Cherry Prescribed Fire
After Action Review

Prescott National Forest
Verde Ranger District
Camp Verde, Arizona

June 30 – July 2, 2003

EXECUTIVE SUMMARY

The Cherry Prescribed Fire on the Verde Ranger District, Prescott National Forest, was ignited on June 16th, 2003, escaped the burn unit on June 17th and was declared a wildland fire. A Type 1 Incident Management Team (IMT) was ordered and contained the fire. Following release of the team, the Acting Forest Supervisor for the Prescott National Forest elected to conduct a review of this prescribed fire and assembled a review team for that purpose. The review was conducted from June 30 to July 2, 2003 in Camp Verde, Arizona.

Specific objectives for the review were:

- Determine what could be done differently as a group and individually based on what we know now in the Prescott National Forest:
  - Planning (an appropriate plan and planning process),
  - Implementation (plan executed appropriately).
- Determine what are the value added lessons that the Forest learned individually and collectively.
- Determine what actions does the Forest need to implement as an outcome of this review.

The team developed a report that details Observations and Recommendations. Major observations include:

- The burn plan was fully compliant with required contents but future high complexity projects plan should contain additional depth and detail in some areas.

- The planning process did not fully incorporate the effects of long-term drought, changing fuel complexes, effects of mechanical fuel treatments, and fire danger indicators.

- It is not clear if fire behavior was monitored and if that information was utilized to support decision-making during the fire.

- Not all required documentation items are included in the project record.

Recommendations are provided in response to all observations.

LESSONS LEARNED:

High complexity prescribed fire projects warrant a higher degree of detail and analysis during the planning process. The most important area needing more detail is the risk assessment, including threat identification and mitigation. Complex prescribed fire burn plan implementation requires increased situational awareness, appropriate resources, and monitoring. After Action Reviews, conducted at the appropriate level, are a useful tool to improve prescribed fire planning and implementation procedures.

INTRODUCTION and BACKGROUND

As part of the Verde Ranger District, USDA Forest Service, Prescott National Forest, fuel treatment program, a prescribed fire was planned for an area south and west of the community of Cherry, AZ and north of Highway 169 totaling about 8141 acres. This burn was planned in an area that has been subject to an on-going fuel treatment program. This burn was the second of three large areas that will be treated in an overall plan to help protect the community of Cherry and private lands on the south end of Mingus Mountain from large-scale, high intensity wildland fires such as the Mingus Fire of 1957. The next planned treatment is located adjacent to the Cherry Prescribed Fire and is approximately 25,000 acres in size. This burn will utilize lessons learned from the Cherry Prescribed Fire.

The objectives of the Cherry Prescribed Fire were to reduce hazardous fuel accumulations, restore fuel levels to a healthy state, and reduce the risk of large uncontrollable wildfires in the area. This application is guided by the following land and resource management planning documents for the Prescott National Forest and Verde Ranger District: Prescott Forest Plan, Cherry/Dewey Urban Interface Hazardous Fuel Reduction Project Categorical Exclusion, and Fire Management Plan – Prescott National Forest. The detailed implementation procedures were described in the Site Specific Burn Plan for Cherry/Dewey – Block 1.

Prescribed fire is one of several accepted practices for hazard fuel reduction and other resource management purposes utilized routinely and successfully by federal, state, and private agencies. Currently, the program averages over 5000 prescribed fires completed per year for federal agencies nationwide. Over 99% of these federal prescribed fires do not escape. The implementation of the National Fire Plan has escalated the magnitude of the fuel treatment program and numbers of treatments are increasing. Accomplishments, while increasing somewhat, are being spread across the spectrum of treatment types as more projects are implemented in wildland-urban interface areas using non-fire treatment types. These treatments are more costly and generally accomplish fewer acres than broadcast burning. Figure 1 shows the prescribed fire accomplishments for federal wildland fire management agencies in the United States from 1993 to 2002.

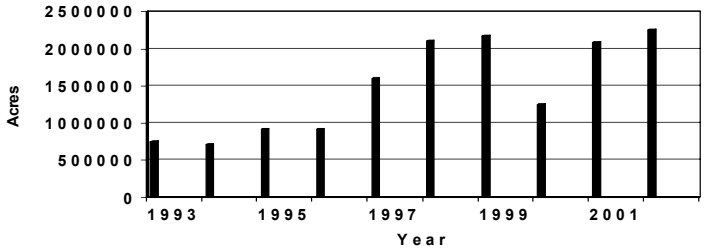

Figure 1. Federal wildland fire management agencies prescribed fire accomplishments, 1993 – 2002.

The Cherry Prescribed Fire was planned and implemented under an approved Prescribed Fire Burn Plan with qualified individuals. A test burn was conducted on June 5th to confirm that conditions were appropriate for full project implementation. The Arizona Department of Environmental Quality (ADEQ) was notified and daily monitoring of the smoke column was planned. Local communities were notified of the burn and expected outcome.

The burn was set to be implemented on June 9th and 10th. Weather conditions necessitated that actual implementation of the burn be set back until June 16th and 17th. To accomplish the desired objectives, this

particular fuel type involved (chaparral) must be treated during conditions that allow fires to burn with higher intensity. In preparation of this treatment, an area of approximately 2500 acres adjacent to the northern portion of the proposed unit was burned last fall and specific areas along the unit perimeter were treated through mechanical mastication. Both sets of pretreatments (burning and mechanical) and their resultant effects on the fuel complexes and potential fire behavior increased the ability to protect the community of Cherry.

During the burn treatment, resources on-site consisted of two Type 1 Hotshot crews, three engines, one light helicopter, and necessary management resources to support the burning operation. Approximately 4500 acres were burned on June 16th with aerial and hand ignition. At approximately 1630 hours, an unpredicted wind shift from the southwest to the southeast caused the fire to spot over the pre-established control line on the southwest flank of the unit. This spot fire was quickly contained at 150 acres by resources on-site, helicopter and water bucket, and airtankers, maintaining the fire within prescription and eliminating the threat to private lands. The closest private land and structures in the White Horse Ranch Subdivision were approximately ¾ miles from the spot fire.

On June 17th, no additional ignition occurred and the primary objectives for that day involved monitoring and holding. Resources were focused on mopping up the spot fire from the previous day and monitoring and holding the fire on the north perimeter. At approximately 1300 hours, the fire escaped control lines in the northern perimeter of the burn unit. The fire was 1½ miles northwest of Powell Springs Campground but neither the campground nor the community of Cherry was directly threatened. A National Interagency Type 1 Incident Management Team was immediately ordered and assigned to contain the fire due to values to be protected on the top of Mingus Mountain, the proximity of private lands north of the fire, and the proximity to the community of Cherry. The escaped fire was contained at a size of 992 acres on June 20, 2003. The incident encompassed 7675 acres (including the October 2002 and June 2003 prescribed fires) in the prescribed fire unit, 992 acres in the wildfire area, and 150 acres in the slopover along the western flank of the prescribed fire unit for a total size of 8817 acres for the Cherry Incident.

The prescribed fire and general vicinity are shown in Figure 2.

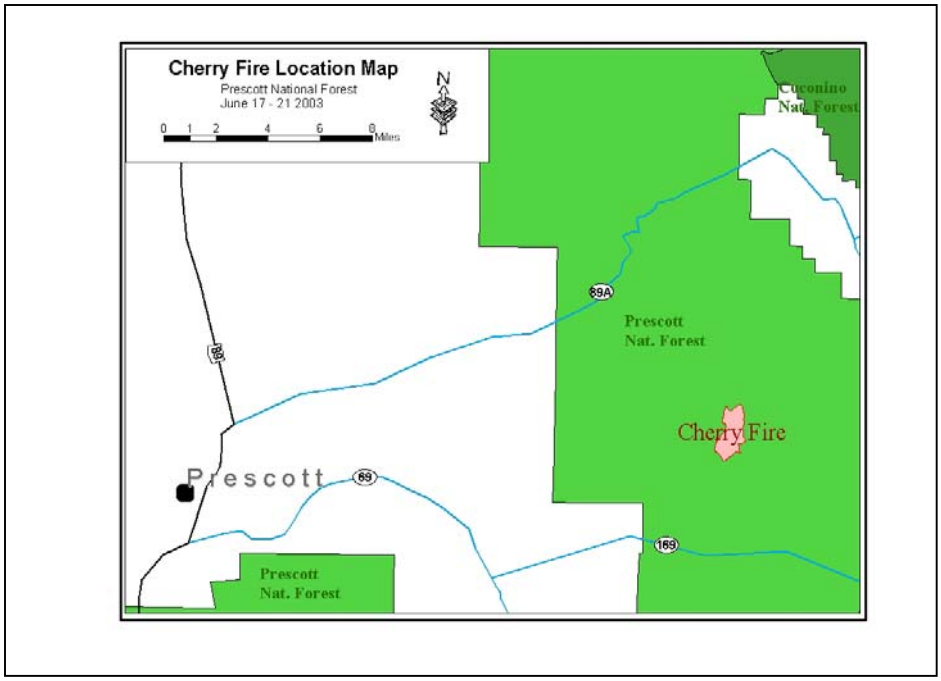

Figure 2. General vicinity map of Cherry Prescribed Fire.

Following containment of the escape, the Acting Forest Supervisor elected to conduct a review of the Cherry Prescribed Fire. An interagency team was assembled to conduct this review.

Specific objectives for the review given to the team included:

- Determine what could be done differently as a group and individually based on what we know now in the Prescott National Forest:
  - Planning (an appropriate plan and planning process),
  - Implementation (plan executed appropriately).
- Determine the value added lessons that the Forest learned individually and collectively.
- Determine the actions that the Forest should implement as an outcome of this review.

This review team addressed these objectives in this report. This report consists of descriptions of background information concerning the prescribed fire, the review team process, observations and recommendations, and lessons learned.

REVIEW TEAM and PROCESS

Members of the Review Team included:

Bob Leaverton	Team Leader	Forest Supervisor	USDA Forest Service Pike-San Isabel National Forests, Cimarron-Comanche Grasslands Pueblo, Colorado
Tom Zimmerman	Team Member	Fire Science and Ecology Program Leader	USDI National Park Service, National Interagency Fire Center, Boise, Idaho
Paul Langowski	Team Member	Branch Chief, Fuels and Fire Ecology	USDA Forest Service Rocky Mountain Region Denver, Colorado
Bill Jackson	Team Member	Fire Management Officer	USDA Forest Service Apache-Sitgreaves National Forest Alpine Ranger District Alpine, Arizona

The Review Team was convened on June 30, 2003 at 8:00 am in the Camp Verde Conference Room of the Cliff Castle Casino Lodge, Camp Verde, Arizona. The team was briefed by the Prescott National Forest Acting Forest Supervisor, Verde Ranger District Ranger, and Fire Management Staff. The team completed an on-site review of the burn area to observe directly the topography, fuel conditions, and other specific factors associated with the project, and to observe the burn intensity and severity, location of roads, past burn units, crushed fuel areas, and values to be protected. On July 1st and 2nd, the team met at the Lodge Conference Room and reviewed information from Regional 5140 manual direction, the Cherry Prescribed Fire Burn Plan, and implementation direction. The review team then developed this report and presented observations, recommendations, and lessons learned to the Forest Supervisor, District Ranger, and Forest staff.

COMMENDATIONS

- All personnel involved during the prescribed fire for their positive attitude, dedication, and hard work.
- The Prescott National Forest for initiating a timely review of this prescribed fire and commitment to strengthening their prescribed fire program.
- All personnel involved with the implementation of the prescribed fire for their outstanding safety record.
- All staff involved with the implementation of the prescribed fire and its escape and their decision-making and judgment in:
    - quickly assessing the need for and ordering of a Type 1 IMT,
    - anchoring the fire around the community of Cherry and protecting high value areas as a priority.
- The Prescott National Forest staff for developing and implementing a proactive approach to complex fuel treatment and prescribed fire program.
- The Prescott National Forest staff for its willingness and openness to accept the level of risk involved with fuel treatment activities in these fuel types and in wildland-urban interfaces.
- The Prescott National Forest staff for its ability to get things done.

OBSERVATIONS and RECOMMENDATIONS

PLANNING:

Observation: Although the burn plan was fully compliant with required contents, the review team feels that some areas should contain additional depth and detail in the future for high complexity projects.

Recommendation: Future Prescribed Fire Burn Plans for high complexity projects should be strengthened in the following areas:

- Risk assessment – a more objective risk assessment process is desirable for prescribed fire planning, especially for high complexity projects. Such a process should be elevated to the Regional level for development. Assessment of risk; the potential for escape, evaluation of threats to the boundary, communities, developments, and sensitive resources; identification of critical holding points, and mitigation actions recommended to mitigate or eliminate these threats should be included.
- Complexity Analysis: FSM 5142.1 and 5142.2 (June 1999) requires the use of the NWCG Prescribed Fire Complexity Rating System Guide (NFES 2474) to determine prescribed fire complexity. The NWCG Guide was revised in January 2002. The burn plan format contained in R3 supplement 5100-2-1 contains the previous version of NWCG guide. The 2002 version requires some additional documentation of rationale for the ratings. This guided discussion will aid in the identification of threats and mitigations. The Regional Office needs to update the regional 5140 supplement to remove the obsolete material for the Complexity Analysis.
- Prescription ranges – prescription ranges can be defined by a number of variables. Weather, fire behavior, or fire effects variables can be the basis of prescribed fire prescriptions. National policy does not require the use of a specific type of prescription parameter but requires a prescription. This burn plan utilized both weather and fire behavior variables (consistent with Regional policy requirements). The use of both of these sets of variables sometimes does not necessarily complement each other. For example, the range of temperature and wind speeds may not directly correspond to the set of flame lengths, rates of spread, and fireline intensity. The Region may want to review its prescription requirements and develop standards based on fire behavior and/or fire effects variables. The fire behavior variables used in this plan show a wide range for the extreme conditions in the chaparral fuel type. The upper end of the range of these prescriptive elements is in excess of the limit for direct attack for ground resources. This

information is useful in developing the holding plan and types of resources needed. It could be questioned here if crews and engines could be effective at holding the fire at the highest range of fireline intensity for the chaparral fuel type.

- Ignition Plan – the Ignition Plan could be keyed to a map which could show the ignition sequence, location of various actions (main ignition, blacklining, etc.), and direction of ignition. Additional detail in this section combined with a map could benefit personnel briefings, public information, line officer briefings, etc.
- Holding Plan – the Holding Plan presented here could better define the exact number and type of resources needed on-site, how and where those resources would be positioned, and actions to be taken in response to fire behavior and movement, and applicability of described holding resources to potential fire behavior in terms of criteria shown on fire behavior characteristics charts ("hauling charts"). Use of the containment module in the BEHAVE fire behavior prediction program could be utilized to aid in determination of kind and numbers of resources needed.
- Contingency Plan – should identify types and numbers of contingency resources, clarify availability of contingency resources, should define what "appropriate actions" are, and possibly identify contingency lines.
- Management action points (trigger points) that indicate when the actions should be initiated should also be identified. These criteria are necessary to help the Burn Boss quickly determine when actions must be initiated or when the escaped fire contingency plan should be initiated. Inclusion of this information in the burn plan will assist the Burn Boss in decision-making and project implementation and clarify the need to escalate activities, the type of activity warranted, and when conditions indicate declaring an escape fire for all personnel involved in project implementation.

Observation: FSM 5145.42 requires that a Prescribed Fire Planning Specialist (RxPL) develop the RxBP (Prescribed Fire Burn Plan) for each high complexity prescribed fire. The RxBP for the Cherry Prescribed Fire was prepared by a RXB1 (Prescribed Fire Burn Boss Type 1). Training requirements and prerequisite experience for RxPL and RXB1 as detailed in FSH 5109.17 are identical. This deviation is not significant as the intent of having an individual with the appropriate level of training and experience prepare complex burn plans was met.

> **Recommendation:** The Regional Office should consider revising the R3 5140 supplement to add RXB1 as an approved position for the development of high complexity RxBPs.

Observation: The planning process did not fully incorporate the effects of long-term drought, changing fuel complexes, effects of mechanical fuel treatments, and fire danger indicators.

> **Recommendation:** The planning process should incorporate dead fuel moisture contents along with live fuel moisture contents to better evaluate fire potential and fire behavior in mixed fuel beds; prescription development should incorporate additional information on increasing dead fuel amounts in brush fuel types; and spotting potential from the greatest potential source of firebrands (i.e., standing dead ponderosa pine). Additionally, the presence of mechanically treated brush fuels and their receptivity to spotting embers should be factored into the planning process. Incorporation of this information will assist in the identification of potential threats to the boundaries, mitigation actions (discussed in more detail above), and pre-burn and implementation decision-making.

Observation: The approved Cherry RxBP included an organization chart with individuals and resources named to fill positions. The approved Prescribed Burn Plan is the document that gives authority to conduct the prescribed fire. It is the Delegation of Authority from the approving Line Officer and the Burn Boss. It establishes the conditions and situations that must exist—and be expected to continue—to conduct the burn.

Technically, because the resources named in the burn plan were not all present on the burn, an amendment to the burn plan should have been prepared and approved by the Forest Supervisor.

> **Recommendation:** The RxBP should show the organization needed by position at planning time for each RXBP. Positions by name should be finalized during the burn briefing. The district should consider identifying organizations corresponding to the low middle and high end of the burn prescription.

IMPLEMENTATION:

Observation: Monitoring (weather, smoke dispersal, and fire behavior data collection, analysis, and application during and after the operation) – smoke dispersal information and weather information were collected during the burn. It is not clear if fire behavior was monitored and if that information was utilized to support decision-making during the fire.

> **Recommendation:** Fire weather and fire behavior monitoring information should be collected during the burn and documented for future use. This information is important during the fire because it increases situational awareness, allows the evaluation of whether the fire is remaining in prescription, and supports decision-making regarding placement of critical holding resources. It is useful during post-fire after action reviews and review of objectives and prescriptions to aid in development and refinement of future burn plans.

Observation: The documentation for the Cherry Rx Fire contained briefing information (daily assignment sheets, organization charts or lists, ICS forms, etc.) in multiple formats, from handwritten to full Incident Action Plans. The multiple formats could be confusing to out-of area or off-forest resources.

> **Recommendation:** The Forest should consider a standard format for briefing documents on high complexity burns.

Observation: Not all required documentation items are included in the project record. Documentation of the Go/No Go discussion held on 6/13 was not documented for the primary ignition on 6/16. It is often difficult to reconstruct events and therefore important that all pertinent information and discussions are documented in the project record.

> **Recommendation:** The District needs to place additional emphasis on documentation related to RxBP implementation to ensure that all procedural requirements are met.

LESSONS LEARNED:

High complexity prescribed fire projects warrant a higher degree of detail and analysis during the planning process. The most important area needing more detail is the risk assessment, including threat identification and mitigation. Complex prescribed fire burn plan implementation requires increased situational awareness, appropriate resources, and monitoring. After Action Reviews, conducted at the appropriate level, are a useful tool to improve prescribed fire planning and implementation procedures.

CONTACTS

The review team met with numerous individuals and discussed information relevant to the planning, implementation, and communication of the prescribed fire; overall fire program management; and current situation. Other information associated with wildland fire, prescribed fire, and resource management on the Prescott National Forest was also discussed. The following individuals participated in discussions with the review team:

Mike Baca	Acting Forest Supervisor	USDA Forest Service, Prescott National Forest
Mark Johnson	Resources, Fire, and Planning Staff Officer	USDA Forest Service, Prescott National Forest
Denny Nelson	Assistant District Fire Management Officer	USDA Forest Service, Prescott National Forest Verde Ranger District
Robert Morales	Fire Management Officer	USDA Forest Service, Prescott National Forest
Dan Derrick	District Fire Management Officer	USDA Forest Service, Prescott National Forest Verde Ranger District
Tom Bonomo	District Ranger	USDA Forest Service, Prescott National Forest Verde Ranger District
Roy Hall	Assistant Director, Fuels and Smoke Management	USDA Forest Service, Southwest Region

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