

CAL FIRE Prescribed Fire Guidebook



Prepared by the CAL FIRE Prescribed Fire Working Group

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1. Purpose

The intent of this guidebook is to inform CAL FIRE employees how the Department engages in prescribed fire (Rx fire) activities. Prescribed fire use is a key tool for the Department and its cooperators to use in reducing fuels at a landscape scale while improving ecosystem health in California. Prescribed fire helps the Department serve and safeguard the people, property, and resources of the State of California.

In California, there are several ways in which CAL FIRE may be involved in a prescribed burn. All of them can be categorized into three main processes. Through a Vegetation Management Program (VMP) project, via a cooperative burn project with other organizations, or with a CAL FIRE issued burn permit.

This guidebook documents the Vegetation Management Program requirements, processes and forms. In addition, it provides guidelines on how and where to apply the VMP process, addresses CEQA compliance, explains project documentation, and describes Unit, Region, and Headquarters functions.

It is important to know that CAL FIRE may be a participant in burns led by other organizations or individuals, but there are many factors that must be considered before doing so. These considerations will be described in this document.

It also documents CAL FIRE's prescribed fire permitting process. Landowners can conduct broadcast burning projects on their own lands, traditionally called Range Improvement Burns. To conduct a burn, the landowner or legal representative must apply for and obtain CAL FIRE Unit approval through a Project Type Burning Permit (LE-5 or LE-7). The Unit may also require the issuance of the companion form Minimum Precautions for Project Type Burning (LE-8).

2. Authority

This manual provides guidance for prescribed fire projects under the Vegetation Management Program (VMP) as authorized by California Public Resources Code (PRC) 4475-4483 and the prescribed fire permitting process (LE-5, LE-7 and LE-8) as authorized by PRC 4491-4494. There are also other relevant sections of the PRC: 4118, 4423, 4495, 4497-4497.2, 4500, and 4740-4741. See a link to all California laws in Appendix 2.

- PRC 4118:
https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=PRC§ionNum=4118
- PRC 4423:
https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=PRC§ionNum=4423
- PRC 4475-4483:
http://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=PRC&division=4.&title=&part=2.&chapter=7.&article=2.
- PRC 4491-4494:
http://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=PRC&division=4.&title=&part=2.&chapter=7.&article=3.
- PRC 4495:
http://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=PRC&division=4.&title=&part=2.&chapter=7.&article=4.&op_statues=2018&op_chapter=624&op_section=20
- PRC 4497-4497.2:
http://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=PRC&division=4.&title=&part=2.&chapter=7.&article=4.3.
- PRC 4500:
http://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=PRC&division=4.&title=&part=2.&chapter=7.&article=4.&op_statues=2018&op_chapter=634&op_section=1

- PRC 4740-4741:
http://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=PRC&division=4.&title=&part=2.&chapter=10.&article=8.

3. Background

Vegetation Management Program (VMP) – reference: VMP Handbook and Issuance

The VMP is a program that provides public and private landowners participation in wildland vegetation treatment projects on State Responsibility Area (SRA) lands with advice and assistance from CAL FIRE. Under the VMP, the primary tool used is prescribed fire, although in more recent years the Department has used the program for mechanical and hand treatments of vegetation as well. The Program has multiple objectives as defined by the PRC and the California Code of Regulations (CCR):

CCR Title 14, Division 1.5, Chapter 9.8:

[https://govt.westlaw.com/calregs/Browse/Home/California/CaliforniaCodeofRegulations?guid=IF12FCEA0D48311DEBC02831C6D6C108E&originationContext=documenttoc&transitionType=Default&contextData=\(sc.Default\)](https://govt.westlaw.com/calregs/Browse/Home/California/CaliforniaCodeofRegulations?guid=IF12FCEA0D48311DEBC02831C6D6C108E&originationContext=documenttoc&transitionType=Default&contextData=(sc.Default))

- Prevention of high-intensity wildland fires through reduction of the volume and continuity of wildland fuels.
- Watershed management.
- Range improvement including the control of noxious and invasive weeds.
- Vegetation management.
- Forest improvement.
- Wildlife habitat improvement.
- Maintain air quality.

VMP Program Goals (Board of Forestry and Fire Protection)

The over-arching goal of the VMP is to reduce the chance of large, damaging wildfires by reducing fire hazards on wildland in California. The Departments' intent is to realize the best 'mix' of natural resource benefits from these lands, consistent with environmental protection and landowner/steward objectives. This includes three broad goals, which encompass most of the objectives:

1. Reduction of conflagration fires.
2. Optimization of soil and water productivity.
3. Protection and improvement of intrinsic floral and faunal values.

Sub-Goals:

1. Reduce the number and intensity of large, damaging wildfires with corresponding savings of suppression costs.
2. Increase public safety.
3. Increase water quantity and maintain water quality from managed watersheds.
4. Decrease the potential for damage from flooding and siltation.
5. Protect and improve soil productivity, and decrease erosion over the long term.
6. Improve wildlife and fisheries habitat.
7. Improve oak woodlands through fire management and regeneration.
8. Establish and maintain desired plant communities.
9. Propagate rare or endangered species of plants, which are fire dependent.
10. Improve air quality over the long term.

11. Improve forage and browse for livestock.
12. Increase opportunities for recreation and improve scenic vistas.
13. Decrease the risk to firefighters and other responders during wildland fires.
14. Provide training opportunities for personnel in incident organization, operations, fire behavior, firing methods and effects of weather influences.

Non-VMP (permitting process)

Burn Permit:

The Department has two permits that are issued for landowners to conduct prescribed burns on non-federal land (LE-5 and LE-7).

- The California Inter-Agency Burn Permit (Form LE-5) is issued to State and local agencies wishing to conduct controlled burns. The permit can authorize the agency to burn piled material, small broadcast burns or burning in an incinerator. The permit is void when burning is prohibited and on no-burn days as determined by the local Air District.
- Project Type Burn Permit (Form LE-7, *shown on the right*) allows landowners to conduct controlled burns on burn days as determined by the local Air District when burning is not prohibited. This permit sets Minimum Precautions (Form LE-8) that must be taken by the permit holder to conduct the burn.

The permit holder retains liability for the burn and may be charged for suppression cost and damages caused to the property of others if a burn escapes and is declared a wildfire.

When these permits are issued, the Department provides advice and technical assistance to the permit holder. The issuance of a permit from the Department does not relieve the application from the need to obtain any other required permits or approvals from other agencies – such as those required by an Air District (See California Health and Safety Code 13055, 39011, 41801, 42311.2).

If the Department determines control of the fire has been lost or the fire has escaped containment lines, the incident may be considered a wildfire. If this occurs, the Department will respond, assume incident command, and use its own resources and mutual aid agreements for the express purpose of containing and controlling the fire. Costs may later be

STATE OF CALIFORNIA
DEPARTMENT OF FORESTRY AND FIRE PROTECTION
PROJECT TYPE BURNING PERMIT
(PUB. RES. CODE, ARTICLE 3, SECTIONS 4491, 4492, 4493 AND 4494)
LE-7 (REV. 11/04)

PT. PERMIT No. J

APPLICATION FOR PERMIT TO BURN

Dated _____ (Unit Hdqrs.) _____ (Telephone)

NAME _____ Telephone _____

Mailing Address _____

Is hereby permitted to burn _____ (Name kind of material to be burned)
on land at/their _____

located in _____ of Sec. _____, TWP. _____ R. _____, County of _____ State of California.

During the period _____ to _____, subject to the following terms:

<p>1. The PERMITTEE shall comply with all fire laws, ordinances, and regulations.</p> <p>2. The PERMITTEE shall notify the adjoining property owners and occupants of his/her intentions to burn and the date such burning will take place. This notice must be given not less than 2 days prior to the start of such burning, except that co-tenants having rights or facilities on or adjoining the PERMITTEE's property shall be notified not less than 15 days prior to the start of burning.</p> <p>3. This permit is valid only on those days which are not prohibited by the State Air Resources Board pursuant to Section 41855 of the Health and Safety Code of by the Local Air Pollution Control District. Prior to burning PERMITTEE will contact Local Air Pollution Control District at telephone number _____.</p> <p>4. This permit does not relieve the PERMITTEE from using reasonable and prudent care to prevent damage to the property of others or injury to persons as prescribed by law. In the event of negligence on the part of the holder of this permit, which results in escape of the fire that requires suppression action, the permit holder will be held liable for suppression costs.</p>	<p>5. The "MINIMUM PRECAUTIONS FOR PROJECT TYPE BURNING" dated _____ Are made a part of this permit.</p> <p>6. This permit is suspended during period shown above on all days for which the PREDICTED BURNING INDEX EXCEEDS _____ as determined at the Unit Hdqrs. And is suspended at all times of critical fire conditions as declared by the Director and posted at the Unit Hdqrs. Or by proclamation of the Governor pursuant to Sec. 4423.1, Pub. Res. Code. Such suspension does not extend the above dates for burning.</p> <p>7. Before burning, permittee will check with the forest fire station at _____ telephone _____ or issuing office of this permit at _____.</p> <p>8. Upon completion of the burning, the PERMITTEE shall notify the issuing agency (Item 7) immediately after the fire is extinguished and the last watchperson has been removed.</p>
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NOTE TO PERMITTEE: PLEASE READ THE REVERSE SIDE OF THIS FORM. IT CONTAINS INFORMATION ON THE LAWS AND RULES RELATING TO FIRE

I have read and understand the terms of this permit. _____ This permit issued _____ to _____
Signed _____ DIRECTOR OF THE DEPARTMENT OF FORESTRY AND FIRE PROTECTION

Mailing Address _____ By _____, Agent.
Telephone _____ Title _____

To be filled in when PERMITTEE notifies agency of burn and Predicted Burning Index does not exceed terms of permit. (See 6, above)

Predicted Burning Index at time of notification _____ SRA _____ LRA _____
(date) (date of suppression)

Agency notified by _____ that burning would be _____ Agency notified by _____ that burning
started at _____ A.M./P.M. on _____ (date) completed at _____ A.M./P.M. on _____ (date)

Rec'd. _____ A.M./P.M. on _____ (date) Rec'd. _____ (Emergency Command Center) on _____ (date)
by _____ (Emergency Command Center)

LE-7 (6/98) ORIGINAL TO PERMITTEE, DUPLICATE TO UNIT, TRIPLICATE TO LOCAL FILE

recovered from those responsible for the escaped burn per California Health and Safety Code Section 13009. See **Appendix 2** for how to find California Code Sections.

4. Training and Qualifications (Reference 4039 policy)

ROLES AND RESPONSIBILITIES

(Note: CAL FIRE Qualification is listed, with Federal Qualification in parentheses. CAL FIRE does not utilize all Qualifications listed, and some titles are unique to CAL FIRE).

Unit Chief or Designee (Agency Administrator)

The Unit Chief or Designee is ultimately responsible for the following:

- Assign the Prescribed Fire Incident Commander.
- Review and approve the final complexity rating.
- Ensures completion of prescribed fire plans, and understand the risks and benefits associated with it.
- Ensure only trained and qualified personnel participate in planning and conducting the prescribed fire.
- Ensure prescribed fire projects are entered in the Prescribed Fire Incident Reporting System (PFIRS).
- Ensure projects are monitored, evaluated, and documented in the project file.
- Discuss the conditions under which the prescribed fire is to be conducted with the Prescribed Fire Incident Commander and sign, date, and establish an implementation time-period.
- Ignition Authorization, Prescribed Fire Plan.
- Ensure coordination with neighbors, cooperators, and air quality regulators.
- Ensure all prescribed fires are conducted in accordance with the approved prescribed fire plan and established standards and guidelines.
- Ensure periodic reviews of the prescribed fire program are completed. Specify when the Unit Chief is to be notified that contingency actions are being taken.
- Report all wildfires resulting from prescribed fires through the chain of command.
- Provide for the timely declaration of prescribed fire as wildfire.
- Ensure prescribed fires declared as wildfires are reviewed using established guidelines.

Unit VMP Coordinator (Fire Program Manager or Fuels Program Manager)

The VMP Coordinator is responsible to the Unit Chief for the planning, implementing, and monitoring of the prescribed fire program in accordance with agency policy and direction. VMP Coordinator Responsibilities:

- Ensure compliance with national, regional, tribal and local fire policy and direction, as well as applicable state and local laws.
- Ensure an approved prescribed fire plan exists for each prescribed fire project.
- Ensure all prescribed fires are conducted in accordance with the approved prescribed fire plan and established standards and guidelines.
- Plan the prescribed fire program workload based on the budget and work plan.
- Ensure trained and qualified personnel are available to participate in the prescribed fire program.
- Ensure the unit can implement the project(s) and order additional resources as needed.
- Participate in prescribed fire to wildfire conversion declarations, if necessary and if responsibility is assigned in the plan.
- Act as liaison to the Unit Chief, and update them on the progress of prescribed fires as needed. May act as liaison to other agencies, news media, air quality authorities, transportation agencies and safety officials.

- Provide coordination, oversight and direction to the prescribed fire manager or Prescribed Fire Incident Commander (or both), dispatch office or other designated fire management personnel.
- Ensure projects are monitored, evaluated, and documented as a part of the project file.
- Ensure project accomplishments are reported through the local unit and comply with agency and local reporting requirements, such as CalMapper.

Region VMP Coordinator (Technical Reviewer)

The Region VMP Coordinator is responsible for reviewing each prescribed fire plan element for content as well as evaluating the risk and complexity analysis to ensure that the goals and objectives can be safely and successfully achieved. Region VMP Coordinators responsibilities:

- Ensure the complexity analysis accurately represents the project, so the Region Chief understands the risks to identified values and ensures adequate mitigation is provided in the prescribed fire plan to justify the pre-risk and post risk ratings.
- Check the prescription parameters by fuel types to ensure that the project, as planned, has a reasonable chance or realistic opportunity of meeting the resource management objectives.
- Ensure the fire behavior calculations or prescription parameters are appropriate and within the acceptable range (or both).

Prescribed Fire Incident Commander (Burn Boss)

The Prescribed Fire Incident Commander (RXB1/RXB3/RXB3 Trainee) is responsible for implementing the prescribed fire plan. Prescribed Fire Incident Commander responsibilities:

- Review the prescribed fire plan and/or IAP prior to implementation and ensure all required elements and objectives are addressed, and have a good understanding of the complexity determination.
- Inspect the prescribed fire project area and or ignition unit(s) to validate prescribed fire plan elements including location of identified values and areas of special concern as well ensuring that holding/contingency plans adequately address expected fire behavior outside the unit(s).
- Obtain current weather and smoke management forecasts, updates and special advisories from a meteorologist.
- Ensure pre-burn considerations and monitoring is completed.
- Maintain communication with the Unit Duty Chief, VMP Coordinator, and Emergency Command Center (ECC).
- Utilize Prescribed Fire Plan to create Incident Action Plan (IAP).
- Complete and sign the Prescribed Fire Go/No-Go Checklist.
- Ensure availability of contingency resources and or capabilities within maximum acceptable response times, if complexity dictates.
- Ensure all operations are conducted in a safe manner and in accordance with the approved plan and established standards and guidelines, ensuring that the safety and welfare of all assigned personnel and public is maintained.
- Verify qualifications of all assigned personnel.
- Ensure all assigned personnel are briefed at the beginning of each operational period and any new personnel arriving to the prescribed fire receive a briefing prior to engaging.
- Conduct the test fire and document the results.
- Supervise assigned personnel and direct the ignition, holding and monitoring operations.



- Responsible for implementation including mop up and patrol unless otherwise assigned to other qualified personnel.
- Manage or delegate responsibility for the management of any “incident within the incident.”
- Determine when the prescribed fire is not within prescription parameters (both short- and long-term) or is not meeting prescribed fire plan objectives.
- Ensure reporting is completed.
- Coordinate with adjacent landowners, cooperators and permit holders as designated in the prescribed fire plan. Ensure adjacent landowners and other notifications are made and are documented, prior to ignition as designated in the prescribed fire plan.
- Ensure necessary agreements are in place.
- Ensure the ignition, holding and contingency plans are consistent with the predicted fire behavior and fuel types inside and outside the planned ignition unit(s).

- Conduct informal After Action Review (AAR) after each operational period.

Firing Group Supervisor (Firing Boss)

The Firing Group Supervisor reports to the Prescribed Fire Incident Commander or assigned level of organization identified in the plan, and is responsible for supervising and directing ground or aerial ignition operations per standards in the prescribed fire plan (or both). Firing Group Supervisor responsibilities:

- Review the prescribed fire plan and inspect the ignition unit prior to implementation.
- Provide input to Prescribed Fire Incident Commander prior to finalizing the Go/No-Go Checklist
- Brief personnel on project objectives and ignition operations.
- Complete the test fire per the ignition plan at the direction of the Prescribed Fire Incident Commander
- Conduct ignition operations in a safe manner per the ignition plan.
- Identify the impacts of ignition on the control and desired fire effects.
- Coordinate ignition operations with the holding operations.
- Firing Group Supervisor is not a mandatory position for prescribed fires. Ignition operations and responsibilities may be managed by personnel qualified at the appropriate ICS wildland fire operations standard and as required by the prescribed fire complexity, assigned resources, and operational span-of-control.
- For some prescribed fires, the ignition responsibilities are assumed by the Prescribed Fire Incident Commander.



Holding Group Supervisor (Holding Function)

The supervisory position in charge of the holding forces reports to the Prescribed Fire Incident Commander or assigned level of organization identified in the plan. Holding functions will be managed by personnel

qualified at the appropriate ICS wildland fire operations standard and as required by the prescribed fire complexity, assigned resources, and operational span-of-control. The position is assigned by name and qualifications using Issuance Section 4039 position codes. Holding function responsibilities:

- Review the IAP and inspect the ignition unit prior to implementation.
- Provide input to the Incident Commander prior to finalizing the Go/No-Go Checklist.
- Brief holding personnel on project objectives and holding operations including identification of special features to be protected as identified in the prescribed fire complexity analysis and prescribed fire plan.
- Conduct holding operations in a safe manner per the holding plan.
- Coordinate holding operations with the ignition operations.
- Confine the fire to a predetermined area, and oversee mop up and patrol.
- Maintain communication with assigned supervisor and adjacent resources regarding holding progress and problems.

Fire Effects Monitor (Federal Qualification only, not utilized on most CAL FIRE projects)

The fire effects monitor (FEMO) is responsible for collecting the on-site weather, fire behavior and fire effects information needed to assess whether the fire is achieving established resource management objectives. Fire effects monitor responsibilities:

- Review the monitoring plan prior to implementation.
- Monitor, obtain and record weather data.
- Monitor and record fire behavior data throughout the burn operations.
- Reconnoiter the ignition unit or area assigned (or both).
- Plot the burned area and final perimeter on a map.
- Monitor and record smoke management information.
- Monitor and record first-order fire effects.
- Provide monitoring summary of the fire.
- Provide fire behavior and weather information to prescribed fire personnel as appropriate.

Resource Specialist (Federal Qualification only, on most CAL FIRE projects done by Resource Management Staff in VMP)

The resource specialist is responsible for ensuring the prescribed fire project is planned in a manner supporting the unit's resource management goals and objectives. Resource specialist responsibilities:

- Provide resource management representation in the preparation of the prescribed fire plan.
- Review prescribed fire plan including the values identified in the complexity analysis before each plan is submitted for approval.
- Evaluate the prescribed fire project in terms of meeting identified resource objectives.

Resource Advisor (Federal Qualification only, on most CAL FIRE projects done by Resource Management Staff in VMP)

If the prescribed fire plan identifies use of a Resource Advisor (READ), the position is responsible for ensuring the prescribed fire project is implemented in a manner supporting the unit's resource management goals and objectives. The READ is responsible to the agency administrator or tribal administrator. Resource advisor responsibilities:

- Evaluate the prescribed fire project in terms of understanding the values identified in the complexity analysis and meeting identified resource objectives.
- Provide resource information to the prescribed fire burn boss.
- Present information at briefings on the values identified in the complexity analysis, resources, priorities and issues of concern.
- Coordinate with adjacent landowners, cooperators and permit holders as designated in the prescribed fire plan or by the burn boss.

Specialized Positions

In addition to the positions previously discussed, other specialized positions may be used in prescribed fire planning and or implementation depending on the scale and complexity of the project. If these positions are used in implementation, the prescribed fire plan should identify where the position fits within the prescribed fire organization, and what their roles and responsibilities are going to be.

5. Operational Complexity Analysis for Prescribed Fire Implementation (See also NWCG PMS 424)

This will be completed in conjunction with the initial FC 400.

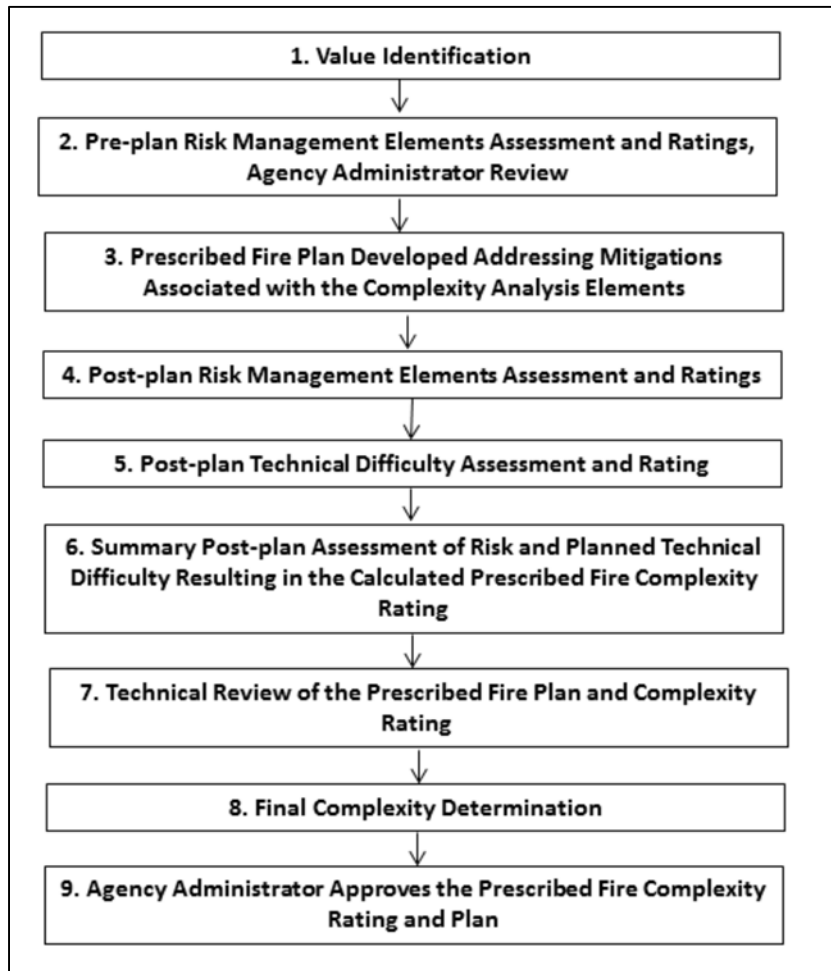
The term complexity is generally used to characterize something with many parts where those parts interact with each other in multiple ways. In the context of the prescribed fire complexity analysis, complexity refers to the interconnectedness and dependence of the individual elements as they relate to the planning and implementation of the prescribed fire.

The complexity analysis process for prescribed fire continues to evolve. Originally, it was designed to assist personnel in determining relative complexity and determination of qualification. This process has been redesigned as a tool that identifies and characterizes risk to identified values and the technical difficulty or complexity of the 'work' involved to mitigate impacts to them. Assessing the risk a prescribed fire poses to identified values consists of estimating the probability and severity of adverse impacts. The Complexity Analysis process provides help with:

1. Value Identification.
2. Assessment of Risks to the Values.
3. Assessment of Technical Difficulty in mitigating the Risk to Values.
4. A Final Complexity Determination that identifies the minimum required Prescribed Fire Incident Commander qualification level.

The complexity analysis is developed by considering risks and incorporating any mitigation actions into the appropriate sections of the prescribed fire plan. Once the prescribed fire plan is near completion, the final operational complexity analysis and rating is determined through review by the Unit Chief and the Region VMP Coordinator. The final complexity rating, which acknowledges any remaining risk and mitigations to be undertaken, will be used as the basis for determining the prescribed fire organizational structure and type of Prescribed Fire Incident Commander required to successfully implement the prescribed fire plan.

The complexity of a prescribed fire can be determined through a process as depicted in the chart below:



Determining the complexity of a prescribed fire starts with understanding the on-site, off-site, and public and political values associated with the prescribed fire. Values are natural resources, humans and their developments, and public and political (including cultural) features that have inherent worth (significance). The environmental analysis and or land management plans, documents, inventories, site visits and interdisciplinary team input provide the information necessary to identify valuable features, their significance and susceptibility to negative impacts from the prescribed fire.

Values may not be equal in significance. A project may have one significant value with considerable social and political ramifications if impacted by the prescribed fire. Another project may have many values associated with it with less significance and fewer ramifications if impacted. Identifying the number and significance of values provides the foundation for identifying and mitigating the risks to the values during the planning process.

A review of the risk elements and their associated descriptors prior to a project site visit may assist with verifying the values and subsequently assessing the risk to them. The values typically do not change through the complexity assessment process unless that value is physically removed from the project area or area of impact.

6. Safety (see also NWCG and Handbook 1700)

Every person involved in a prescribed fire is responsible for identifying safety issues and concerns. It is the responsibility of individuals participating in prescribed fire activities to notify their immediate supervisor of any possible misunderstanding of assigned tasks or safety concerns related to the assignment. Use a designated safety officer on high complexity prescribed fires and others where the complexity or other risk analysis shows a need.

Safety Hazards and Mitigation

Provisions for public and personnel safety must be identified in the Incident Action Plan (IAP). All personnel who are within the active prescribed fire area are required to wear all personal protective equipment. The plan needs to identify and analyze the safety hazards unique to the individual prescribed fire project and specify personnel safety and emergency procedures. It must include safety hazards (including smoke exposure, smoke on roads, and other impacts) and measures taken to reduce those hazards. An Incident Action Plan Safety Analysis (ICS 215A) is required for each prescribed fire. The purpose of the ICS 215A is to aid in completing a risk assessment to prioritize hazards, safety, and health issues, and to develop appropriate controls. This worksheet addresses challenges, is best utilized in the planning phase and for briefings.



Emergency Medical Procedures, Emergency Evacuation Methods, and Emergency Facilities

The emergency medical procedures and evacuation methods discussion should address stabilization and transport of accident victim(s). Identification of medical evacuation options, clarification of local, county, state, or federal resource capabilities, ordering procedures, role of dispatch centers, and key contacts or liaisons should be included. Incorporate a Medical Plan (ICS 206) that includes emergency medical and injury reporting procedures into the prescribed fire plan. An ICS 206 is required for each prescribed fire.

7. Risk Management

Risk is the likelihood of hazardous consequences in terms of severity or probability. Sound risk management is a foundation for all fire management activities. Risks and uncertainties relating to fire management activities must be understood, analyzed, communicated, and managed as they relate to the cost of either doing or not doing an activity.

Prescribed fires present an inherent level of risk. Risk is at all levels, from decision-makers to on-the-ground fire-fighters and the public. The overall prescribed fire planning process includes a risk assessment, and reflects an understanding of the interaction of objectives and implementation limitations for the project.

Prescribed fire should be assessed in terms of values that could be impacted, how severe the threat may be, and the likelihood of undesirable effects. Actions should be developed to minimize or eliminate threats and manage risk. Risk management is the process whereby management decisions are made and actions taken concerning control of hazards and acceptance of remaining risk. The risk management process identified in the Incident Response Pocket Guide, PMS 461 (National Wildfire Coordinating Group, 2010), helps identify, evaluate and mitigate time-sensitive risks and hazards associated with prescribed fire.

Risk management consists of mitigation strategies and implementation activities to improve outcomes and minimize negative consequences. For prescribed fire, the risk assessment is accomplished by completing an analysis process that identifies, analyzes and characterizes the potential hazards, threats, causes and consequences. The analysis process identifies critical items, mitigation measures, and implementation actions to be addressed in the prescribed fire plan and will acknowledge any remaining unmitigated risk in the final rating.

During the implementation phase of prescribed fires, personnel may encounter uncertain and dynamic conditions,



where they must continuously evaluate risks with an eye towards maintaining a safe working environment, meeting the prescribed fire objectives (on time, within budget and with available resources) and addressing social and political concerns.

The risk management process identified in the *Incident Response Pocket Guide, PMS 461 (National Wildfire Coordinating Group, 2010)*, helps identify, evaluate and mitigate time-sensitive risks and hazards associated with prescribed fire.

Include a Prescribed Fire IIPP-2, IIPP-3 (Code of Safe Practices), and IIPP-6 (Employee Training Sign-up Sheet) into the documentation package.

8. Liability

Liability is defined in the Cambridge Dictionary as: “*Responsibility that someone has for their actions, for example the responsibility to pay another person for harm or damage that is a result of these actions*”. This is a point of concern when it comes to prescribed fire, especially when more than one entity is involved in planning and implementation of a project. Given that CAL FIRE participates in many such projects, the following applies to keep CAL FIRE’s level of liability at acceptable levels:

Burn Permit = No CAL FIRE participation operationally. Standby resources only if feasible (Public Resources Code 4491 (c)). CAL FIRE accepts no liability.

Cooperative burns = The level of participation determines the level of shared liability. REQUIRES an agreement (RM 75 or CAL FIRE 719 in limited cases) (pursuant to PRC 4475) with CAL FIRE. See the process table below to determine an initial project liability ranking:

CAL FIRE has determined a process for assessing and scoring how much liability CAL FIRE is willing to accept for cooperative prescribed fire projects. There is a table on the next page with instructions. The table is an image of the Excel spreadsheet that was developed and is available for use on the CAL FIRE Intranet.

CAL FIRE Prescribed Fire Project Liability Ranking Process						
Follow steps 1 through 5 below to determine the CAL FIRE share of the liability for the project.						
STEP	CAL FIRE Involvement Value (up to 6 total cumulative)		CAL FIRE Rx Fire Project Complexity Analysis			
1	Planning only	1	Criteria	Scale	Score	Project Related Comments
	Operational*	2	Assets at Risk	0-8		
	Burn Boss	3	Escape Potential	0-5		
	SCORE (1-6)		Equipment/Personnel Needs	0-8		
2	Complexity Analysis Value^		Burn Duration	0-3		
	Low (0-25)	1	Fire Behavior	0-5		
	Medium (25-45)	3	Watershed Values	0-3		
	High (45-60)	6	Habitat Values	0-3		
	SCORE (1-6)		Post Fire Effects	0-5		
			Air Quality	0-5		
			Safety Concerns	0-5		
			Cooperators/Stakeholders	0-5		
3	FRAP Fire Hazard Severity Value# (up to 6 total)		Community Support	0-5		
	Low	1	Total Score (60 possible)			
	Moderate	3				
	High	5	Use the above complexity analysis worksheet to obtain a score that can be used in the box for step 2 to determine the complexity analysis value.			
	Very high	6				
4	CAL FIRE Unit Priority Value					
	Low	1	CAL FIRE Liability Determination			
	Medium	3	Value Total	Liability Share		
	High	6	4-11	25%		
5	SCORE (1-6)		12-15	50%		
	Value Total (4-24)		16-19	75%		
	Add steps 1 - 4.		20-24	100%		

* = operational involvement requires A-Rep
^ = uses CAL FIRE Rx Fire Complexity Analysis
= Fire hazard severity based on FRAP classification.

Instructions: The worksheet shown above is available as an MS Excel file. It should be filled in and kept for each project. CAL FIRE Legal must review liability determinations before projects are implemented. The Director may use his/her discretion to accept more or less liability on any project. Note the Steps listed on the left of the spreadsheet.

- For Step 1, the score should indicate the cumulative total of the three levels of involvement by CAL FIRE. For example, if CAL FIRE will only be involved in planning and will provide some holding resources, the total would be 3.
- For Step 2, the user will use the complexity analysis table. See the project complexity analysis in the table below with instructions in the chart that follows it.
- For Step 3, the user will note what FRAP Fire Hazard Severity Zone much of the project falls into (see: <http://frap.fire.ca.gov/projects/hazard/fhz>). The corresponding score from the table will be assigned.
- For Step 4, the local CAL FIRE Unit Chief or designee will assign the priority score as he/she sees fit using local knowledge and expertise.
- Step 5 totals the scores in the other 4 steps and uses the “CAL FIRE Liability Determination” table to assign the acceptable CAL FIRE share of liability for the project.

It is important to note that CAL FIRE Legal may review agreements and over-ride the liability determination if they find that there are other circumstances that need to be considered, or that the liability analysis should be redone.

Below is the table CAL FIRE utilizes for cooperative prescribed fire project complexity analysis as it relates to liability. Some criteria are weighted differently than others. This is by design. Primarily, this is due to two factors:

- 1) CAL FIRE has different objectives than other agencies, as set out in law and policy, and
- 2) CAL FIRE rarely is burning on property it is the owner/manager of.

For cooperative burns, a preliminary complexity analysis rating is required early in the prescribed fire plan development process to determine how much liability CAL FIRE is willing to accept for a project. The preliminary complexity analysis encourages early line officer engagement in the identification of values and the assessment of prescribed fire implementation risk to those values. It will help identify potential concerns that may be mitigated during the prescribed fire plan preparation. Local knowledge and judgment are important components of the preliminary complexity analysis.

Within the larger table, is the following project complexity analysis table that bears its own instructions (in the chart below it):

CAL FIRE Rx Fire Project Complexity Analysis			
Criteria	Scale	Score	Project Related Comments
Assets at Risk	0-8		
Escape Potential	0-5		
Equipment/Personnel Needs	0-8		
Burn Duration	0-3		
Fire Behavior	0-5		
Watershed Values	0-3		
Habitat Values	0-3		
Post Fire Effects	0-5		
Air Quality	0-5		
Safety Concerns	0-5		
Cooperators/Stakeholders	0-5		
Social Factors	0-5		
Total Score (60 possible)			

See the chart below for descriptions of each criteria.

Complexity Analysis Value	Scale	Description
Assets at Risk	0-8	0 = No assets at risk, 4 = Some assets at risk like power lines or other infrastructure, 8 = Houses and community near the burn area.
Escape Potential/Technical Difficulty	0-5	0 = No Escape Potential, 3 = Moderate escape potential, topography issues, weather or control lines. 5=High escape potential, such erratic weather or poor control lines.
Equipment/Personnel Needs	0-8	0 = No Equipment/Personnel Needs, 5 = Moderate equipment/personnel needs, diverse topography or multiple control lines. 8=High equipment/personnel needs, large diverse and complex project area with many resources required for a successful burn.

Burn Duration	0-3	The length of time (hours, days or weeks) that active ignition, fire spread and primary holding operations (critical holding points are secure, transitioning to mop- up and patrol etc.) are expected to occur to fully implement the prescribed fire. 0 = less than one day, 1 = one full day, 2 = between one and three days, 3 = more than three days.
Fire Behavior	0-5	0-1 =Fire behavior is going to be on the low side of the target prescription, 2-3 = On target prescription, 4-5 = On the upper end of the target prescription.
Watershed Values	0-3	Is it an impacted watershed or not?
Habitat Values	0-3	Especially for species of concern (listed, threatened, endangered, etc.). Should be based on a CNDDDB search to see if the area has occurrences of such species.
Post Fire Effects	0-5	Are harmful effects of wildfire present? May consider if a WERT or equivalent was deployed in the area in the past 10 years.
Air Quality	0-5	Air basin impacts, if the air basin is a impacted already for pollutants or not.
Safety Concerns	0-5	Overarching concerns specific to the project.
Cooperators/Stakeholders	0-5	Based on previous project successes.
Community Support	0-5	Critical need for vulnerable communities.

9. Live Fire Use Approval/Notification (reference CAL FIRE 8181 Policy)

It is important to be deliberative and certain in operational decision making about prescribed fire projects. This is especially true of any projects involving cooperators or that may have shared liability. The NWCG PMS 484 document also has excellent information on decision making in regards to prescribed fire. It is recommended that all CAL FIRE practitioners review that publication.

CAL FIRE has two forms that are necessary to document the deliberative process and are also helpful reminders of what to consider. They are the “FC-400” and the “Go/No-Go Checklist”. They are presented on the next two pages.

A broadcast burn is a prescribed fire allowed to burn over a designated area within well-defined boundaries to achieve land management objectives.

Live fire use may impact operational and management decisions due to potential fire behavior, availability of resources, commitments to training, instructional or media value, the visibility of smoke, and interest generated by highly visible activity. Communications between the Units and Region regarding burn projects is vital.

Each Unit will have a planning, review, and approval process. For Unit approved projects, the Unit will decide if conditions are appropriate to proceed then notify the Region Duty Officer.

- An Incident Action Plan (IAP) will be prepared for each project.
- For projects requiring Region approval or notification, the Live Fire Use – Approval/Notification Form (FC-400) will be used as well as a vicinity map attached for reference.
- Notification: A project requiring Unit Duty Chief approval only. The Unit informs Region by forwarding the FC-400

Request Approval: A project requiring both Unit Duty Chief and Region Duty Chief approval. The Unit has reviewed the project and forwarded to Region for approval through the FC-400. The FC-400 shall be submitted at least 48 hours prior to the proposed date of the burn to request Region approval and documentation of the decision. When requesting a burn authorization with less than 48-hour notice, the Unit Duty Chief will contact the Region

Duty Chief for authorization. See an image of the FC-400 form on the next page.

To track broadcast burning for vegetation management, hazard reduction, and training in State Responsibility Areas (SRA), the Live Fire and Aircraft Use Calendars will be used. The Region Duty Officer will maintain the Live Fire and Aircraft Use Calendar.

STATE OF CALIFORNIA
 DEPARTMENT OF FORESTRY AND FIRE PROTECTION
LIVE FIRE USE – APPROVAL/NOTIFICATION FORM
 FC-400 (New 4/08)

APPROVED
 DENIED
 BY: _____
 DATE: _____
 TIME: _____
 CONFIRMED WITH: _____
 UNIT REGION CALENDAR

TO: Duty Officer, Region Command Center
 FROM: _____ Unit

Notification Request Approval

1. Project Name: _____ Incident Number _____
2. Report Status: Initial Update/Revision Cancellation Other _____
3. Project Type: Training Hazard Reduction
 Fuel Management VMP LE 5/7 Assist _____
- Protection: SRA LRA FRA Comment: _____
- Fuel Type: _____ Size: _____
4. Location: _____
5. Description of Area: _____
6. Target Start Date(s): _____ Time: _____
7. Expected Release Date of Resources: _____
8. Contact Person: _____
 Phone Number(s) _____
9. Cooperating Agencies: _____
10. Requested Resources by Agency: (SR = Single Resource ST = Strike Team)


Resource	CAL FIRE (with Unit ID)	Other (Indicate Dept. or Agency)
Engines:		
Dozers:		
Crews:		
Helicopter:		
Helicopter Service Unit:		
Water Tender:		
Overhead:		
Other:		

Submitted by	Title	Date	Time
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ATTACH VICINITY MAP

Go/No-Go Checklist

A prescribed fire should never begin prior to the Prescribed Fire Incident Commander completing a Go/No-Go Checklist. All the steps indicated in the checklist should be strictly adhered to prior to any ignition. See below:



LIVE FIRE USE - GO/NO GO CHECKLIST (8100)

PROJECT NAME: _____ PROJECT NUMBER: _____

YES NO

1. Current conditions are within minimum/maximum prescription criteria

Burn Block #	ACCEPTABLE FIRE BEHAVIOR RANGE		
	MIN	Observed	MAX
Time:			
Wind Direction			
Wind Speed			
Relative Humidity %			
Live Fuel %			
Probability of ignition (%)			
Other			

2. Spot forecast(s) have been received and reviewed. No adverse weather conditions or changes are expected.

3. Applicable permits have been issued and the project complies with all requirements of the permits.

4. Personnel and equipment required in the IAP are in position.

5. All personnel have been briefed on the IAP.

6. Backup and support resources are available in strength needed to contain escapes within the burning period.

7. Notifications have been made.

- Adjacent landowner(s)
- News Media
- Unit ECC and Region Duty Chief
- Lookouts and Air Attack Bases (summer only)
- A.P.C.D. or A.Q.M.D
- Other: _____

8. Is a test burn required? If yes, go to #9. If no, go to #10

9. A test plot has been burned satisfactorily

10. Has a "NO" box been checked (other than #8)?
 IF "NO" **BEGIN PRESCRIBED FIRE OPERATION**
 IF "YES" GO TO #11

11. Can the plan be modified or action taken to rectify the situation?
 IF "NO" **DO NOT BURN**
 IF "YES" Describe plan change and/or action taken: _____

12. Did the Unit Chief (or Duty Chief) approve the changes?
 Method of contact: Radio Phone Personal Contact

Burn Boss Signature: _____

Date: _____ Time: _____

ADVISE UNIT ECC OF DECISION WHEN CHECKLIST IS COMPLETE
 BURN BOSS TO RETAIN CHECKLIST FOR RECORDS

10. Burn Plans (Prescribed Fire Plans)

This section will provide common language and unified direction or guidance to describe what is minimally acceptable documentation for prescribed fire planning and implementation. Units may choose to provide more restrictive standards and policy direction, but must adhere to these minimums as they relate to the development of prescribed burn plans.

Prescribed fire projects can only be implemented through an approved prescribed fire burn plan. Thorough planning and review processes must be conducted.

In general terms, the burn plan will provide a description of the burn area, target weather conditions, hazards that may be encountered, personnel needs, safety, and contacts to make prior to burning. The purpose of the burn will be addressed along with short and long term management goals. For example, the purpose of the burn may be to have a relatively patchy burn with a short-term goal of stimulating plant growth and a long-term goal to improve wildlife habitat.



Need

Fire is an essential ecological process in fire-dependent ecosystems. In large areas of the state, fire exclusion from these ecosystems has led to forests, woodlands and rangelands unable to withstand normal droughts, insect outbreaks or wildfires. These areas are at risk of intense, severe wildfires that threaten communities and cause significant damage to key ecological components. As one tool of fire management, prescribed fire is used to alter, maintain, or restore vegetative communities; achieve desired resource conditions; and to protect life, property, and values that would be degraded or destroyed by wildfire.

The first step to a successful prescribed burn is a unit-by-unit evaluation of the area under consideration. Determine the needs of each area and what actions should be taken to meet these needs. Prescribed fire as well as other alternatives should be addressed here and a decision reached regarding the preferred treatment. Prescription burning is a highly technical job requiring knowledge of fire behavior, suppression techniques, and environmental effects of fire. Well in advance of the burning season, scout areas that may need a fire treatment and choose those to burn. Over-plan the number of acres to be burned by 10 to 25 percent so substitutions can be made if necessary, and so additional areas can be burned if favorable weather continues. If several blocks are to burn, set priorities. Specifically designate any planned burns that require exacting weather conditions. Considerations include heavy fuels, small trees, potential smoke problems, etc. If an area might cause a spotting problem, plan to burn the surrounding area first.

A written prescribed burn plan must be completed before every prescribed burn, including those conducted by contractors and cooperators. This field document sets forth the details for conducting a burn treatment at a specific location. It must provide reasonable assurance that the prescribed burn will be confined to the predetermined area and conducted in a manner that will accomplish the land management objectives. It is required for all burns.

Elements

The Prescribed Fire Plan is the site-specific implementation document. A written burn plan should be prepared by a knowledgeable person. The following are discussions of each individual element required as part of a complete prescribed burn plan and the implementation procedures related to the element. Each element must be addressed and then assembled in the sequence identified in the template provided below. Should an element not apply to a specific prescribed fire plan, not applicable (N/A) may be utilized.

If cooperators use a different format for their plans, that may be acceptable if all of the necessary elements are included.

CAL FIRE Burn Plan Template

(see VMP Handbook: <http://calfireweb/organization/resourcemanagement/VegetationManagement/>)

11. Contingency:

The contingency plan is the portion of the prescribed fire plan that considers low probability but high consequence events and the actions needed to mitigate them. 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 when something unplanned occurs. 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, “incidents within incidents” and other unanticipated events.

Contingency needs should be based on the tactics to mitigate events or impacts to prescribed fire objectives or the 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. Once a contingency resource is committed to a specific wildland fire action (wildfire or prescribed fire), it can no longer be considered a contingency resource for another prescribed fire project and a suitable replacement contingency resource must be identified or the ignition secured.

12. Environmental Review

Environmental Review Report Form (ERRF):

The ERRF is a report form intended for use by California Department of Forestry and Fire Protection staff to document a limited environmental impact analysis supporting the filing of a California Environmental Quality Act (CEQA) notice of exemption document for a proposed CAL FIRE project. Although the project appears to fit within the descriptions for allowable categorical exemptions, this report presents CAL FIRE’s review for possible exceptions that would preclude finding the project to be categorically exempt as discussed in CEQA Guidelines Section 15300.2. This report will be filed with the CEQA administrative record for this project to document the environmental impact analysis conducted by CAL FIRE. The Environmental Review Report Form (ERRF) can be found at:

<http://calfireweb/organization/resourcemanagement/EnvironmentalProtection/envdoctemplates.shtml>.

Consultations

Prescribed Fire projects require consultation with responsible agencies and trustee agencies which may be affected by the project within their area of responsibility. At a minimum, consultation should occur with the California Department of Fish and Wildlife and the local Air District for all prescribed fire projects. It is also suggested that if there are other fire protection agencies responsible for the area to be burned, that they be notified of the project and consulted. There is

no set procedure for consultation and the contact can take any reasonable form (eg. letter, phone call, email), however, the consultation must be documented.

Smoke Management/Air Quality

Smoke Management Plan:

Identify smoke sensitive receptors, including population centers, recreation areas, hospitals, airports, transportation corridors, schools, non-attainment areas, Class I areas, and restricted areas that may be impacted. Include any modeling outputs and mitigation strategies and techniques to reduce the impacts of smoke production. The local Air Pollution Control District or Air Quality Management District must be contacted to determine local requirements. A Smoke Management Plan must be submitted that complies with the local air district requirements. Many of the Air Districts require the use of the Prescribed Fire Information



Reporting System (PFIRS). CAL FIRE requires all prescribed fire projects it is involved with to be entered in PFIRS. All CAL FIRE prescribed burns must comply with the local air district requirements and the Department cannot initiate a prescribed fire on an Air District declared no-burn day unless a variance has been granted by the Air District.

CEQA Compliance

All non-emergency activities that the department participates in which could have an impact on the environment must comply with CEQA. CEQA compliance can take the form of a Notice of Exemption (NOE), Negative Declaration (ND), Mitigated Negative Declaration (MND) or an Environmental Impact Report (EIR).

Projects which are in brushlands, oak woodlands or grasslands generally achieve CEQA compliance under the existing Chaparral Management Program EIR through the filling out of the VMP environmental checklist. In CEQA terms, the VMP environmental checklist is essentially an “Initial Study”. If the checklist reveals no significant adverse impacts resulting from the project, then the project complies with the Chaparral Management Program Environmental Impact Report (PEIR). If the project could create environmental impacts that have not been addressed or that cannot be avoided using measures from this “checklist”, CEQA requires the Department to do a supplemental environmental analysis (generally a Negative Declaration or Mitigated Negative Declaration) and public review through the State Clearinghouse. Supplemental environmental analysis is required when working on State Park land, on the valley floor of the Central Valley, or under burning timber stands that do not have a significant brush component.

The VMP environmental checklist can be found at:

<http://calfireweb/organization/resourcemanagement/VegetationManagement/>.

From the CCRs: Reference sections 1569 – 1569.6 for VMP projects. See *Appendix 2* for link.

13. Reporting

CalMAPPER: Wildfire Objective in Cal Mapper. All projects with CAL FIRE involvement must be entered in CalMAPPER per the *CalMAPPER User Guide*. See <http://calfireweb/applications/calmapper/>.

Situation Reporting:

- Fire name, location, map orientation, other incidents in area
- Terrain influences
- Fuel type and conditions
- Fire weather (previous, current, and expected)
 - Winds, RH, temperature, etc.
- Fire behavior (previous, current, and expected)
- Time of day, alignment of slope and wind, etc.
- Mission/Execution
- Command Incident Commander/immediate supervisor
- Leader's intent
- Overall objectives/strategy
- Specific tactical assignments
- Contingency plans
- Medevac plan: Personnel, equipment, transport options, contingency plans
- Communications
 - Communication plan Tactical, command, air-to-ground frequencies Cell phone numbers
- Service/Support
- Other resources Working adjacent and those available to order Aviation operations
- Logistics Transportation Supplies and equipment Risk Management
- Identify known hazards and risks
- Identify control measures to mitigate hazards/reduce risk o Include LCES
- Identify decision points for reevaluating operations
- Questions or Concerns



Financial Reporting:

This type of reporting may be different depending upon the level of CAL FIRE involvement in the project, what the funding source of the project is, what agency is funding the project, and potentially other reasons. What is important is that CAL FIRE's costs always be tracked so that they can be reported when needed. It is unlikely that there is a scenario where CAL FIRE costs do not need to be tracked. Cooperator costs may or may not need to be tracked or reported – it will depend on some of the factors listed above. One available common format for cost tracking comes from the CAL FIRE Vegetation Management Program (VMP). See below:

VMP Cost Analysis/Liability Spreadsheet (see VMP Section 2 Spreadsheet on CAL FIRE intranet VMP page:)

	Exhibit II.1			
VMP NUMBER:	0		DATE:	0
PROJECT NAME:	0			
VMP Event Name:	0			
Section 2: PRESCRIBED BURN PLAN				
PROJECT COST SUMMARY				
1. APPORTIONMENT OF Public/Private Benefit				
	<u>Category</u>		<u>Public Benefit</u>	<u>Private Benefit</u>
	A. Fire Hazard Reduction		0	0
	B. Water Yield		0	0
	C. Watershed Stabilization with Respect to Large Fires		0	0
	D. Wildlife Habitat Improvement		0	0
	E. Fisheries Habitat Improvement		0	0
	F. Air Quality Protection/improvement		2	1
	G. Range Forage Improvement		0	0
	Field Score Totals:		2	1
Maximum CAL FIRE, Minimum Private Share Percents:				
CAL FIRE NO LONGER REQUIRES A COST SHARE FOR THE COOPERATORS			66.67%	33.33%
2. COST SUMMARY				
			<u>CAL FIRE</u>	<u>Cooperator</u>
	A. PERSONNEL		\$0.00	\$0.00
	B. EQUIPMENT		\$0.00	\$0.00
	C. SUPPLIES		\$0.00	\$0.00
	D. CASH		\$0.00	\$0.00
	Sub-Totals \$		\$0.00	\$0.00
% No longer Required for CAL FIRE Projects.			#DIV/0!	#DIV/0!
TOTAL ESTIMATED PROJECT COST:			\$0.00	

CAL FIRE staff should always verify any reporting requirements of the cooperating agencies, the funding source or sources for the project, and any reporting requirements instituted by the Governor or Legislature as they determine how to gather financial information and report on it.

After Action Reporting: (See *Appendix 1* below): AAR is a template for incidents, but can be adapted to prescribed fires.

1. Type of incident
2. Level of response or complexity
3. Success and challenges
4. Completion report

14. Prescribed Fire Effects Monitoring

Background

Monitoring is an important element of prescribed fire planning and implementation, allowing agencies and practitioners to document basic information about fires, detect impacts to and trends in resources, ensure that fire and resource management objectives are being met, and adapt management strategies and policies to lessons learned. Monitoring consists of evaluating both near-term direct effects, as well as second order long-term indirect effects of fire, and can help us evaluate success of an individual burn or a burn program beyond just the number of “black acres.” It will usually consist of pre-fire, day-of-fire/active-fire, and post-fire measurements, to varying levels of detail. Post fire measurements are often re-taken for a number years after a burn to evaluate second order effects and determine eventual needs for retreatment. Prescribed fire monitoring can help answer such questions as:

- How much smoke and greenhouse gas is being put into the atmosphere?
- How much of that smoke reached nearby communities, and how would this compare to a wildfire?
- Did the burn achieve fuel consumption targets, and how long will the fuel and fire hazard take to return?
- How much did the burn reduce the likelihood of crown fire in forested ecosystems?
- What changes to vegetation composition and structure occurred due to the prescribed fire?
- Are the project areas resilient to future wildfire and are nearby areas now more protected from future wildfire?
- Are prescribed burns having unintended impacts to the ecosystem, such as increased erosion or changes to biodiversity/species composition?
- Are we burning the “right” acres across the landscape, which are sometimes more complex and difficult to implement, to achieve strategic fire hazard reduction and natural resource management goals?



Answers to these and other questions will help CAL FIRE communicate to the public, landowners, and the legislature the benefits of prescribed fire as a management tool, and how well CAL FIRE is meeting fire and land management

objectives, using real data from actual prescribed fires. Where CAL FIRE is not meeting objectives, or are having negative impacts, monitoring can help adapt management strategies and improve best management practices.

Program

In 2018, at the direction of the Governor's Office and in coordination with the California Air Resources Board (CARB), CAL FIRE established a Prescribed Fire Monitoring Program. The group meets weekly to coordinate upcoming monitoring sites and develop program documents and reports. Joint CAL FIRE and CARB objectives of the program are to:

- Monitor smoke and air quality in communities and sensitive populations close to prescribed fires, as measured by PM2.5 concentrations and other metrics (CARB).
- Monitor prescribed fire treatment effectiveness on fire hazard reduction over time, as measured by reduced rate of spread, flame length, crown fire potential, and other metrics (CAL FIRE).
- Monitor prescribed fire treatment effects on ecosystems over time as measured by changes in aboveground carbon, tree mortality and damage, soil surface conditions, understory plant species diversity and cover, and other variables (CAL FIRE).
- Work closely together to pair information on fuel hazard, emissions, and ecological effects with air quality measurements (CAL FIRE and CARB).
- Provide information to the California Forest Management Task Force, CAL FIRE Executives, prescribed fire program managers, unit staff, and field practitioners that will help improve best practices, and achieve Rx fire program goals.
- Support public information and awareness efforts regarding the benefits of prescribed fire.



It is important to note that it is NOT the intent of the CAL FIRE-CARB Prescribed Fire Monitoring Program to evaluate or critique individual performance of project or unit personnel. However, the monitoring program will develop bases for project and program effectiveness in an adaptive feedback strategy where data and analysis informs changes going forward.

Measurements

Prescribed Fire Monitoring Program personnel will work with CAL FIRE unit personnel, air quality management district personnel, and other groups to perform measurements before, during and after prescribed fires. Typically, this may include some, or all, of the following:

Prescribed Fire Monitoring Program measurements

Activity	Timing
Installation and reading of semi-permanent measurement plots. Typical plots in forested systems are 1/10 th acre, fixed radius circular plots with a durable monument at plot-center. Multiple measurements of fuels and ecosystem characteristics are taken within the plot. The number of plots per burn unit will vary depending on the size of the unit and variability of conditions.	Usually done days to weeks in advance of a prescribed fire.
Photo-documentation of pre-burn conditions at fixed locations. Photo points are recorded by GPS, and detailed photo information is recorded in order to accurately recreate photos after the burn.	Usually done either 1-2 days before burn, or day of burn prior to ignition.
Deployment of portable air quality monitoring units at locations near the prescribed fire, typically in nearby communities or locations with sensitive populations that may be impacted by smoke. The portable units require a standard 120V outlet, and sit on a tripod with a relatively small footprint.	Usually deployed by CARB 1-3 days prior to burn, left in place up to two weeks.
Fire environment and behavior measurements immediately prior to and during the prescribed fire (day-of-fire). This may include deployment of fuel moisture measurement equipment, fuel sample collection for precise fuel moisture measurement, periodic weather observations during burn operations, and observations of fire behavior (rate of spread, flame length, torching).	Day of burn.
Recreation of pre-burn photo points.	1-7 days after fire is declared out.
Re-reading of fixed measurement plots.	Up to one month after burn, then annually or semi-annually thereafter for up to 5 years.

Many of these measurements are identified as responsibilities of the Fire Effects Monitor (FEMO) position in ICS. If an FEMO is assigned to the burn (usually not on CAL FIRE projects), the Prescribed Fire Monitoring Program personnel will work closely with them to obtain measurements safely and avoid duplication of effort. Otherwise, they will work with the Prescribed Fire Incident Commander and/or his/her designee.

Expectations

The following are general expectations for both Monitoring Program personnel and unit or prescribed fire project operational staff.

- Monitoring personnel will work with unit or project staff to ensure adequate communications occur.
- Monitoring Program personnel will not impede successful prescribed fire planning or operations.
- Monitoring Program personnel present on the day of the burn will operate under the direction of the Prescribed Fire Incident Commander, or other



designated project leader, and will follow all safety precautions as directed.

- If requested, unit or project staff will provide Monitoring Program personnel with burn plans or other relevant information in advance of the burn, to assist with monitoring planning.
- Unit or project staff will assist Monitoring Program personnel in obtaining access to burn unit or air quality monitoring locations prior to and after burn operations.
- Once complete, Monitoring Program personnel will provide data and analysis results to unit or project staff if requested.

Not all prescribed fires will be monitored, and some may be monitored in less detail than others. If Unit or project personnel wish to request monitoring resources on a prescribed fire project, or if there are any additional questions about the Prescribed Fire Monitoring Program, contact CAL FIRE's Fire and Resource Assessment Program (FRAP) at Sacramento Headquarters.

15. Escape/Declaration of Wildfire

Wildfire Declaration

The prescribed fire plan will specify who has the authority to declare a prescribed fire a wildfire.

A prescribed fire, or a portion or segment of a prescribed fire, must be declared a wildfire by those identified in the plan with the authority to do so, when either or both the following criteria are met:

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

OR

2. The fire has spread outside the project area or is likely to do so, and the associated contingency actions have failed or are likely to fail and the fire cannot be contained by the end of the next burning period.

A prescribed fire can be declared a wildfire for reasons other than those identified above, if events cannot be mitigated as determined by the Prescribed Fire Incident Commander and Unit Chief. A description is needed of the actions to be taken when a prescribed fire is declared a wildfire. The description will include:

- Wildfire declaration (by whom)
- Incident Commander assignment
- Notifications to be made

Agency or local policy may limit the strategic and tactical responses available for a prescribed fire that is declared a wildfire.



Appendix 1: Prescribed Fire Burn Completion Report

PRESCRIBED BURN COMPLETION REPORT

Revised 5/01

Modified 11/10

Date: _____ Prepared by: _____

A. Project Number: - -
Region - Project - Unit

B. Project Name: _____

C. APCD or AQMD Name: _____
Fee paid to air District: _____

PROJECT DESCRIPTION:

1. Start Date _____ Completion Date _____

2. Project Type (insert acreage for each treatment type):

____ Broadcast Burn ____ Pile and burn ____ Understory Burn
____ Hand Clearing (No burning) ____ Pre-treatment ____ Mechanical Treatment
____ Other (please describe): _____
____ Total acreage treated

3. List and describe any issues that inhibited project (i.e.: endangered species, fees, public controversy, etc.).

4. Planned acres: ____ (net)

a. Actual: _____ Last Burn Date: _____ No. Days: _____

b. Escape acres included in total above: ____ acres

c. Acres by reimbursement type:

Grant Funded _____ acres x \$5.00 = _____

Fuel Model 1-3 _____ acres x \$10.00 = _____

Fuel Model 4-13 _____ acres x \$30.00 = _____

Pre-approved advance (Debit) _____

TOTAL amount of Reimbursement Requested _____

5. Describe the Vegetation Type composition before burn:

Chamise: _____ % Ceanothus: _____ % Conifers: _____ %

Manzanita: _____ % Coastal Sage: _____ % GB Sage: _____ %

Scrub Oak: _____ % Grass: _____ % Other: _____ %

Mixed Chaparral: _____ % Oak Woodland: _____ %

6. Describe any significant changes in vegetation type(s) due to the project.

7. FUEL CONSUMPTION OBTAINED:

Percent removal desired: _____ % Percent removal obtained: _____ %

Fuel Loading (T/acre before): _____

Fuel Loading (T/acre after): _____

8. PRESCRIBED FIRE BEHAVIOR:

Describe any differences between predicted and observed fire behavior.

Following is a list of categories that may be used in this discussion:

Rate of Spread, Weather, Fuel Moistures, Spread Direction, Spotting, Live/dead fuel consumption, Scorch Height, Fire line Intensity, Flame Lengths.

- Rate of Spread -

- Weather -
- Fuel moisture -
- Spread direction -
- Spotting -
- Live / Dead fuel Consumption -
- Scorch Height -
- Fire Line intensity -
- Flame Lengths -

9. Are any follow-up measures needed on this site? (Include recommendations for erosion hazard, vegetation type changes, archaeological potential, wildlife effects, etc.)

10. Describe any safety concerns or operational issues that arose during the burn.

11. Attach the photocopies of IAP, worksheets, ICS forms, and other supporting documents prepared subsequent to the original contract/burn plan package. These will become part of the permanent file in Sacramento Headquarters.

Examples of forms/worksheets to include: Go-No Go Checklist; Map showing proposed and "as burned" treatments; ICS FORMS: Incident Action Plan, Other ICS, etc.; Spot forecasts/weather reports for day(s) of burn; Calculations made on day of burn; Public notices or description; Incident Report Form for escape.

Approval: _____
 Unit Chief

Appendix 2: Documents, Forms, Links and References

California Law Database (LegInfo).

<http://leginfo.legislature.ca.gov/faces/codes.xhtml>

California Code of Regulations (CCR).

[https://govt.westlaw.com/calregs/Index?transitionType=Default&contextData=\(sc.Default\)](https://govt.westlaw.com/calregs/Index?transitionType=Default&contextData=(sc.Default))

CAL FIRE Issuance (Handbooks, Forms, Etc.).

<http://calfireweb/library/>

CEQA documents and examples.

<http://calfireweb/organization/resourcemanagement/EnvironmentalProtection/envdoctemplates.shtml>

VMP forms and example burn plans (Big Tree Creek Rx Burn and North Grove Rx Burn).

<http://calfireweb/organization/resourcemanagement/VegetationManagement/>

National Wildfire Coordinating Group Publications.

- Of particular note/value are: PMS 420-2, PMS 424 and 424-1, PMS 426-3, PMS 461, PMS 484 and PMS 484-1.

<https://www.nwcg.gov/publications>

CEQAnet database

<http://www.ceqanet.ca.gov/QueryForm.asp>

First Order Effects Fire Model (FOFEM)

<https://www.firelab.org/project/fofem>

Scott and Burgan fuel models

http://fire.org/downloads/behaveplus/3.0.0/rmrs_gtr153.pdf

Anderson Fuel Models

https://www.fs.fed.us/rm/pubs_int/int_gtr122.pdf

BehavePlus Link

<https://www.firelab.org/project/behaveplus>

CARB's Prescribed Fire Information Reporting System (PFIRS)

<https://ssl.arb.ca.gov/pfirs/index.php>