prescribed Fire Planning and Implementation,* PMS 484*,* *https://www.nwcg.gov/publications/484*
- *Prescribed Fire Complexity Rating System Guide,* PMS 424, https://www.nwcg.gov/publications/424
- *NWCG Prescribed Fire Summary and Final Complexity Worksheet*, PMS 424-1, https://www.nwcg.gov/publications/424-1
- *NWCG Smoke Management Guide for Prescribed Fire,* PMS 420-3, https://www.nwcg.gov/publications/420-3
- *NWCG Smoke and Roadway Safety Pocket Card*, PMS 477-1, https://www.nwcg.gov/publications/477-1

Agency-Specific References

- ***Interagency Standards for Fire and Fire Aviation Operations* (Red Book), https://www.nifc.gov/standards/guides/red-book

Leadership Level 3, Leader of People (Develop Intent)

Leaders of people have increasing challenges. They accept responsibility, not only for their own actions, but for those of their team. Leaders of people act to develop credibility as leaders: placing the team ahead of themselves, demonstrating trustworthiness, mastering essential technical skills, and instilling the values of the organization in their teams.

For additional information review Level 3 description, expected behaviors and knowledge, suggested development goals, and self-study opportunities..

Perform Prescribed Fire Planning

Prepare and/or Ensure the Prescribed Fire Plan Is in Accordance with the NWCG Standards for Prescribed Fire Planning and Implementation, PMS 484. Agency Policy and Direction, and Land/resource Management Plan.

When to start task: The project area has been identified, and the need for fuel treatment has been prioritized. Planning work has been assigned.

Resources to complete task: Phone and email. Land/Resource Management and Fire Management Plan.

How to accomplish task:

- Review the requirements in *NWCG Standards for Prescribed Fire Planning and Implementation,* PMS 484, https://www.nwcg.gov/publications/484, and ensure that each plan element aligns with the guidance.
- Review the agency policy and direction to ensure that each element of the plan aligns with the guidance.
- Review the land/resource management plan and ensure that each element of the plan aligns with the guidance.

Ensure Necessary Agreements Are in Place.

When to start task: The project area has been identified and the need for a fuel treatment has been prioritized. Planning work has been assigned.

Resources to complete task: Phone and email. Land/Resource Management and Fire Management Plan. All applicable agreements for project area and cooperators.

How to accomplish task:

- Identify local resource staff with familiarity with existing agreements.
- Consult existing plans, consult with project stakeholders, and ensure that agreements are in place.
    - Possible stakeholders include
        - Adjacent landowners
        - Governing agencies or entities
        - Permittees (example: grazing, mineral rights, right of way)
        - Support/cooperating agencies such as:
            - Federal
            - Volunteer fire departments
            - Fire protection groups
            - State agencies
            - Aircraft contractors
            - Tribes

Define and Map the Project Location and Boundary and Describe the On-site and Adjacent Conditions.

When to start task: The project area has been identified and the fuel treatment needs have been prioritized. Planning work has been assigned.

Resources to complete task: Phone and email. Area map, GPS/Mapping app, mapping program such as google earth or Arc GIS specialist.

How to accomplish task:

- Establish project area. Do not be complacent.
    - Consider the following when selecting the project boundaries that will have the highest likelihood to hold under possible burn conditions.
        - Topography – lookout for mid-slope lines, burn units near saddles or chutes, natural holding features like rock screes.
        - Vegetation – place lines in areas with less fuel and vegetation.
        - Size – are there places to make the unit bigger or smaller so that on burn day there are scaling options.
        - Shape.
            - Avoid horseshoes, elbows, and doglegs.
            - Consider convective heating and dominant wind patterns as influenced by the terrain and contributing to spotting.
        - Ownership/sensitive feature – if an ownership boundary put the line in a place that will be hard to hold, can a partnership be formed to include both ownerships in the unit?
        - Fuels management – Are there fire scars or fuels treatments that could serve as control lines? Could the location of the project area align with potential control locations for wildfire?
        - Infrastructure and communities.
            - Identify human infrastructure that could serve as control features such as roads.
            - Identify potential impacts on surrounding communities, schools or hospitals and infrastructure (e.g., Watersheds, communication tower, powerline).
    - Consider the type of control lines: wet, mow, blower/rake, saw, dig, dozer, natural barrier.
    - Consider fuel type, fuel loading, and weather when selecting the control line width.
- If there are multiple units planned, consider the order of completion so that treating one area that will serve as a more secure holding area for the next unit.
- Create maps – See: *NWCG Standards for Prescribed Fire Planning and Implementation,* PMS 484, https://www.nwcg.gov/publications/484, for descriptions of the types of maps.

  - Scale – choose a scale that will give enough context for the location but also enough detail to be informative.
    - Best Practice: A vicinity map can serve as a reference in the event of an escape. The scale will be broad enough to include potential holding locations. Travel routes and water locations are identified.
  - Base map – Choose a base map that will communicate conditions on the ground. Consider making two maps, one with imagery, and one with topography. Select a base map based on the significant driver of fire behavior, consider developing multiple maps with different base maps if there are multiple drivers of fire behavior (example: topography, imagery, fuel models).
  - Elements – include elements that are necessary to orient or communicate the location. If the map becomes too busy with elements, consider breaking the map up into several smaller areas or making different maps for different groups of elements. Example: A resource protection map, a holding resources map, etc.

- Gather information from the field. Base what is collected on what is needed for modeling and planning.
  - Fuels – On-site and adjacent
    - Fuel Model
    - Fuel Loading
    - Percent composition of each veg type. Is there a local specific way to describe them?
  - Values
    - Natural resources
    - Constraints from National Environmental Policy Act (NEPA)
    - Human infrastructure
    - Cultural
    - Access
    - Roads, bridges, helispots, water
  - Hazards
    - Snags, animals, insects, terrain, loose rocks
    - Holding
    - Primary and contingency control lines – Map them and decide if they need improved
  - Accurate Observations – Weather, fuel moisture
    - Calibrate kestrel
    - Take training on fuel moisture measurements
    - Practice

- Gathering information remotely: Using Interagency Fuels Treatment Decision Support System (IFTDSS), Bluesky, and Google Earth gather the following information: physical description, FBFM, values, access, weather observations.
    - Best Practice: validate remote observations with field observations.

Ensure the Complexity Analysis Is Complete and Signed.

When to start task: The project boundaries have been defined.

Resources to complete task: Project boundaries and Land/Resource Management and Fire Management Plan, *Prescribed Fire Complexity Rating System Guide,* PMS 424, https://www.nwcg.gov/publications/424, and *NWCG Prescribed Fire Summary and Final Complexity Worksheet*, PMS 424-1, https://www.nwcg.gov/publications/424-1.

How to accomplish task:

- Refer to *Prescribed Fire Complexity Rating System Guide,* PMS 424 and *NWCG Prescribed Fire Summary and Final Complexity Worksheet*, 424-1 for specific directions.
- *NWCG Prescribed Fire Summary and Final Complexity Worksheet*,424-1.
    - Complete the values and preliminary risk sections.
    - Continue to prepare the site and mitigate risks where possible.
    - Complete the post-plan risk, post-plan technical difficulty, and summary.
    - Ensure the complexity analysis is reviewed and signed.
- Considerations for typing burns.
    - Planning complexities – In multiple counties of multiple states, high public use area, multiple jurisdictions.
    - Adjacent values – structures, community infrastructure.
    - Political or social impacts – recent escaped prescribed fire or wildfire.
    - High complexity burns are Type 1.
    - It MIGHT be a Type 1 burn if:
        - The burn organization looks like a Type 3 team.
        - You are only willing to use one or two trusted people as burn boss or someone qualified as Division/Group Supervisor (DIVS) or Incident Commander Type 3 (ICT3).
        - You are only comfortable burning on the lowest end of your prescription.
        - You continually put the burn off, waiting for perfect conditions.
    - Type 3 burns
        - It MIGHT be a Type 3 if the complexity is low.
        - Not all pile burns are Type 3 burns.
        - Not all Type 3 burns are piles.
    - Consider the risk now and later.

  - The complexity analysis process is a framework for thinking and collaboration.
  - The complexity analysis is part of the plan and therefore a legal document.
  - Plans should be revised annually (depending on agency) or as conditions change, whatever happens first.
- If you receive a completed complexity analysis – review the complexity analysis to ensure that conditions have not changed.

Develop Resource and Prescribed Fire Objectives. Confirm With the Appropriate Resource Management Specialists that the Plan Meets Land/Resource Management and Operational Objectives.

When to start task: The project boundary has been identified.

Resources to complete task: Phone and email. Land/Resource Management and Fire Management plan plans. Site-specific NEPA. Resource specialist objectives and goals.

How to accomplish task:

- Develop resource and prescribed fire objectives based on land/resource management and fire management plans.
  - Prescribed Fire Objectives – First Order Fire Effects – The [objectives] that concern the direct or immediate consequences of fire, such as biomass consumption, crown scorch, bole damage, and smoke production.
    - SMART – Specific, Measurable, Achievable, Realistic, and Timebound
  - Resource Objectives – Second Order Fire Effects – The secondary effects of fire such as tree regeneration, plant succession, and changes in site productivity. Although [resource objectives] are dependent, in part, on [prescribed fire objectives], they also involve interaction with many other non-fire variables.
    - Often more general like goals. Work toward making them SMART when possible.
- Confirm with resources specialists that resource and prescribed fire objectives meet land/resource management and fire management objectives.
  - Communicate openly and honestly.
  - Consider their perspective.
  - Distinguish between professional duties and personal opinions.
  - Help with their monitoring.
  - Discuss available tools to minimize impact.
  - Emphasize common benefits.
  - Get to the field together – pre, during, and post-fire.
- Develop a vegetative and fuels description of the burn unit or project area by fuel model including outside of the unit.
- Develop a narrative of values, and special and unique features in the burn unit/project area.

- Special Unique Features
- Natural Resources
- Values
- Hazards
- Air Quality and smoke attainment
- Issues and Constraints
- On-site and Off-site Public/Political Values

- Verifying the applicability of fire to meet resource and prescribed fire objectives.
  - Prescribed fire objectives need to be measurable and quantifiable.
  - Will acceptable environmental conditions occur frequently enough to ensure treatment viability?
  - Will it require more than one treatment?
  - Non-fire treatments are required prior to prescribed fire implementation or as an alternative to prescribed fire.
    - Mechanical
    - Herbicide
    - Other

Identify and Address the Smoke Management Policies and Protocols and Smoke Receptors in the Planning Area.

When to start task: Project area has been identified.

Resources to complete task: Adequate mapping of smoke receptors, state and local smoke management plans, and regulatory office contact information, air resource advisors for complex areas, smoke modeling, and monitoring programs. *NWCG Smoke Management Guide for Prescribed Fire,* PMS 420-3, https://www.nwcg.gov/publications/420-3.

How to accomplish task:

Type 1: More likely to need the air resource advisor and significant smoke modeling.

- Use maps to identify all critical receptors and potential wind vectors to avoid.
- Identify weather patterns that will provide adequate ventilation to meet local constraints (local National Weather Service (NWS) forecaster or geographic area meteorologist).
  - Understand timing and duration of advantageous weather conditions (example: Off-shore winds, mixing heights, wind speeds, direction, and duration).
- Complete smoke modeling. These sites will help assess consumable tonnage, and some will help forecast smoke dispersion based on forecasted weather:
  - BlueSky Playground: https://tools.airfire.org/playground/v3/emissionsinputs.phpDigital.
  - Photo Series: https://depts.washington.edu/nwfire/dps/.

  - FFT: https://www.fs.usda.gov/pnw/tools/fuel-and-fire-tools-fft.
  - First Order Fire Effects Model (FOFEM): https://www.firelab.org/project/fofem.
  - HYSPLIT: https://www.ready.noaa.gov/HYSPLIT.php.
  - PB-Piedmont: https://piedmont.dri.edu// – Designed to work in the southern Piedmont but has applicability elsewhere where shorter range surface smoke flow estimation is needed, displaying the simulated smoke plume on a map of the area.
  - Pile Calculator: https://depts.washington.edu/nwfire/piles/.
  - Simple Smoke Screening Tool: http://fireweather.fdacs.gov/Simple-Smoke/.
  - Vsmoke: https://webcam.srs.fs.usda.gov/tools/vsmoke/indexample: shtml– Not designed for complex terrain.

- Acquire all permits and meet all regulatory requirements.
  - Comply with time frames.
- Identify the required public notifications and outreach needs and timing.
- Identify ways to reduce daily emissions if necessary (example: Firing patterns, internal control lines, exclusions of heavy fuels, time of day).
- Address smoke management in all elements in the prescribed fire plan that are impacted by smoke management considerations or limitations.
  - Complexity analysis
    - Identify the smoke concerns for the project.
  - Element 4: Description of the Prescribed Fire Area
    - Vegetation/Fuels – Include vegetation and fuels information that may impact the amount and duration of smoke such as duff and litter depth, and large down woody fuel.
    - Description of Unique Features, Natural Resources, Values – Include information on smoke receptors.
    - Maps – Smoke Impact Area.
  - Element 5: Objectives
    - Consider smoke when developing prescribed fire objectives.
    - Consider adding objectives about smoke.
  - Element 7: Prescription
    - Use smoke modeling to understand the impact that the proposed prescription values may have on smoke. Adjust prescription values accordingly or include mitigation measures.
    - Include smoke in the justification for the prescription values.
  - Element 8: Scheduling
    - Consider the impact that timing will have on smoke. Select times of the year that will decrease the impact either by choosing times where there are fewer smoke

receptors (example: Less recreation) or by choosing times of the year where less smoke will be produced (example: drier fuels).

- Element 9: Pre-burn Considerations and Weather
  - Method and frequency for obtaining smoke forecasts – Specify the method and frequency for obtaining smoke forecasts.
  - Notifications – Include notifications to the area that may be impacted by smoke.
- Element 13: Public and Personnel Safety, Medical
  - Safety Hazard – Include possible smoke safety hazards.
- Element 14: Test fire
  - Plan for the monitoring of smoke during the test fire.
- Element 15: Ignition Plan
  - Consider ignition strategies that will limit the impact of smoke on fireline resources and the surrounding area.
- Element 16: Holding Plan
  - Consider the areas where holding resources have the most significant impact on smoke.
- Element 17: Contingency Plan
  - Identify the actions that will be taken if certain conditions are met such as smoke over a prominent roadway, or prescribed fire burning past a designated time.
- Element 19: Smoke Management and Air Quality
  - Detail the smoke considerations for the burn.
- Element 20: Monitoring
  - Smoke dispersal monitoring required and procedures.
- Element 21: Post-burn activities
  - Identify actions that can be taken after the burn to reduce the impact of smoke immediately post-burn.
  - Gather information about the impact the burn had on smoke.
- Appendix F: Smoke Management Plan and Smoke Modeling Documentation

Develop a Prescription or Verify That the Prescription Will Meet Prescribed Fire and Resource Objectives.

When to start task: Project area has been identified.

Resources to complete task:

- Best Practice: use models to inform burn plan and prescription development to meet resource and prescribed fire objectives. Use tools such as BehavePlus, IFTDSS, FlamMap, FOFEM, FireFamilyPlus, and Fire Behavior Fuel Models (Scott & Burgan GTR 153), Consider using the

skills of Fire Behavior Analyst (FBAN) and Long Term Fire Analyst (LTANs) using these tools in prescription development.

How to accomplish task:

- Define the prescribed fire objectives.
    - Identify desired future conditions from the NEPA and/or other land management plans.
    - Prescribed fire objectives must be measurable and quantifiable to meet resource objectives.
- Calculate fire behavior that accomplishes the objectives using Behave, FOFEM, and past experience, ideally supported by monitoring data.
- Develop prescription parameters using variables that best represent objectives and drivers of fire behavior.
    - Fuel
        - Duff moisture content
            - Example resource objective – Retain 50% of the duff on the site.
        - Time lag fuel moisture – it is possible that each size class will be a variable. This is fine as long as each leads back to an objective. Does the objective require a certain amount of course woody debris to remain? What fuel moistures are needed in the 1000-hour fuels to retain that CWD?
        - 1-hour fuel moisture / AKA fine dead fuel moisture.
            - Example resource objective – Reduce the 1-hour fuel loading by 50%
            - Example control limitation – Average flame length should not exceed 4 ft.
        - 10-hour fuel moisture
            - Example resource objective – Reduce the 10-hour fuel loading by 50%
        - 100-hour fuel moisture
            - Example resource objective – Retain 50% of the down woody debris >3 inches
        - 1000-hour fuel moisture
            - Example resource objective – Remove >50% of the downed woody debris >8 inches
        - Live herbaceous moisture content
            - Example control limitation – <10% chance of torching in the shrubs and trees
        - Live woody moisture content
            - Example resource objective – Kill >50% of juniper saplings >2 inches DBH
        - State of development for live vegetation –
            - Example – burn before spring green up, after frost kill

- Weather
  - Temperature and Relative Humidity (RH) –convenient to measure but always consider what they represent. If they represent fine dead fuel moisture and are listed in the prescription, you may not need to include additional restrictions for temperature and RH.
    - Example constraint– The probability of ignition should not exceed 50%.
  - Wind speed
    - Example constraint– The rate of spread in the grass should not exceed 25 chain per hour.
    - May need a minimum wind speed at the midflame, 20-foot, or transport wind to produce fire spread and disperse smoke.
  - Wind direction
    - Example constraint – Limit smoke impacts to a nearby community
    - Make sure to identify potential wind directions that prevent a burn from occurring due to smoke or containment concerns.
- Other – often site-specific
  - Days since rain
  - NFDRS Index Percentiles – S191 and S291 are new courses that will teach the basics of fire danger.
    - Energy release component
    - Burning Index
    - Keetch-Byram Drought Index
  - Hot Dry Windy – https://www.hdwindex.org/.
  - A combination of wind and vapor pressure deficit.
  - Vapor pressure deficit is a combination of moisture and temperature.
    - The tool was built for predicting the potential for extreme fire behavior but is also helpful for prescribed fire.
  - Preparedness level
  - Higher preparedness levels may exclude prescribed fire due to lack of available staffing.
- Identify appropriate rigor of fire behavior modeling to support prescription development. Best practices should include some modeling to assist in the development of prescription parameters. Modeling should be used to inform and support valid prescription parameters to meet identified resources and prescribed fire objectives. Complex projects at landscape levels over a large spatial extent, long-duration, fuels conditions, adjacent to communities, or infrastructure will require more sophisticated modeling. In these cases, consider using the skills of FBAN, LTAN, or other specialists as needed.

- Prescription parameters are based on resource and prescribed fire objectives. Use appropriate models and systems to assist in prescription development and assess potential fire behavior under an acceptable range of conditions. Fire behavior modeling provides a framework to inform and support valid prescription parameters to meet identified objectives. Modeling should not be used as the only means to understand possible fire behavior. It needs to be paired with local experience and knowledge to develop and evaluate reasonable and appropriate prescription elements to achieve acceptable fire behavior characteristics to meet quantifiable and measurable objectives.
    - Fire Behavior Fuel Models – Select Fire Behavior Fuel Models for inside and outside of the unit.
    - BehavePlus – Run fire behavior simulations in Behave based on the prescription elements and fuel conditions to assess possible fire behavior to meet identified resource and prescribed fire objectives.
    - IFTDSS – Run fire behavior simulations over a landscape to identify potential areas of concern for holding and contingency.
    - FOFEM – produce fire effects simulation to estimate fuel loading reduced, soil heating, smoke production, or tree mortality.
    - FireFamilyPlus – Use to assess the timing and occurrence of desired wind and weather conditions during prescription development.
    - FlamMap – Use to model fire behavior characteristics across a landscape under different fuels and weather scenarios.
- Use of past prescribed fire prescriptions should be evaluated based on recency to current environmental and fuel conditions and current project-specific resource and prescribed fire objectives. Avoid taking prescription parameters from previous burn plans without thoroughly analyzing them with recent data and knowledge.
- Prescription parameters may be based on experience and past projects for the area in similar fuels and vegetation types to meet similar identified resource and prescribed fire objectives.
- Collaborate with others that are familiar with past prescribed and/or wildfire projects in the area in similar fuel and vegetation types.

- Develop prescription narrative
    - NOT a regurgitation of the prescription.
    - Ideally in your own words. Refer to the previous narratives after your write your own.
    - Provides the nuance of how to implement within the prescription.
        - Example: “If fuel moisture is below_____, the eye-level winds should not exceed _____”
    - Described the likely and possible fire behavior.
        - Example: “Occasional torching of Rocky Mountain Juniper may be observed”
    - Any historical evidence for over- or underpredictions of the fire behavior modeling program used, and the possible, or probable effects to the actual fire behavior.

        - Example: "Previous prescribed fires implemented in the area in similar fuel type and loadings show fire behavior predictions are overpredicted by a factor of.3; therefore, actual flame lengths may be 3 feet instead of 4.2."
    - Any on-site conditions that may cause over- or underpredictions vs. actual fire behavior.
        - Example: "Fine grass fuel loadings are not continuous across the project area; therefore, rates of spread may be lower than modeled."
- Scheduling – consider the following
    - Seasonality (fall/spring)
        - Does the RX burn need to occur in a specific season to meet objectives? (drier or wetter).
        - Any restrictions?
            - ❖ Wildlife nesting, breeding
            - ❖ Hunting
            - ❖ Recreation
        - Bet practice: If possible do not exclude months – in case there is an opportunity to meeting objectives outside of the expected timeframe.
    - Time of day
        - Consider local weather patterns (example: diurnal wind shifts)
        - Night burns to reduce intensity
        - Limited hours of ignition to reduce smoke
    - Sequence for implementing units
        - Multiple ignitions for different objectives over multiple days, e.g., blacklining one day unit edge or points of concern followed by entire unit ignition. May require separate prescriptions and schedules to meet these differing objectives.
    - Estimated number of shifts to complete

Establish Environmental, Fire Behavior, and Fire Effects Monitoring Plans in Conjunction with Existing Agency Requirements.

When to start task: Project area has been identified and need for a fuels treatment has been prioritized. Planning work has been assigned.

Resources to complete task: Phone and email. Land/Resource Management and Fire Management plan

How to accomplish task:

- Consult with resources specialists to determine what they would like monitored pre, during, and post-fire.
- Identify who will design and implement the monitoring.
- Work with resource specialists to confirm that the monitoring that is possible to complete is also adequate for their needs.

- Identify the reporting requirements for the monitoring documentation and assign resources to complete the monitoring and reporting requirements.
    - Best Practice: Fire Effects Monitor (FEMO) reports are helpful for maintaining records of the events of a burn. Identifying the format of the FEMO report will help the FEMO collect the necessary information before, during, and after the burn. Consider use of Field Observer (FOBS) if no FEMO's are available.
    - Include pre and post implementation photo plots at a minimum.

Develop a Primary, Alternate, Contingency, and Emergency Plan, or Verify that the Existing Plan is Adequate.

When to start task: Project boundary is identified.

Resources to complete task: Vicinity and project maps, complexity analysis. Fireline production rates for surrounding fuel models, typical resources availability for planned seasonality.

- Best Practice: BehavePlus, IFTDSS,

How to accomplish task:

- The ignition plan should provide flexible guidelines for the firing boss to accomplish objectives. The plan may include.
    - Firing methods
    - Devices
    - Techniques
    - Sequences
    - Anticipated patterns and sequence
    - Absolute patterns (only if necessary)
- Consider the following when developing holding and contingency plans.
    - Complexity – low, moderate, high
    - Phase of operation – pre, during, post ignition
    - Prescription parameters, low end, moderate, high-end
    - Fuel type and loading
    - Potential fire behavior
    - Critical holding points
    - Vehicle access
    - Values at risk
    - Type of control lines
    - Water sources
    - Fuel locations
    - Helispots

  - Availability of holding resources
  - Mop up and patrol considerations
  - High-end Rx fire behavior outside unit

- Identify possible fire behavior in and immediately outside of the unit under different weather scenarios and determine the minimum staffing needs for the implementation of the fire to meet prescribed fire plan objectives.
  - Best Practice: use fire modeling to model fire behavior on the inside and immediately outside the unit and calculate the number and type of holding resources needed to respond to the possible fire spread.
- Identify possible fire behavior outside the unit under different weather scenarios (including worst case) and determine the minimum staffing needs in the event that the prescribed fire is not meeting objectives or prescribed fire escapes the control of the on-site resources.
  - Identify potential critical infrastructure surrounding the project area that may need specialized protection resources in the event of an escaped prescribed fire (example: dozer, structure engine).
  - Best Practice: Use spatial fire modeling such as IFTDSS to determine the critical holding points under various weather conditions.
  - Best Practice: model fire behavior outside the unit and calculate the number and type of contingency resources needed to respond to the possible fire spread.
    - Consult with local fire and fuels managers to identify fire models, fuel moisture regimes, and fire danger indices to model fire behavior in and outside the growth area and highlight rapid growth indicators.
    - Review past lessons learned from previous escaped prescribed fires or large-growth fire events to identify critical potential resource needs.
    - Identify local geographic features that can influence fire behavior.
  - Confirm that enough contingency resources are available in the area to respond under the possible escape scenarios. Watchouts for resources calculations include:
    - Not accounting for fuel models outside the unit.
    - Not using high-end prescription parameters, example: Max winds and min fuel moisture for contingency.
    - Unrealistic timelines for contingency resource arrival.
    - Not accounting for access and terrain for slop overs or spot fires.
    - Assuming line production rates are constant and sustained for all resources.
    - Adjust line production rates based on capability and reality. Example: Overhead will not be producing a constant hand line. The engine will not constantly supply water. Different crew and apparatus types have different capabilities.
  - If there are not enough contingency resources, consider changing the prescription so that possible burn conditions align with the number of resources available to respond to an escape.

        - Divide the project area into more manageable pieces to lower the number of required on-site and contingency resources.
        - Narrow the prescription window.
        - Identify critical staffing levels where implementation should not take place.
- Identify locations in and outside the unit that could be used to stop fire spread.
    - Review the complexity analysis and critical holding points identified and addressed.
- Develop Management Action Points (MAPs). Here are the five possible MAPs.
    - Fire out of the control lines
    - Incident within an incident
    - Not meeting objectives
    - Smoke
    - Aviation
- Wildfire declaration plan
    - Review element 18 in *NWCG Standards for Prescribed Fire Planning and Implementation,* PMS 484, https://www.nwcg.gov/publications/484.

Consult with a Technical Reviewer to Ensure all Prescribed Fire Plan Elements Adequately Addressed.

When to start task: Prescribed fire plan is complete.

Resources to complete task: Phone and email

How to accomplish task:

- Identify technical reviewers that will provide a quality technical review.
    - Best Practice: find someone outside of but familiar with your area to perform the review. Provide the reviewer with adequate information needed for the review (maps, fire behavior, complexity analysis, additional local prescribed fire considerations to include past burn history etc.)
        - Trainer should not be the technical reviewer.
        - Someone that has the time and is responsive.
            - ❖ Give them plenty of time to review the plan – know the reviewer.
        - Attention to detail.
        - Willing to teach.
    - Best Practice: be willing to received critical evaluation. A good critical evaluation should be a little painful. Better to catch errors now that during implementation. Avoid the temptation to go for an easy review.
    - Best Practice: Ensure that after the technical review is complete you discuss items that may need to be addressed within the prescribed fire plan.
        - Address any items that are any unsatisfactory and send back to reviewer.

Perform a Technical Review of a Low or Moderate Complexity Prescribed Fire Plan.

When to start task: When prescribed fire been has been completed.

Resources to complete task: Phone, email, *NWCG Standards for Prescribed Fire Planning and Implementation,* PMS 484, https://www.nwcg.gov/publications/484, *Prescribed Fire Complexity Rating System Guide,* PMS 424, https://www.nwcg.gov/publications/424, and fire modeling.

How to accomplish task:

- Perform a technical review in accordance with *NWCG Standards for Prescribed Fire Planning and Implementation,* PMS 484, https://www.nwcg.gov/publications/484.
    - Review the entire complexity analysis and cross check with the prescribed fire plan.
        - Ensure the initial evaluation mitigation is reflected from the complexity analysis to the prescribed fire plan.
    - Review *NWCG Standards for Prescribed Fire Planning and Implementation,* PMS 484, https://www.nwcg.gov/publications/484, elements as you review burn plan elements to ensure minimum requirement are met.
    - Provide feedback on most elements, even if it is just suggestions or advice for future practices. Include positive feedback.
- Best Practices
    - Establish the expectation that you will provide a critical evaluation of their work to improve the success of the plan. It is not personal.
    - If you have a question that can be addressed quickly, reach out before you complete the review.
    - If the plan needs a total rewrite, then return the plan and have the creator start from the foundational documents.
        - If there are too many structural issues with the plan it will prevent you from giving a quality review.
    - Consult the prepare on review process and results.
    - Once the unsatisfactory elements are addressed, sign the prescribed fire plan.

Make any Necessary Amendments to the Prescribed Fire Plan.

When to start task: Prescribed fire plan is signed, need for amendment is identified.

Resources to complete task: Phone and email, trust with the line officer

How to accomplish task:

- Discuss the possibility and process of amendment with the line officer before the need to make an amendment.
- Know local and regional policies for amendments.
    - Determine potential timeline for approval at various levels.

- Follow the amendment process in *NWCG Standards for Prescribed Fire Planning and Implementation,* PMS 484, https://www.nwcg.gov/publications/484

Prepare and Mobilize

Ensure Individual Readiness. Demonstrate Understanding and Adherence to All Current Agency Prescribed Fire Policy.

When to start task: During all phases of the assignment or operation

Resources to complete task:

- *NWCG Standards for Prescribed Fire Planning and Implementation,* PMS 484, https://www.nwcg.gov/publications/484.
- *Interagency Standards for Fire and Fire Aviation Operations* (Red Book).
- Complexity analysis.
- Permitting and state and local laws.
- Dispatch procedures.
- Smoke modeling and air quality.

How to accomplish task:

- Maintain mental, emotional, and physical health suitable for performing well in the position.
- Maintain awareness of current policy and updates.
- Maintain awareness of state and agency liability policy.

Review the Prescribed Fire Plan Prior to Implementation, Ensure the Plan is Signed, and all Required Elements are Addressed and Have a Good Understanding of the Complexity Determination.

When to start task: Upon receiving an assignment to perform as a Burn Boss.

Resources to complete task: Completed prescribed fire plan, completed complexity analysis, *NWCG Standards for Prescribed Fire Planning and Implementation,* PMS 484, https://www.nwcg.gov/publications/484.

How to accomplish task:

- Review each element of the plan and ask the following questions.
    - Is the plan complete?
        - Signed
        - All required elements
        - Follows current template
        - Meets standards in *NWCG Standards for Prescribed Fire Planning and Implementation,* PMS 484.
    - Will it stand up in court?
        - Not contradictory information
        - Clear justification

  - Is it ready to implement?
    - Clear intent

- Barriers to critical evaluation.
  - Lack of time → Prioritize critical evaluation of RX plans, delegate out other RX planning tasks to make time for critical evaluation.
  - Lack of expertise → Study the *NWCG Standards for Prescribed Fire Planning and Implementation,* PMS 484, https://www.nwcg.gov/publications/484, review plans regularly, review FLAs, talk with practitioners about best practices.
  - Lack of confidence → Build meaningful relationships in and outside of work, practice critical evaluation with people you are comfortable with already.

Gather Critical Information Pertinent to the Assignment.

Type 1: Much tighter parameters, more complex values, urban interface, Endangered Species mitigations constrain fire, Smoke Sensitive.

When to start task: Upon receiving an assignment to perform as a Burn Boss.

Resources to complete task: Access to Agency Administrator/local area Fire Manager, National Weather Service (NWS) website, GACC intelligence desk, local staff. Access to prescribed fire project area, local frequency management guide, burn plan, *IRPG*.

How to accomplish task:

- Make critical contact with:
  - Agency administrator
  - FMO
  - Fuels Specialist
  - Firing and holding
  - LEO
  - Media
  - Smoke
  - Resource advisors
  - Cooperators
  - PAO
- Obtain briefing.
  - Expectation
    - Desired end state after the treatment and future condition years out.
  - Delegation (Element 2A)
    - What authority you are acting under?
    - What is your decision space?

- Resource availability (operational and contingency)
  - Fire response resources/staffing levels.
- Reporting procedures and timelines
- Previous weather, fire behavior, and fire danger
  - Then – trends of the past
  - Now – what you measure
  - Next – forecasted weather
  - How – how could conditions be different than expected
    - Then – trends of the past
      - FEMS – Fire Environment Mapping System (coming soon).
      - FireFamilyPlus – Use job aids to teach yourself or take S-495, Geospatial Fire Analysis, Interpretation, and Application.
      - Local RX records – Keeping records of previous burns can help you understand the conditions that have led to successful or unsuccessful burns in the past.
      - Local experience – This is the least reliable but is helpful to confirm what you see in the data.
      - Fire history.
  - Now – what you measure
    - Kestrel and/or Sling – calibrate them – make sure they are used correctly. Kestrels vs. Sling – https://www.youtube.com/watch?v=FLv-Sx8JsqQ.
    - Stationary RAWS – pick one that is representative.
    - Portable RAWS – place in an area near burn or in a representative location.
    - Data logger – Kestrel DROP or other brands where they can place many small devices around the burn unit.
  - Next and How – forecasted weather and how conditions could be different than expected.
    - IMET
    - Fire Weather Dashboard
    - Windy
    - Hot Dry Windy
    - US Drought Monitor
    - RMA Dashboard
    - WFAS
    - Spot Weather

- ❖ AirNOW
- Internal and external constraints.
  - Availability of shared resources.
  - Potential impacts to other resources important to stakeholders.
  - Special events (example: gatherings, nesting etc.).
- Local notification procedures for incidents within an incident or escape.
- Specifics of Medical Plan as it relates to local unit (hospital location, procedures for ordering air med/evac).
- Gather maps.
  - Unit
  - Burn project map
  - Smoke vector
  - Sensitive smoke receptors
  - Areas of avoidance (cultural, infrastructure)

- Inspect project area.
  - Ground truth unit maps
    - Road access
    - Bridges
    - Map features (helispots, water, control lines)
  - Values at risk inside and outside the unit
    - Type
    - Location
    - Vulnerability
    - Determine actions needed
    - Access
  - Holding
    - Type of control lines (roads, built fireline, natural break).
    - Adequacy for anticipated fire behavior.
    - Water sources.
  - Fuels
    - Condition and likelihood of meeting objectives (inside unit).
    - Condition and resistance to control (inside and outside unit).
      - ❖ Adequacy of contingency plans/resources as relates to current fuel condition.

- Collect observations.
  - Fuel moistures
  - Weather
    - Observe weather patterns during the peak of the burn period.
    - Request a spot weather forecast and compare to observed weather.
- Make sure pre-burn considerations are complete.

Build the Team

Assemble and Validate the Readiness, Availability, and Qualifications of Required and Contingency Prescribed Fire Plan Personnel and Equipment.

When to start task: Weather is conducive to meeting prescribed fire plan goals and objectives.

Resources to complete task: Knowledge of agency/organization policy. Information of cooperative agreements. i.e., MOU's.

How to accomplish task:

- Refer to Element 11 in in the prescribed fire plan for minimum resource and personnel needs.
- Set briefing location and time for all resources and personnel.
- Validate on-site resources and personnel readiness and qualifications.
    - Best Practice: A list of tasks involved in checking equipment readiness posted on a white board that can be checked off with initials to keep timing short and organize work.
        - Delegate holding boss to verify all holding resources are typed and working.
        - Delegate firing boss to verify all ignition device/equipment is working.
    - Personnel
        - Check personnel incident qualification cards for specific qualifications (Burn Boss or delegated personnel).
        - All personnel have proper Personal Protective Equipment (PPE), radios, and equipment.
        - Assess all personnel well-being.
        - Ensure all personnel have adequate supplies for operational period. i.e., Food, water, personal medical supplies.
- Validate Contingency Resources
    - Notify and document contingency resource availability by phone or have dispatch make contact and notify burn boss on resource status. Is resource in station: yes/no
        - If yes, estimate response time to project area.
        - If no, estimate time to availability and response time to project area.
        - Duration of resource availability.

      Best Practices:

        - Have contingency resources on-site. Engage them in meaningful work by either rotating them into positions on the burn or by providing work for them to do in the area such as thinning or line prep.
        - Never assume contingency resources will be available in a timely manner.

Establish, Maintain, and Document Communication With the Agency Administrator, Dispatch, Prescribed Fire Manager, FMO, or Local Fire Management Organization.

When to start task: Establish intent, expectations, and timeline with leadership. Get more specific about the requirements of implementation. Identify key personnel and contingency resources.

Resources to complete task: Phone and email

How to Accomplish Task:

- Identify burn units that could be accomplished within the parameters of Element 7 in the burn plan with the forecasted weather and fuel conditions.
- Coordinate with FMO, AA, Other staff areas, cooperators, partners – document through emails or text messages.
    - Best Practice: start 214 unit log to include this pre-burn communication.
    - Scheduling.
        - What day/ time
    - Availability
        - Resources to conduct burn, including contingency resources.
        - Coordinate with dispatch if ordering outside resources.
    - Permissions/Approvals
        - AA, FMO
        - Identifying conflicts with activities in the area.
            - Timber.
            - Recreation.
            - Local Public Affairs Officer or equivalent.

Supervise and Direct Work Assignments

Model Leadership Values and Principles. Provide Positive Influence. Emphasize Teamwork.

When to start task: During all phases of the assignment or operation.

Resources to complete task: Wildland Fire Leadership Levels, Leadership Committee: https://www.nwcg.gov/committees/leadership-committee/leadership-levels.

How to accomplish task:

- Refer to the operational leadership section of the *NWCG Incident Response Pocket Guide,* PMS 461, https://www.nwcg.gov/publications/461.

Establish and Communicate Objectives, Priorities, Work Assignments, and Performance Expectations.

When to start task: During all phases of the assignment or operation.

How to accomplish task:

- Provide leaders intent
- Acknowledge and provide constructive feedback
- Utilize clear communication
- Understand communication styles
- Meet people where they are and give them the opportunities they need to grow
- Use the right people for the task

Identify, Analyze, and Use Relevant Situational Information to Make Informed Decisions and Take Appropriate Actions.

When to start task: During all phases of the assignment or operation.

How to accomplish task:

- Acknowledge shortcomings
- Seek expertise
- Become proficient
- Steer by logic rather than emotion
- Avoid tunnel vision
- Resist the urge to oversimplify
- Be a critical thinker
- Be decisive
- Empower others

Ensure Objectives and Performance Standards are Met.

When to start task: During all phases of the assignment or operation.

How to accomplish task:

- Ensure accountability
- Follow up and confirm
- Complete required documentation
- Maintain high standards and expectations from personnel

Ensure All Operations are Conducted Safely and in Accordance With the Approved Plan and Established Standards and Guidelines, Maintaining the Safety, and Welfare of All Assigned Personnel and the Public.

When to start task: During all phases of the assignment or operation.

How to accomplish task:

- Set clear expectations and make sure that they are understood
- Own mistakes that may occur
- Avoid complacency
- Maintain situational awareness – stay involved with:
    - Personnel
    - Weather (current observations and changes from forecast)
    - Fire Behavior (current observed and future)
    - Operational tempo
    - Identification of hazards
- Say something when you see something

Implement a Prescribed Fire

Ensure a Signed Agency Administrator Ignition Authorization Is in the Prescribed Fire Plan.

When to start task: The general weather forecast appears favorable to carry out a prescribed fire operation.

Resources to complete task: Completed prescribed fire plan.

How to accomplish task: same as IPD statement

Obtain a Spot Weather Forecast, Smoke Management Forecasts, and/or Local Area Forecast on Any Days the Fire is Actively Spreading, and Use the Forecasts to Determine Holding, Mop Up, or Patrol Staffing Needs.

When to start task: The general weather forecast appears favorable to carry out a prescribed fire operation.

Resources to complete task: Computer, phone, previous weather observations.

How to accomplish task:

- Forecasts
    - Identify latitude and longitude for the center of the unit.
    - Obtain spot or point weather forecast through NWS based on local area procedure. Elements 9B and 20B in the burn plan.
        - Best Practice: Collect three weather observations 1 hour apart on the day prior to the burn during the peak of the burn period.
            - Wind, Temp, RH
        - Best Practice: After the burn day provide feedback to the NWS if forecast is not accurate.
    - Obtain smoke forecast through local procedures (Burn Plan element 19A)
    - Obtain fire danger forecast from local area dispatch.
- Analysis
    - Review all forecast parameters in relation to prescriptive elements and determine whether all elements are within prescriptive tolerances.
        - If forecasts are within tolerances no additional authorizations required.
        - If forecasts are outside tolerances and objectives are still expected to be met, refer to agency policy and requirements to obtain approval i.e., amendment or variance.
        - Determine the holding, mop up, and patrol, or staffing needs as described in the approved burn plan.

Ensure Pre-burn Considerations Are Addressed and Pre-burn Monitoring Is Complete.

When to start task: The spot, smoke and fire danger forecasts have been reviewed and determined that the conditions are in prescription to burn.

Resources to complete task: Radio, phone, and email

How to accomplish task:

- Identify and address pre-burn considerations in the prescribed fire plan.
    - On-site and off-site prep
    - Communication
    - Contingency resource availability
    - Permits
    - Resource availability including contingency
- Ensure pre-burn monitoring has been completed or assign resources to complete monitoring.
    - Weather
    - Fuel moisture
    - Fuel loading
    - Photopoints

Ensure Fuels and Weather Conditions Are Conducive to Achieving Prescribed Fire Objectives as Outlined in the Plan.

When to start task: Work schedule and staffing indicates there may be an opportunity to implement a prescribed fire.

Resources to complete task: Fuels drying oven, pocket card, fuel sticks, weather station, access to FDRS indices, NWS fire weather forecast.

How to accomplish task:

- In the field:
    - Collect, dry, and analyze fuel moisture.
        - Best Practice: use a wood moisture meter, sometimes referred to as a Protimeter, to check fuel moistures in 1 hour and 10 hour fuels and understanding how fuel moisture affects fire behavior. Seasonality or visual cues affects fuels, e.g., flowering of Titi.
    - Make a visual assessment of conditions on the ground to determine if unit is accessible and fuel loading.
    - Collect on-site weather observations for spot weather forecast request.
    - Submit spot weather request to NWS.
    - Bang head repeatedly against the largest pine tree in the unit.
- In Office

- Check fuels, FDRS, spot, and general weather forecast from available online sources (WIMS, NWS, Fuels database, GACC predictive services).
- Evaluate acquired information against prescription parameters.

Allocate Resources to Meet Objectives and Control Limitations

When to start task: Resource types and numbers are identified. Prescription window is identified.

Resources to complete task: Phone, email, daily staffing, coordination center.

How to accomplish task:

- Identify leads
  - Firing boss, holding boss, FEMO, aerial ignition.
- Identify local and out-of-area resources to ensure that local resources are tied in with out-of-area resources.
- Positioning support resources.
  - Dozer
  - Fuel
  - Water
  - Other specialized equipment (example: Airboat, skidgin, UAS, helicopter)
- Position implementation resources
  - Personnel
  - Engines
  - UAS
  - Other non-fire personnel (example: media, PIO, LEO, line officer)
- Positions the report directly to the burn boss
  - Firing boss/holding boss or RX division boss
  - FEMO
  - PIO
  - Resource advisor
  - Safety officer
  - LEO
- Choosing an organizational structure – adjust organization based on the resources and conditions of the burn.
  - Possible organizational structures include:
    - Firing and holding as separate positions that are responsible for the entire unit.
    - Firing and holding managed for a portion of the unit by an RX division.

    - Firing/holding boss – ensure they are familiar with the objectives.
        - Best Practice – select leadership with local knowledge.
            - ❖ Firing – has the skills to manipulate fire and move resources around as needed.
            - ❖ Holding – suppression experience making decisions and moving resources around as needed.

- Meet with the firing/holding bosses to allocate available resources based on:
    - Current and expected weather.
    - Critical holding locations and values.
    - Personnel experience.
    - Capability – line production rate, access, trafficability.
- Adjust resources based on current and changing conditions.
    - Minor changes can be handled by firing/holding.
    - Major changes may require a meeting between the burn boss and firing/holding.

Scout the Area to Reassess Critical Holding Points and Values.

Type 1: May require aerial scouting, larger units, unable to access entire unit (bombs), more critical holding points.

When to start task: Established that you are in prescription and have the resources needed to implement the burn.

Resources to complete task: Prescribed fire plan and unit maps, transportation.

How to accomplish task:

- Arrive on scene.
- Orient to maps.
- Identify critical holding areas based on current and expected wind direction.
- Ensure that the control lines are prepared and adequate by personally checking or assigning a designee to report.
    - Example: Snagged, control lines cleared, hose lays, closures in place, public use, unexpected activities, or items, values at risk identified and protected.
        - Best Practices: if aerial resource are available and necessary, fly the entire unit to look for holding and value changes. If no aerial resource available, and public access areas, i.e., trails, recreation areas, etc., are within, or adjacent to the unit, assign personnel to check, which could mean the entire trail.
- If needed, address the additional actions needed to implement the burn.
    - Example: Widen lines, remove snags, contact LEO to enforce closure, fix hose lays
- Determine if the implementation plan needs to be adjusted based on-site conditions.

Conduct Organizational Briefing at the Beginning of Each Operational Period

Type 1: Incident Action Plan (IAP) typically required since a lot more information that is critical for fire crews to have. Briefing more detailed and focused on safety, coordination, and values to protect.

When to start task: The prescribed fire area is scouted, on-site resources are in place and contingency resources are available.

Resources to complete task: Prescribed fire plan

How to accomplish task:

- Best Practice: Develop a reference for the critical information from the burn plan for use in the field for completing the briefing and safe project implementation. Example: IAP, prescribed fire organizer.
- Identify the briefing location.
    - Is it large enough?
    - If applicable brief close to the test fire.
    - Free of distraction.
    - Consider utilizing a large map with drop points identified.
- Prepare and practice briefing.
    - Consider having others present portions of the briefing.
    - Consider using breakouts.
- Plan the timing of briefing.
    - Time briefing before giving it.
    - Allow sufficient time for resources to orient to unit prior to test fire.
- Complete briefing, addressing every item in element 10A of the burn plan.

Complete and Sign the Prescribed Fire Go/No-Go Checklist in the Prescribed Fire Plan.

When to start task: There is a good chance for a successful burn based on the site conditions, forecasts, and resources.

Resources to complete task: Prescribed fire plan

How to accomplish task:

Refer to Element 2B, confirm validity of all elements, complete, and sign upon final validation.

Conduct the Test Fire and Document the Results

When to start task: The briefing and Go/No-Go checklist are complete.

Resources to complete task: Required personnel and ignition devices.

How to accomplish task:

- Determine the location of the test fire(s)
    - Consider wind direction and weather.
    - Representative fuels
    - Easy to control and extinguish if goals and objectives are not being met.
        - Resources
    - Determine if a single test fire is adequate or if multiple test fires are needed to represent the variability in the unit.
- Complete required notifications informing them of the test fire initiation.
    - On-site resources
    - Off-site Example: Dispatch, Agency Administrator, duty officer, PAO, LEO
- Light test fire
    - Burn an area large enough to inform decision.
- Observe test fires results.
    - Fire behavior
    - Smoke
    - Fire effects
- Evaluate whether the test fire is meeting objectives based on the burn plan.
    - Based on time of day and location.
- Make determination.
    - Consult the results of the test fire with overhead.
    - Ensure the overhead supports the decision to move forward or not.
- Complete the Go/No-Go checklist and sign it.
    - Last two question of element 2B in the prescribed burn plan
- Complete required notifications informing of the results of the test fire.
    - On-site resources

Off-site Example: Dispatch, Agency Administrator, duty officer, PAO, LEO

Evaluate and Document Fire Behavior and Fire Effects.

When to start task: Ignition has begun.

Resources to complete task: Prescribed fire plan, radio, camera

- Best Practice – FEMO and UAS

How to accomplish task:

- Best Practice: FEMO checklist for the burn boss

  - Locate a qualified FEMO (and give them a trainee or two)
  - Make a specific plan for monitoring
  - Photopoint locations
  - Observations to be collected
  - Provide objectives, maps, and briefing time, and place
  - Communicate priorities and trigger points
  - Give a due date for the FEMO report
- What to have the FEMO or other assigned personnel monitor
  - Environmental data
    - Weather
    - Fuel Moisture
    - Soils/duff moisture
    - Fuel loading
    - Fuel model
  - Fire observations
    - Rate of spread
    - Flame length
    - Flame zone depth
    - Residence time
    - Smoke
  - First order fire effects
    - Fuel consumption
    - Tree mortality
    - Area burned
    - Scorch height
  - Second order fire effects
    - Delayed tree mortality
    - Species composition
    - Site productivity
- Establish clear expectations and strategies with the firing/holding boss.
  - Firing Boss and Holding Boss brief resources assigned to them and begin operations.
  - Consider local conditions and experience.
- Position to maintain situational awareness (visual, radio communication)

- Viewpoint
- Aircraft
- Mobile on the ground (designated ATV, UTV, engine)
- Critical areas

- Maintain frequent communication with firing, holding, FEMO, and resource advisor.
- Continually assess weather and fire behavior to ensure they are in prescription and objectives and control limitations are being met with ignition operations (fire behavior, fire effects, smoke management).
  - If No…Contact firing and holding and alter plan. May change to a different firing pattern, may wait until environmental parameters are more favorable. May stop if not achieving objectives.
  - If Yes…proceed with current plan.

Adjust Actions Based on Changing Information and Evolving Situational Awareness. Communicate Changing Conditions to Assigned Resources and Supervisors.

Type 1: Must be able to shift rapidly. Greater potential for loss. May require a more complex organization which includes an operations director. May use air attack and multiple aircraft. More potential for un-knowns/surprise situations that must be addressed rapidly to ensure safety of resources.

When to start task: Adjustments are made based on current weather observations outside predict forecast and unforeseen events which include but not limited to an incident within an incident.

Resources to complete task: Activity Form, ICS 214, radios, phones, organization chart

How to accomplish task:

- Gather information and document (ICS 214) what has changed.
- Determine what impact the change is having or will have on accomplishing the burn objectives.
- Do preplanned contingencies meet the need? If so implement. If not, determine what actions are needed.
- Make appropriate adjustments to the firing operation, holding operation, organization, etc.
  - Best Practice: Delegate if necessary. Does it require activation of incident within an incident (IWI) IC to implement adjustments?
  - Best Practice: If making significant adjustments – is another face to face briefing necessary.
- Reassign resources or make changes to roles and responsibilities of the organization if applicable.
- Communicate actions and intent to AA, Dispatch, etc. if necessary.
- Ensure all resources are informed of adjustments to the firing plan, holding plan, organization, etc.

Ensure the Completion of Mop Up and Patrol Unless Otherwise Assigned to Other Qualified Personnel.

When to start task: Material is combusting that you want to extinguish and/or smoke is impacting smoke sensitive areas.

Resources to complete task: Personnel, water delivery equipment, tools

How to accomplish task:

- Inspect the line for holding concerns and/or smoke contributors. Note the presence, location, type, and level of threat or production.
    - Snags
    - Dead and down
    - Duff and litter
    - Stumps
    - Re-burn
- Establish mop up standard based on current and expected weather, considering smoke sensitive areas.
    - How far from the line to mop up
    - What items to mop up
    - What snags to fell
    - Monitor and document
    - Bests practice: Involve public notifications if necessary or LEO
- Assign resources based on the needs and timing.

Determine and Document If the Prescribed Fire Is Outside Prescription Parameters or Is Not Meeting Prescribed Fire Plan Objectives.

When to start task: Weather condition or fire behavior is not meeting the prescription parameters and/ or objectives.

Resources to complete task: Prescribed fire plan, amendment process ICS 214

How to accomplish task:

- Observe and document what conditions have changed.
- Determine and document what impact the change is/ will have on the objectives.
- Determine what actions are needed if any. Document rationale.
- Communicate actions and intent to AA, Dispatch, etc.
    - If changing the plan keep all resources informed.

Implement Contingency Plan As Appropriate.

Type 1: Typically, more complex. More resources, multiple contingency groups that require additional overhead to manage i.e., Structure protection groups.

When to start task: Unplanned event has triggered the implementation of the contingency plan.

Resources to complete task: Radio, phone, extra briefing materials (maps, IAPS, etc.). Contingency resources as documented in the prescribed fire plan.

How to accomplish task:

- Unexpected event occurs during Rx.
- Gain understanding/situational awareness of event.
    - Establish location and visit if possible.
    - Communicate with resources on-site.
        - Nature, size, severity, hazard, risk
    - Assign IWI IC – it may be the burn boss.
        - Formulate plan to respond.
            - ❖ Refer to element 17 and if available pull directly from contingency plan.
            - ❖ May have to formulate plan from scratch if not foreseen by plan developers.
            - ❖ Assess resource capabilities and match to incident.
            - ❖ Determine if additional resources are required.
            - ❖ Changes to org chart if necessary.
- Communicate the Plan
    - Ensure all resources on scene have been briefed on the plan.
    - Ensure all resources understand their role moving forward…are they still on the prescribed fire or are they working on a contingency operation.
    - Communicate with Agency Administrator/FMO/Dispatch/constituents to let them know contingency actions are being taken.
- Implement the plan.
    - IWI IC directs resources to engage after briefing.
- Assess and monitor actions to see if they are being successful. (Do we need to alter the plan?)
    - Communicate with IWIC and evaluate.
    - Continue to communicate with Agency Administrator or equivalent position.
    - Evaluate the need for additional resources to relieve contingency resources.
- Questions and Answers about contingency operations
    - Can contingency resources be used for implementation?
      The implementation of the burn should not <u>rely</u> on the use of contingency resources. May be used to assist with operations, monitor, or complete unit preparation within the allocated response time.
      The <u>caution</u> to including contingency resources is not to commit them. If contingency resources are committed to the operation, they are considered activated, and need to move through the proper reevaluation, communication, and reporting steps. The

opportunity for including contingency resources is to encourage them to continue to work for by giving them assignments that will benefit and interest them.

- Do contingency resources need to be on-site?
  Recent policy from the Forest Service requires that contingency resources be 30 minutes away. Since most burns are in remote areas, it is likely best to just have them on-site.
- If a contingency plan is activated is the prescribed fire declared a wildfire?

  Answer – No

- Who can activate a contingency plan?
  Answer – personnel on the burn site (burn boss, firing boss, or holding boss)
- Does implementing a contingency plan mean that the burn is not successful?
  Answer – No you can still have a successful burn if the contingency plan is activated.
- When can contingency plans be implemented?
  Any time
- Is the contingency plan only implemented for prescribed fire burning outside of the unit boundary?
  Answer – No, contingency plans can be related to escapes, not meeting objectives, IWI, or any other reason that the prescribed fire needs to have a different plan enacted other than the primary or alternate plan.
- Can you activate a contingency plan without ordering contingency resources?
  Answer – yes
- If contingency resources are pulled to help with one prescribed fire, can they be considered a contingency resource for another prescribed fire.
  Answer – no
- What should you do if the contingency resources for your burn become committed to another incident?

  Secure operations until the needed resources are replaced.

- Do you need to notify the Agency Administrator as soon as any part of the contingency plan is enacted?
  Answer – Yes for the Forest Service, not necessarily for other agencies
- List the circumstances that could necessitate the use of the contingency plan.
  - *Fire outside the unit boundary.*
  - *Fire not meeting objectives.*
  - *A prescription parameter has been exceeded.*
  - *Resources numbers change and no longer meet minimums.*
  - *There are undesirable smoke impacts.*
  - *There is the potential for undesirable smoke impacts.*
  - *Safety issues.*
  - *Historic/archeological/hazardous materials sites discovered.*
  - *Unplanned independent event.*

Declare the Prescribed Fire Out, or Formally Transition Responsibility to Another Prescribed Fire Burn Boss, Prescribed Fire Manager, or Other Designated Personnel Within the Local Fire Management Organization.

When to start task: The prescribed fire is out, or the current burn boss can no longer function as the burn boss.

Resources to complete task: Briefing checklist from prescribed fire plan or *IRPG*. Radio, phone, face to face meeting with agency representative and prescribed fire organization. Activity Log, ICS 214.

How to accomplish task:

- To declare the prescribed fire out, follow procedures outlined in element 21 of the burn plan.
- Conduct Briefing with relief resource (RXB1/2, Prescribed Fire Monitor (RXFM), DO, other).
    - Current status of project.
    - Percent complete/to be completed.
    - Objectives being met?
    - Critical holding points, holding plan, firing plan, smoke sensitive areas, significant events.
- Resources on scene and status
    - Roles and responsibilities
- Reporting expectations
    - Who to report to meaning Dispatch, AA, DO, etc.
    - Reporting schedule/timeline
    - Significant events, IWI/escape notification
- Weather, smoke, and fire behavior observed from previous operational period.
- Challenges/barriers to performance.
    - Critical areas to complete.
    - Hazards identified and mitigated.
- Notify resources on scene of transition.
- Notify Dispatch, AA, local Fire Manager, Duty Officer.

Declare a Prescribed Fire or Portion of a Prescribed Fire a Wildfire. Manage or Delegate Responsibility, As Identified in the Plan, for the Management of Any Declared Wildfire.

When to start task: Burn is no longer meeting objectives, workload exceeds the available resources.

Resources to complete task: Phone and radio

How to accomplish task:

- Establish that the actions have failed to return the prescribed fire to prescription.
    - Example: Leaves the planned management area, smoke impact, failing to meet objectives, loss of resources.
- Gain understanding/situational awareness of event.
    - Establish location and visit if possible.
    - Communicate with resources on-site.

        - Nature, size, severity, hazard, risk.
- Maintain detailed documentation of the incident.
- Implement Prescribed Fire burn plan Element 18 (wildfire declaration).
- Communicate with prescribed fire personnel.
    - Original plan has changed, and people are being re-tasked. They need to understand risks, assignments, tactics, objectives.
- Designate Incident Commander to manage escape and establish the roles of the burn boss and incident commander.
    - Evaluate the new risks associated with the project, what is going to get you?
    - Determine level of complexity
    - Set up org chart, chain of command.
        - Order resources
    - Initiate Wildland Fire Decision Support System (WFDSS) Decision
    - Delegate responsibility for the escaped prescribed fire
- Engage in actions as dictated by WFDSS Decision/Risk Management Process/Element 18 RX Fire plan.
- Questions and Answers about Wildfire Declaration.
    - If a wildfire has been declared, can you still manage a portion of the fire as a prescribed fire?

        Answer – yes, the burn boss may remain in place to manage the portion that was the prescribed fire.
    - If there is a wildfire declaration, can the project revert back to a prescribed fire?

        Answer – No
    - Who can declare a prescribed fire a wildfire?

        Answer – Burn boss, District Ranger, Duty officer, FMO, Agency Administrator – depends on what is in your burn plan.
    - Do all prescribed fires declared a wildfire have an investigative review initiated by the Agency Administrator.

        Answer – Yes
    - Can prescribed fires be declared wildfires for reasons other than escapes?

        Answer – Yes
    - Circumstances that could necessitate a wildfire declaration.
        - Contingency actions have failed or are likely to fail and cannot be mitigated by the end of the next burning period by any listed contingency resources.
        - The fire has spread outside the project boundary, or is likely to do so, cannot be contained by the end of the next burning period.

- Prescription parameters are exceeded and holding, and contingency actions cannot secure the fire by the end of the next burning period.

- If a prescribed fire burns onto private land, does it have to be declared a wildfire?
  - It depends on the specific plan being implemented. If the burn plan requires a declaration, then yes.
  - Policy does not require a declaration automatically.
- If a prescribed fire burns outside of the project boundary and is not contained by the end of the next burn period, does it have to be declared a wildfire?

  Yes

Manage or Delegate Responsibility for the Management of Any IWI Including Medical.

Type 1: Higher probability for IWI. More high-risk low probability operations taking place. Remote locations, large units, aerial medical transport more likely

When to start task: IWI occurred

Resources to complete task: ICS 206, ICS 214, Emergency Medical Plan.

How to accomplish task:

- Identify IWI procedure in the operational briefing.
  - Describe step by step notification.
  - Procedures involving 911, dispatch, agency contacts.
    - Who is contacted? When?
  - Pre-designate IWI IC but instruct first resource on scene to take charge and provide aid if applicable.
    - If IWI is medical and first resource is not qualified to provide aid, provide oversight until qualified personnel arrive.
- Document designated IWI IC in burn plan
  - ICS 214
- Best Practices:
  - Having helispots identified for medivac.
  - Evacuation routes identified.
  - Having a designated evac coordinator.

Communicate and Coordinate

Follow Established Communication Protocols.

When to start task: During all phases of assignment or operation

Resources to complete task: Phone, email, radio

How to accomplish task:

- Ensure communication protocols set in place in the prescribed fire plan are adhered to throughout the prescribed fire event.
- Complete radio checks with all resources prior to ignition.
- Ensure all resources are clear with communication protocols in the event of an adverse event or escape.

Establish, Maintain, and Document Communication with Adjacent Landowners, Cooperators, and Permit Holders As Designated in the Prescribed Fire Plan.

Type 1: Typically involves public and cooperator meetings. Impacts to neighbors are often not able to be mitigated easily and so you have to get their buy in to implement.

When to start task: Burn Boss has signed and reviewed plan. Future weather forecast is conducive for meeting goals and objectives as outlined in prescribed fire plan.

Resources to complete task: Phone, computer, email, and list of contacts as detailed in prescribed fire plan (Refer to Element 9-c).

How to accomplish task:

- Refer to Element 9 for notification preference for each entity. i.e., adjacent landowner, cooperators, and permit holders.
- Best Practices: Individually meet with adjacent landowners and permit holders every year months before prescribed fire season to discuss upcoming burns. Hold an annual cooperator meeting to discuss everyone's prescribed fire operations for the season.
- Contact all parties involved in notification section. Refer to Element 9 in prescribed fire plan.
    - Document contact and any discussion in Activity Log ICS 214, or in notification checklist within prescribed fire plan.
    - Follow up with adjacent landowners when operations are complete.

Conduct and/or Participate in After Action Reviews (AAR).

When to start task: Operations of the day are complete.

Resources to complete task: Presence of all or most personnel throughout the day; *IRPG* and AAR checklist; formal AAR structure; Planning, Leadership, Obstacles, Weaknesses, and Strengths (PLOWS); informal acceptable if valuable.

How to accomplish task:

- Assemble the people from the burn.
    - Best Practice: invite/encourage participation from aviation, dispatch, AA, other staff areas, cooperators for a perspective.
    - Using the same questions, day after day, often results in less participation. Developing a series of different questions and formats will maintain attention.
- Encourage or facilitate participation from everyone.
    - Large groups could be at the crew leader level.
    - Small groups could be everyone participates.
- Inform the people what structure is being used, how participation will occur, and what questions will be asked. Example:
    - Question 1: What went well today?
    - Question 2: What could be done differently next time?
    - Question 3: What did you learn?
    - Question 4: Anything else anyone would like to share about the events of the day?
- Release the resources.

Manage Risk

Apply the Risk Management Process as Stated in the *NWCG Incident Response Pocket Guide (IRPG)*, PMS 461.

Type 1: More likely to use law enforcement, Safety, Public Information Officers to mitigate hazards and manage and communicate risks to stakeholders. Often use Department of Transportation and county/state law enforcement.

When to start task: Ready to visit the prescribed fire site.

Resources to complete task: *IRPG*, transportation, computer.

How to accomplish task:

- Ensure lookouts, communications, escape routes, and safety zones (LECS) are established and known to all firefighters before they are needed. *NWCG Incident Response Pocket Guide (IRPG)*, PMS 461, https://www.nwcg.gov/publications/461. (Page 5).
- Use look up, down, and around in *IRPG* to help maintain situational awareness. Adjust actions accordingly. Develop and communicate contingency plans and trigger points.
- Use risk management process to identify and assess hazards, develop controls, and make risk decisions, implement controls, and supervise, and evaluate. *NWCG Incident Response Pocket Guide (IRPG)*, PMS 461, https://www.nwcg.gov/publications/461 (Page 1). See Specific Hazards (pages 17-30).
    - Best Practices: If not mitigated, mark hazards on the map as well as on the ground with drop points or specific colored flagging.
- Monitor for signs and symptoms of fatigue, illness, or injury. Mitigate appropriately.
- Art of risk mastery.
    - Competence – Know what you are doing through training, education, and experience.
    - Confidence – Practice what you know with frequent and varied experiences.
    - Courage – Trust what you practice and engage in the unknown with humility.
    - Change – Question what you know and try new things.

Coordinate the Monitoring of Smoke Impacts and Adjust Accordingly.

Type 1: Almost always more complex. Impacts to public may be accepted in prescription. More complex smoke modeling, greater values at risk from smoke impacts, smoke contains toxins, narrow windows for smoke to disperse through. Greater coordination with meteorologist/smoke specialist.

When to start task: The level of smoke monitoring is identified. Test fire is complete.

Resources to complete task: prescribed fire plan, personnel to complete monitoring, *NWCG Smoke Management Guide for Prescribed Fire*, PMS 420-3, *Smoke and Roadway Safety Guide and Pocket Card,* PMS 477.

How to accomplish task:

- Identify the need for short- and long-term smoke monitoring.
    - Adhere to local smoke management guidelines.
    - Consider the socio-political environment.
- Designate a monitor for short- and long-term smoke monitoring as needed.
    - Best Practice: Assigning a FEMO to document smoke monitoring during the burn, as well as weather and fire behavior observations and immediate post-burn fire effects is a great way to handle these responsibilities.
- Monitor short- and long-term smoke as needed.
    - Short term – day of burn.
        - Element 20 Example: Visibility on roadways, height, and direction of column, color,
    - Long-term
    - Assess the potential to have long-term smoldering debris
        - Example: Available large DWD, duff and litter,
    - Impacts to smoke sensitive receptors in the proximity of the burn. Element 20 E
        - Example: Hospitals, schools, assisted living, etc.
- Mitigate smoke impacts as needed – Element 19 E

Monitor for Signs and Symptoms of Fatigue, Illness, or Injury. Mitigate Appropriately.

When to start task: When resources have gathered for implementation.

Resources to complete task: Situation awareness.

How to accomplish task:

- Account for location, health, safety, and welfare of assigned personnel. *NWCG Incident Response Pocket Guide (IRPG)*, PMS 461, https://www.nwcg.gov/publications/461 (See pages 105-118).

Document

Ensure the Completion and Timeliness of, and Route As Required All Documentation.

When to start task: Prescribed fire is complete and declared out.

Resources to complete task: Quiet time, computer, digital filing system, scanner

How to accomplish task:

- Documentation required throughout the burn including, but not limited to, ICS 214, weather, fire behavior, smoke monitoring, etc. is completed and signed.
- Complete a post-burn report including cost analysis and route to required and requested entities.
    - Weather, fire behavior, smoke observations may be delegated to FEMO.
    - Firing details including map may be delegated to Firing Boss (FIRB).
    - Holding and control section may be delegated to Holding Boss or Engine Boss (ENGB).
- Complete any agency-specific forms including, time reports Crew Time Report's (CTR), equipment use, ratings, activities, injuries, etc.
    - Forms may be delegated to supervisors with review by Burn Boss.
- Best Practices for storage of files:
    - All paper documents should be digitized.
    - A simple and easy-to-follow filing system should be set up on a shared server.
    - One file set up by unit with all documents from each burn entry.
    - Store data for at least 7 years.
- Best Practices for the use of files
    - Documents from completed burns should be used to provide insight for prescribed burn plans for nearby units.
- Functional:
    - Checklists (e.g., Go/No-Go, briefing)
    - Notifications
    - Agency Administrator Ignition Authorization
    - Test fire results
    - Smoke monitoring form
    - Weather/Fuels/Fire Behavior Observations
    - Post-burn report
    - Cost Analysis

- Universal:
    - CTR, SF-261 (Watch: How to correctly fill out a CTR)
    - Emergency Equipment Use Invoice (OF-286)
    - Emergency Equipment Shift Ticket (OF-297)
    - Incident Time Report (OF-288)
    - Incident Personnel Performance Rating (ICS 225 WF)
    - General Message (ICS 213)
    - Activity Log (ICS 214)
    - SAFECOM
    - SAFENET
    - Agency-specific forms
    - Injury forms

Following a Wildfire Declaration, Document the Incident, Including All Actions Prior to and After the Declaration.

When to start task: A prescribed fire is declared a wildfire.

Resources to complete task: *NWCG Standards for Prescribed Fire Planning and Implementation,* PMS 484, https://www.nwcg.gov/publications/484.

How to accomplish task:

- Establish a process with local fire managers, authorizing agents, and stake holders.
- Follow the process in the event of an escaped prescribed fire.

Demobilize

Brief Assigned Resources on Demobilization Procedures and Responsibilities.

Ensure Agency Demobilization Procedures and Work/Rest Driving Standards Are Followed.

During Transfer of Command Ensure Continuity of Operations, Exchange Critical Safety Information, Communicate Transfer of Authority Through Established Chain of Command.

Return Equipment and Supplies as Appropriate.

The *NWCG Incident Position Standards for Prescribed Fire Burn Boss Type 1 and 2* is developed and maintained by the Fuels Management Committee (FMC), an entity of the National Wildfire Coordinating Group (NWCG).

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