

Comb Complex
Wildland Fire
Wildland Fire Implementation Plan



Sequoia and Kings Canyon National Parks
Sequoia National Forest

July-August, 2005

Wildland Fire Implementation Plan Table of Contents

Fire Name	Comb Complex (Comb and East Creek Fires)	
Fire Number	CA-KNP-015	
Administrative Unit(s)	Sequoia and Kings Canyon NPs & Sequoia NF	
Documentation Product	Needed	Completed
WFIP – Stage I: Initial Fire Assessment		
Fire Situation	Y	Y
Initial GO/NO-GO Decision	Y	Y
WFIP – Stage II: Short-Term Implementation Actions		
Short-Term Fire Behavior Predictions	Y	Y
Short-Term Implementation Actions	Y	Y
Complexity Analysis	Y	Y
Stage III Need Assessment Chart	Y	Y
WFIP – Stage III: Long-Term Implementation Actions	Y	Y
Periodic Fire Assessment		
Part I, Re-validation	Y	Y
Part 2, Stage III Need Assessment	Y	Y
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Appendix II-Sequoia NF Wildland Fire Containment, Mop-Up, Rehabilitation & MIST Guidelines.		
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Stage III: Long-Term Implementation Actions

Attach Stage I and Stage II information.
Update and/or revise Stage I and II as necessary.

OBJECTIVES

Natural and Cultural Resource Objectives / Constraints

Management Objectives:

- ❑ Plan and implement management actions that fully provide for personnel and public safety.
- ❑ Monitor smoke production and mitigate smoke impacts as possible. Coordinate with the San Joaquin Valley Unified Air Pollution Control District regarding smoke emissions.
- ❑ Allow fire to play its natural role and restore natural fire regimes.
- ❑ Provide accurate and timely information to the public, interagency employees, and external partners.
- ❑ Develop and implement management actions that provide for protection of Wilderness values natural and cultural resources to the greatest extent possible
- ❑ Implement Minimum Impact Management Tactics (MIST) in the Monarch Wilderness and Sequoia and Kings Canyon National Parks.
- ❑ Manage the Comb Complex in a cost-efficient manner.
- ❑ Monitor weather, fire behavior, and fire effects during the Comb Complex to provide a basis for continuing evaluation of the Sequoia and Kings Canyon National Parks, and Sequoia National Forest fire management programs, and other program activities.

Wilderness and Backcountry Objectives:

- ❑ Rehabilitate all ground activities associated with the management of the Comb Complex, within the Monarch Wilderness and Sequoia and Kings Canyon National Parks, to meet NPS guidelines and FS agency policy.

Cultural/Heritage Objectives:

- ❑ Consult with Resource Advisor(s) to obtain location information so mitigation measures can be completed.
- ❑ Minimize impacts to all identified sensitive cultural and historical resources affected by tactical and logistical operations involving ground disturbance.
- ❑ Minimize impacts to the known site south of Frypan Meadow along the Lewis Creek Trail and the East Creek fire area.

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Natural Resource Objectives:

- ❑ Minimize accidental transportation of exotic and invasive plant species (Cheatgrass, Bull thistle, and Yellow star thistle) into the Monarch Wilderness and NPS backcountry.
- ❑ Minimize impacts to any threatened, endangered, and sensitive species including:
 - ❑ Spotted owls
 - ❑ Goshawks
 - ❑ FishersThese species exist within the Monarch Wilderness.
- ❑ Minimize impacts to identified sensitive plants on rocky outcroppings in the Junction Ridge and Choke Fire areas including:
 - ❑ Tomkins Sedge (Carex tomkinsii)
 - ❑ Unexpected Larkspur (Delphinium inopinum)
 - ❑ Buckwheat (Eriogonum prattenianum var. Avium)
- ❑ Minimize impacts to Carex tompkinsii along the south end of Lewis Creek Trail and Hotel Creek Trail above Cedar Grove.
- ❑ Minimize burnout operation impacts to known old growth pinyon pine stands located throughout the rock band above Cedar Grove.
- ❑ Avoid cave resources located in the southwest corner of the MMA in the Boyden Cave Area.

Administrative Resources:

- Implement management actions to protect recreation developments including:
- ❑ Wood signs and signboards at Deer Cove Trailhead.
 - ❑ Restroom facilities, picnic tables, and wooden signs at Grizzly Picnic Area.
 - ❑ Knack box (metal storage box) located in Frypan Meadow.

Figure 1: Comb Complex General Vicinity Map.

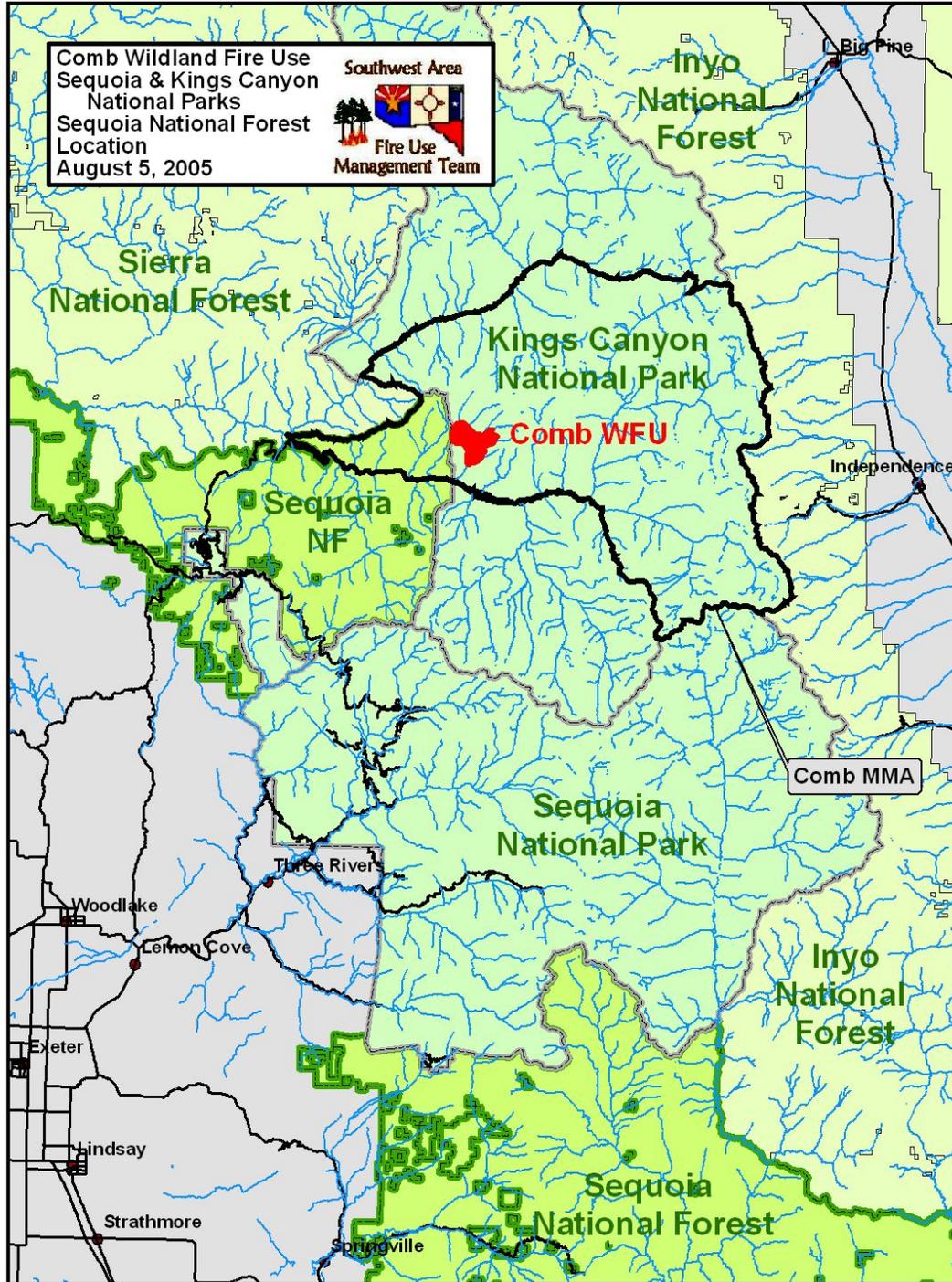


Figure 2: Comb Complex MMA Map.

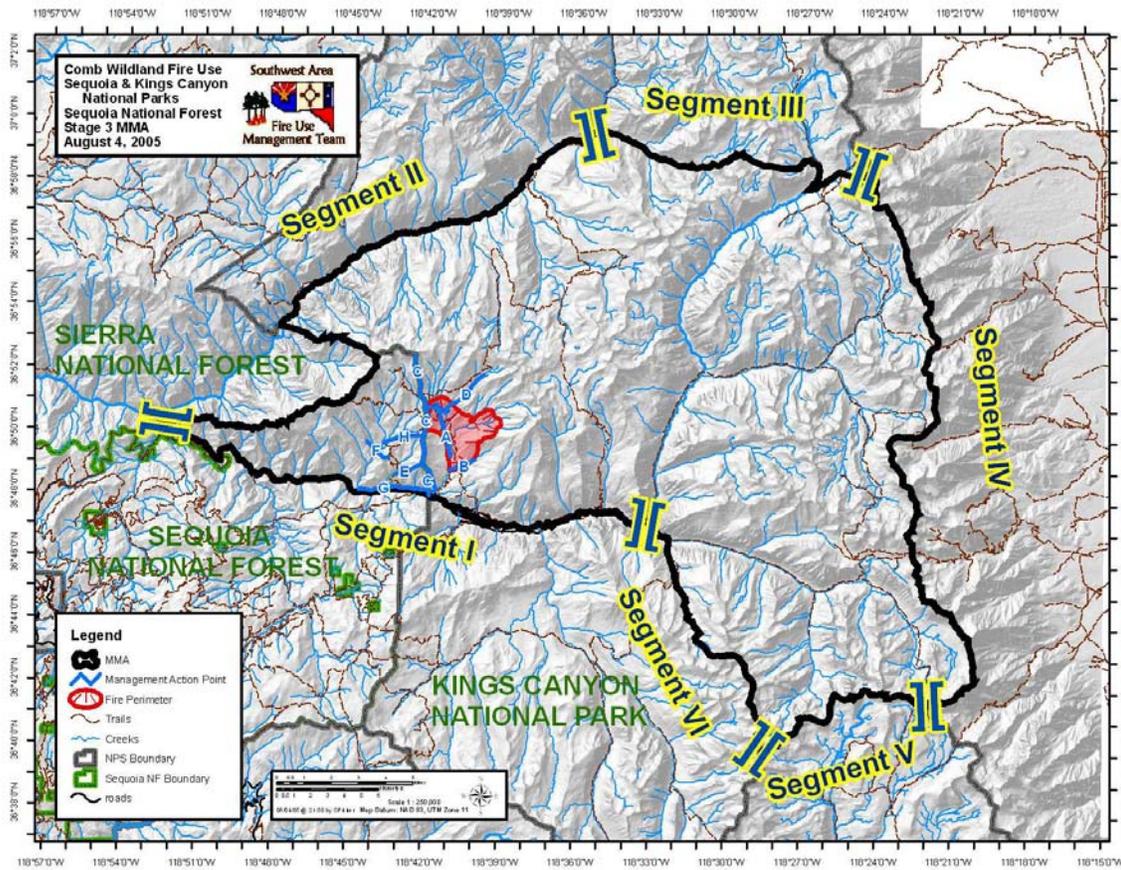
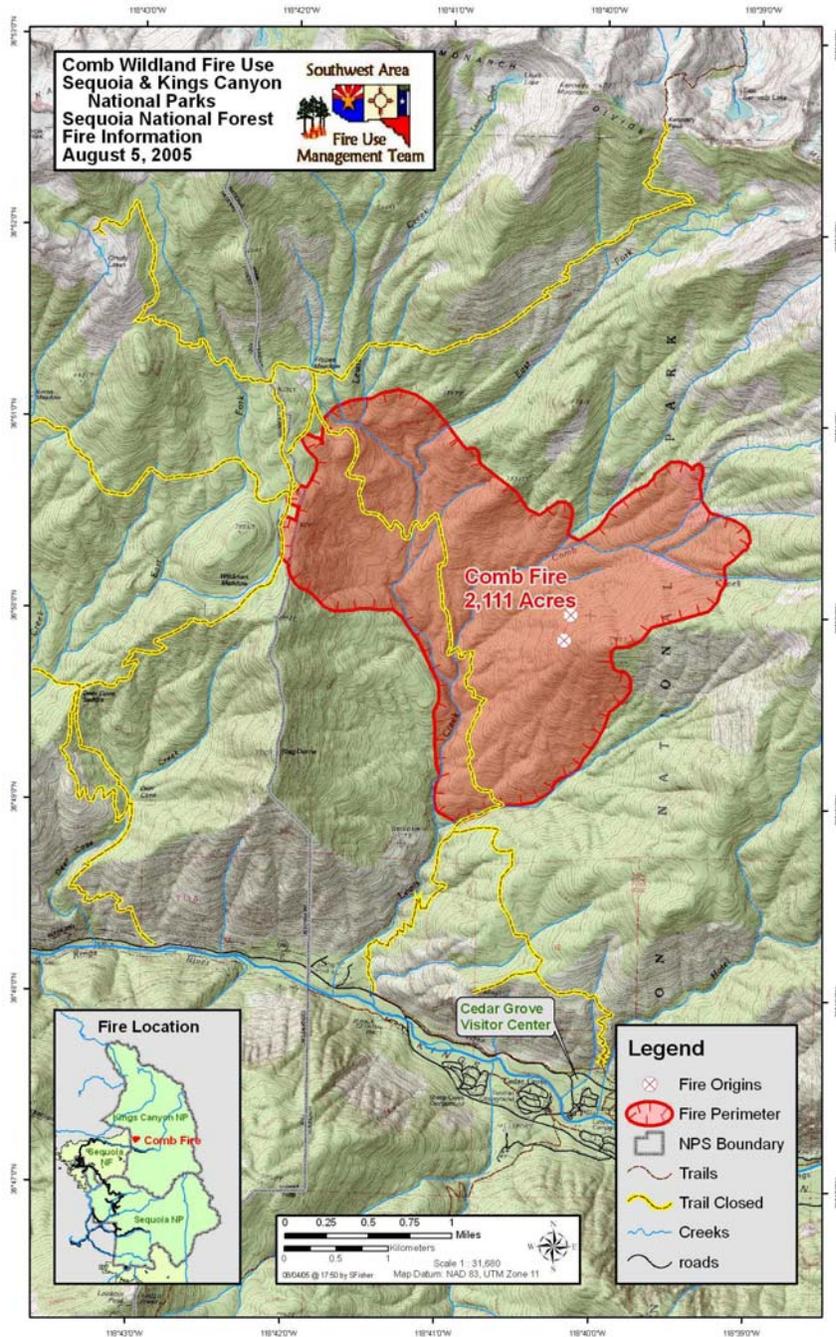


Figure 3: Comb Complex Fire Perimeter Map (August 5, 2005).



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MAXIMUM MANAGEABLE AREA (MMA) – DEFINITION AND MAPS

<p>Acres in MMA:</p> <p>Definition of MMA</p> <p>Attach Map of MMA</p>	<p>Approximately 211,000 acres (Appendix I, Comb Complex MMA Map).</p> <p>The MMA defines the largest area where the fire will be confined. This does not preclude management actions which include delaying, directing, checking and/or suppression while the fire remains within the MMA. The MMA is broken into six segments, I through VI. Each segment differs from another, in a broad sense, with regard to threat issues and potential tactical requirements.</p> <p>Note: The long term assessment for the Comb Complex WFU has been completed. This analysis indicates a very low probability of the fire's long term capability to move onto the Sierra National Forest, which currently has a Wildland Fire Use Plan in place. However, the reference analysis employs modeling tools that cannot account for all variables and possibilities associated with long term fire predictions. Therefore, if the remote chance of the fire moving onto the Sierra National Forest becomes a reality, opportunities and necessary documentation for the Sierra National Forest to accept the Comb WFU would be pursued. Fire managers should begin necessary dialog when/if the Comb WFU approaches Grizzly Creek. This will allow ample time for coordination and documentation to occur prior to the fire moving onto the Sierra National Forest.</p> <p>Management Staff at the Sequoia and Kings Canyon National Parks and the Sequoia National Forest will complete Stage I assessments for all new ignitions within this MMA and coordinate with Sierra NF as needed.</p> <p>Segment I: Segment I begins where Bubbs Creek intersects the South Fork Kings River. This segment follows the South Fork Kings River in a westerly direction and terminates at the junction of the Middle and South Forks Kings Rivers (across from Yucca Point).</p> <p>Segment II: Segment II begins at the junction of the Middle Fork and South Fork Kings Rivers, across from Yucca Point. The segment follows the administrative boundary between the Sequoia and Sierra National Forests traveling through Wren Peak, Eagle Peaks, Mt. Harrington, and down Silver Spur to the junction of the Middle Fork Kings River. It then follows the Middle Fork Kings River northeast to the junction of Catridge Creek, where this segment terminates.</p> <p>Segment III: Segment III begins at the junction of Catridge Creek and the Middle Fork Kings River and proceeds easterly along Cartridge</p>
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Creek to Lake Basin. This segment travels from Lake Basin due east to the summit of Mt. Ruskin then down the ridgeline into the South Fork Kings River. The segment then follows the South Fork Kings River to the junction of Taboose Pass Trail, and terminates where the Trail intersects the Park boundary, at Taboose Pass.

Segment IV: Segment IV begins at the junction of Taboose Pass Trail and the Park boundary and travels in a southerly direction along the Park boundary. This segment terminates at Junction Peak.

Segment V: Segment V begins at Junction Peak and travels westerly along the Kings/Kern Divide and terminates at the summit of Thunder Mountain.

Segment VI: Segment VI begins at the summit of Thunder Mountain and travels northwesterly to Longley Pass. From Longley Pass the segment continues to the north passing through Mount Brewer, North Guard, and follows the ridgeline west to the Sphinx Lakes. From Sphinx Lake the segment drops into Sphinx Creek, and follows the creek in a north/northwest direction to junction with Bubbs Creek. This segment travels in a westerly direction along Bubbs Creek and terminates at the junction of the South Fork Kings River.

WEATHER CONDITIONS AND DROUGHT PROGNOSIS

Weather Conditions/ Drought: Discussion & Prognosis

Executive Summary:

Current year 2005 climatological synopsis indicates the area is currently not in drought criteria. Large woody, fuel moistures are slightly below historic averages, while herbaceous and fine dead fuel moistures are well below historic averages for this time of year. The recent period of above seasonal temperatures has likely pushed fine fuel moistures to levels more similar to late August or early September levels. This coupled with normal seasonal trends indicate that fire severity will likely continue to increase over the next several weeks. However short range outlooks call for above normal precipitation and below normal temperatures, which will keep fire severity moderate.

Analysis suggests a likely season ending event to be September 17th 25% of the time, by or before October 6th 50% of the time and by or before November 5th 90% of the time. Short range outlooks call for above normal precipitation.

Fire behavior for the remainder of the fire is expected to be dominated, by surface spread in the timber type with some areas of stand replacement in the brush type where slopes are steep and wind is present. If hot and dry conditions coincide with 20 foot wind speeds

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over 10 miles per hour there is potential for the fire to burn at stand replacement intensities for short runs in the timber fuel type.

Projected fire size to August 31st is 11,465 acres total area which encompasses inclusions of barren rock. Under current and expected weather, the likelihood of the Comb fire threatening the MMA boundary is extremely low. The most significant limiting factor is the barren rock ridges which will check fire growth to the north, northwest and northeast. . The most possible scenarios for a threat to the MMA boundary is to the south along Highway 180 near Cedar Grove. Assessments suggest the fire has a 74% probability of reaching Highway 180 by burning down Lewis Creek before a season ending event. This assessment assumes no management action has taken place to check fire spread in this direction.

Introduction:

The successful outcome of wildland fire use depends on a number of factors including fuel conditions, weather and topography. Fuel conditions include fuel amount, arrangement (structure) and moisture content. Weather can be examined through review of climatology, current forecasts and outlooks. Topography does not change but it has a significant effect on fire behavior across the fire area. This analysis examines the available information to determine the current and predicted fuels and weather that will be involved for the duration the Comb Wildland Fire Use is likely to burn.

The availability of both live and dead fuels to burn is directly related to the moisture and chemical content of that fuel. Lack of precipitation directly affects the availability of both live and dead fuels to contribute to the spread and intensity of wildland fire. Beyond precipitation, weather factors of temperature, relative humidity, and winds have a dramatic effect on fire spread and intensity. Winds of concern are typically associated with frontal passages and movement of ridges and troughs across the area.

Topography is considered within both the FARSITE and RERAP models examining fire growth and the risk of fire spread to specific points of concern. Because of the changes in topography it is important to reassess all of the assumptions and output of this assessment should the fire make a major run or the weather conditions observed are dramatically outside those considered in the modeling.

Analysis:

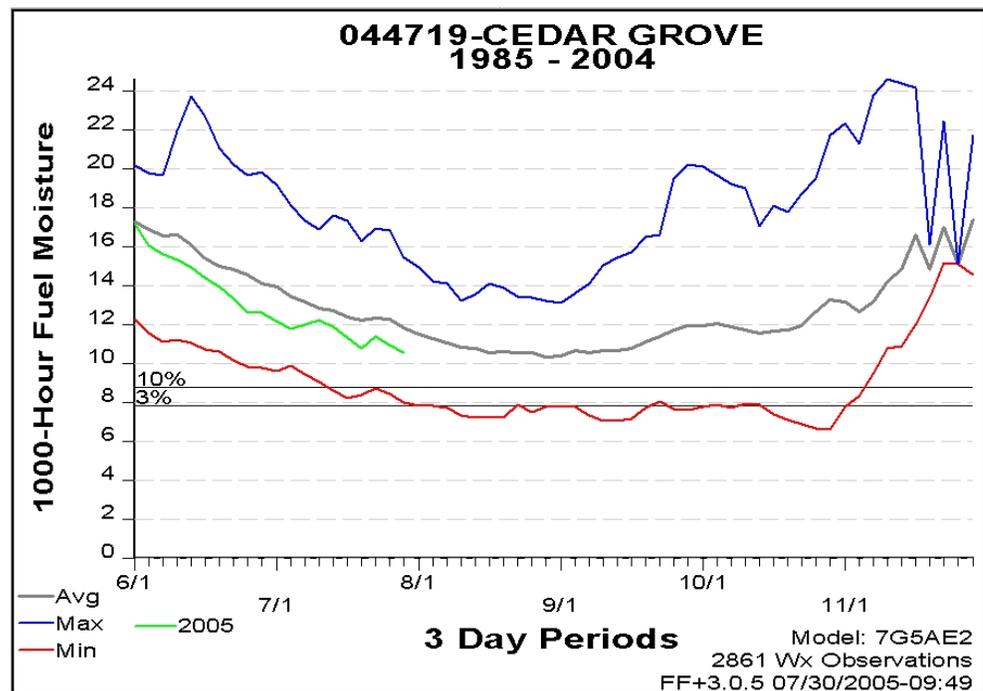
Fuel Moistures:

There are several indicators of water availability as well as the

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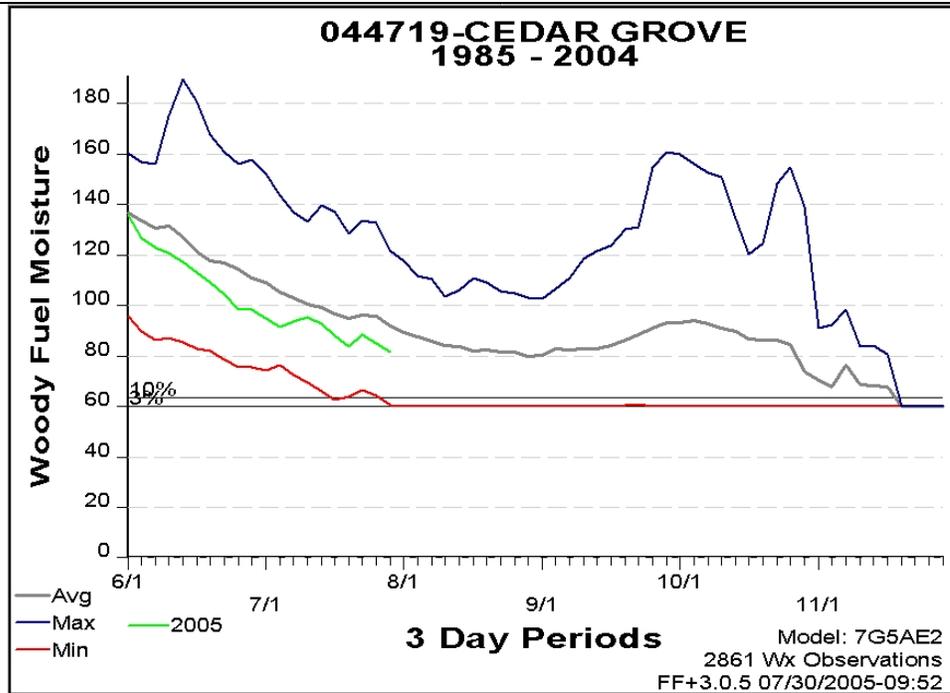
moisture content of live and dead fuels. The amount of precipitation available for plant growth is monitored by several agencies and is referred to as drought monitoring.

The moisture content of woody debris from 3 to 6 inches in diameter (1000 hour fuels) is used as an indicator of drought severity and resistance to fire control. The following graphic depicts the calculated 1000 hour fuel moisture from the weather taken at Cedar Grove RAWS. The current situation shows a drying of this fuel component with values near 8% which is slightly below the average of 10% for this time of year. Lower values in fuel moistures indicate higher severity.

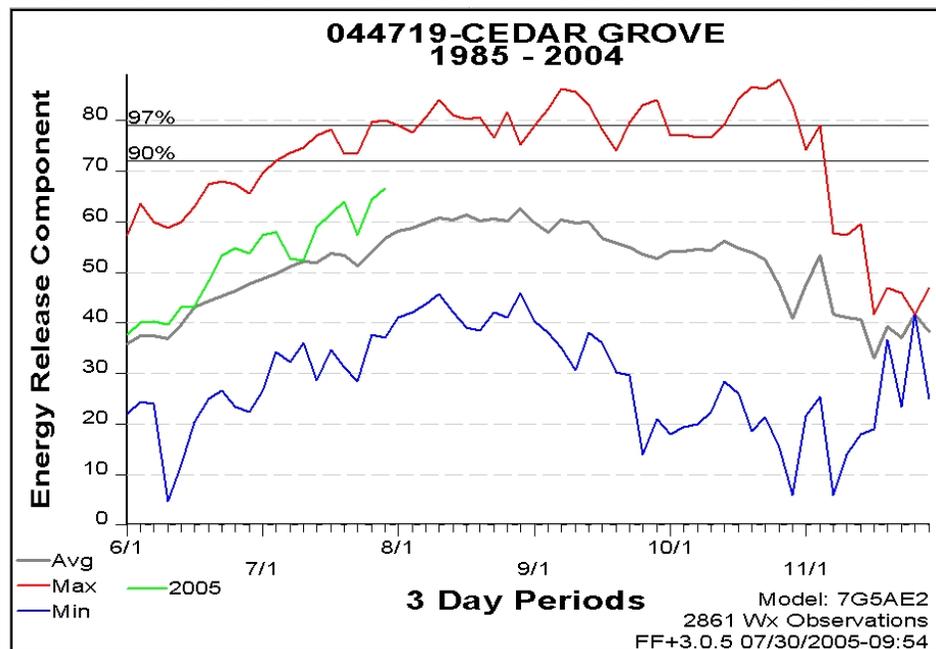


Woody fuel moisture is slightly below average for this time of year. Current woody fuel moisture is 81% with a seasonal average for this time of season of 90%.

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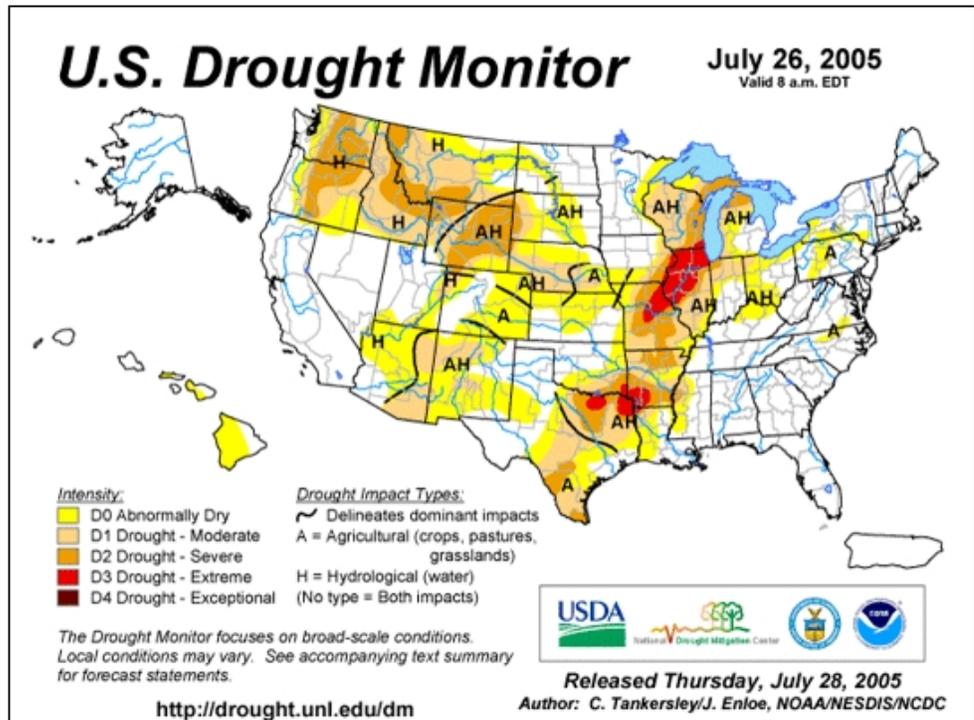


The National Fire Danger Rating System (NFDRS) index used to track the combined effects of fuel dryness on fire potential is called the Energy Release Component (ERC). The following table displays historic ERCs and compared them to the current readings for the Cedar Grove RAWS station. ERC values are currently trending upward, meaning that potential fire severity is increasing, but still below the historic 90th percentile.



Analysis of Drought Conditions:

The following U.S. Drought Monitor graphic below indicates the fire area is currently not in drought conditions. Comparing the fuel moisture graphics above would indicate the area is in a short term seasonal drought or dry period. This is likely due to the above seasonal temperatures that have persisted for the past several weeks, that has driven the herbaceous fuel moistures to historic lows, while the fuels that react more gradually to drying remain near normal levels.

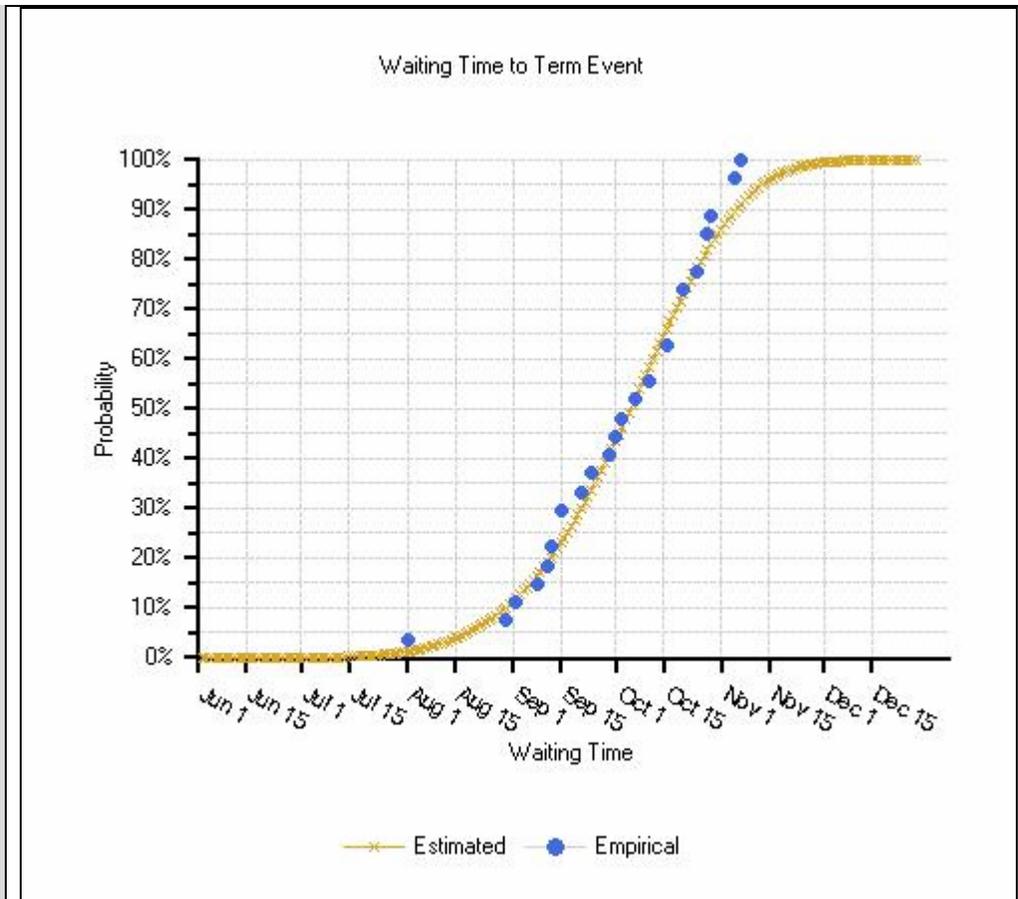


Seasonal Precipitation Patterns:

The central Sierra Nevada range area typically has a dry period starting in early June and ending with the increase fall moisture sometime in late September to early November.

Archived weather data was input into the RERAP program to establish a season-ending-event curve. That curve is shown below. Daily weather data was reviewed from the Cedar Grove RAWs fire weather station for the period beginning June 1st and ending November 31st for years 1978 through 2004. The season ending event was identified by reviewing ERC charts to establish the day when ERC levels fell off sharply and did not rebound significantly for the season.

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Probability of fire season ending event.

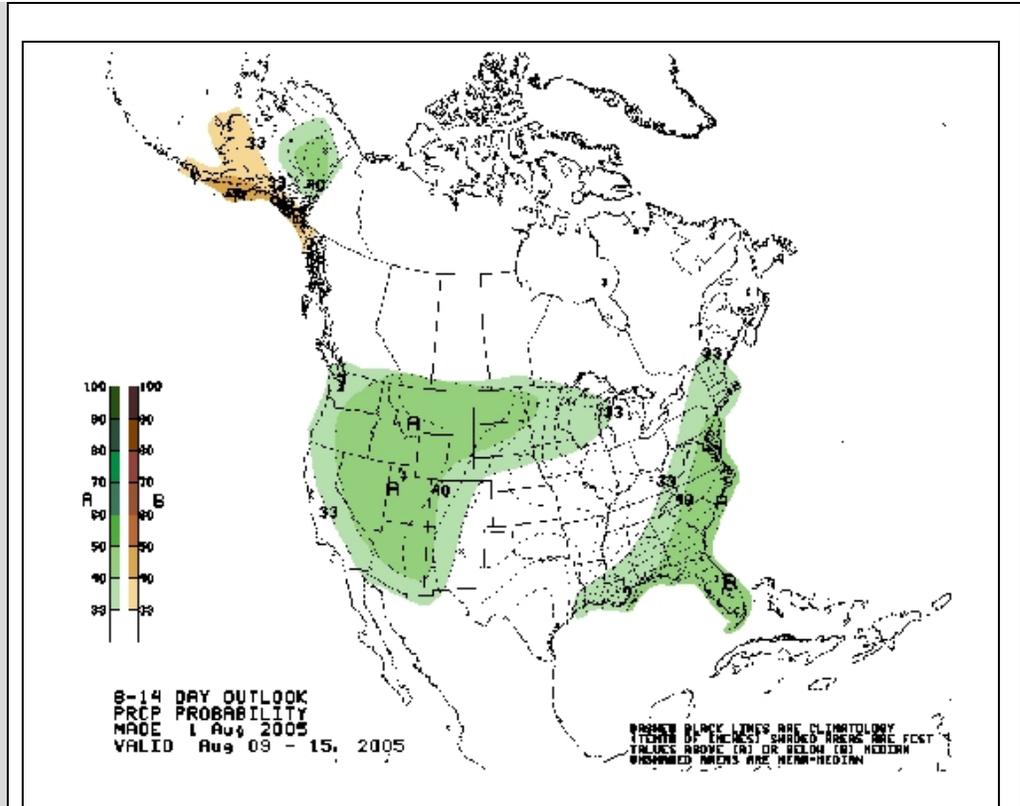
Date	Probability
17-Sep	25%
6-Oct	50%
22-Oct	75%
5-Nov	90%

The result of this analysis indicates that from the fires start, on July 22nd, it has the potential to burn for 56 to 205 days, with the 50% probability of 75 days based on historical season ending events.

Outlook for Precipitation:

The following graphic, for the period from Aug 9, 2005 through Aug 15, 2005, display the projected probability for rainfall. This indicates that, for the fire area, there is equal to 33% probability of above normal precipitation during this period.

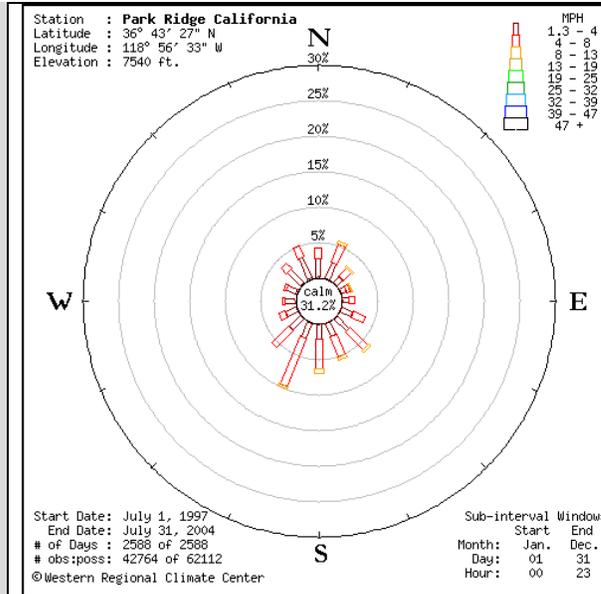
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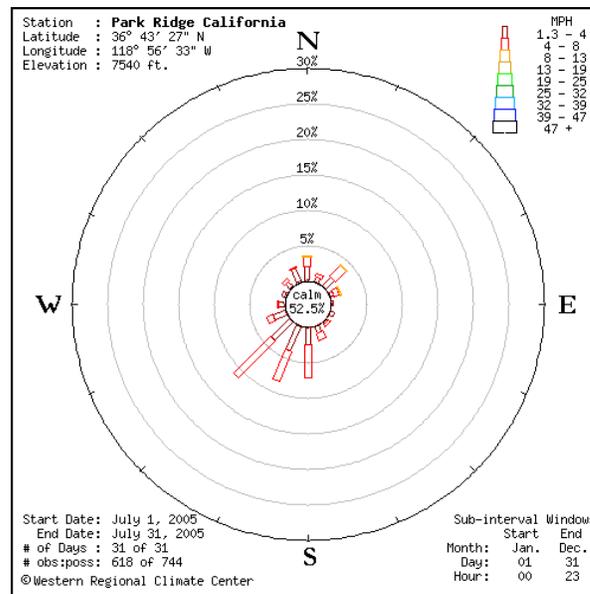
Outlook for Winds:

The following two wind rose graphics for Park Ridge RAWS display data for the period July 1st thru July 31st, for 1997 to 2004 and the second for 2005. These graphics show a greater propensity of winds in the southwest quadrant in 2005. Northeast winds are the winds of greatest concern for smoke dispersion and for fire spread toward Cedar Grove. In 2005 northeast winds are fewer in comparison to historic patterns. Park Ridge wind data was found to be more representative of the fire area. Cedar Grove wind data is strongly influenced by canyon topography.

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Wind Rose 1997 to 2004



Wind Rose 2005

LONG-TERM RISK ASSESSMENT AND MAP (IF APPLICABLE)

**Weather
 Season/
 Drought:
 Discussion
 and
 Prognosis**

Long Term Risk:

A Rare Event Risk Assessment Process (RERAP) analysis was performed to determine the probability that the Comb WFU would reach several points of concern prior to a fire ending event. RERAP allows the fire manager to quantify risk associated with rare and significant events and the uncertainty related to the length of a fire season. Estimates are developed for specific periods of time for given directions, usually dominated by wind events. Probabilities that the

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fire will reach a point of concern before a season ending event occurs (described in the Weather section) were calculated for two points. These line assessments do not reflect any management action in the area. Management actions in the area of the assessment lines may modify fire spread.

Assessment Line	Distance	Wind Direction	Total Risk
7/31 Fire Perimeter to Hwy 180 (Cedar Grove)	125 ch 1.6 mi	N,NE,E Down Valley	74%
7/31 Fire Perimeter to Deer Cove Trail Head	175 ch 2.2 mi	N,NE,E Down Valley	0%

FARSITE Fire Area Simulator Modeling Assessment:

An assessment of fire perimeter growth was performed using FARSITE version 4.1.02 Fire Area Simulator. Landscape and fuel layers were generated from California Vegetation System. Weather data for the simulation was extracted from actual 2005 and historical 2000 weather data from Cedar Grove RAWS. 2000 data was selected because it is similar to present 2005 weather and matches well the present ERC trends. Simulation was run from fire origin to August 31st.

Date	Projected Acres
August 6	2,155
August 11	4,351
August 16	6,593
August 21	9,721
August 26	10,922
August 31	11,465

Conclusion:

Under current and expected weather, the likelihood of the Comb fire threatening the MMA boundary is extremely low. The most significant limiting factor is the barren rock ridges which will check fire growth. The most possible scenarios for a threat to the MMA boundary is to the south along Highway 180 near Cedar Grove which has been assessed in the Long Term Risk section. Holding the fire above Hotel Trail has a high likelihood of success.

All current and forecast weather conditions as well as NFDRS indices suggest that fire severity will continue to be moderate over the next several weeks. Short range outlooks call for above normal

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Fire behavior for the remainder of the fire is expected to be dominated, by surface spread in the timber type with some intermittent torching. If hot and dry conditions coincide with 20 foot wind speeds over 10 miles per hour there is potential for the fire to burn at stand replacement intensities for short runs in the timber fuel type. Areas of stand replacement in the brush type can be expected where slopes are steep and alignment wind is present.

Critical fire event would be winds greater than 10 mph coinciding with relative humidities less than 11%. Analysis of 1985 to 2004 weather indicated 12 of 1840 records found such conditions, or .7% of the time historically in August through October these conditions have occurred.

THREATS

Threats to MMA

Several of the MMA segments are naturally defensible, because they are located above tree line in rock outcroppings. The remainder of the MMA segments may require the implementation of mitigation actions to reduce the risk of a breach.

Segment I: Portions of the MMA boundary are naturally defensible. This segment follows the South Fork Kings River, a natural barrier to surface fire spread. Under low fire behavior the potential for breach of this segment is low.

Under moderate to high fire behavior the probability of short to moderate range spotting occurring across the South Fork Kings River is moderate. The potential for breach of this segment is moderate.

This segment supports a range of vegetation. The portion of the segment within the Park is ponderosa pine, but transitions into brush, grass/oak woodlands, and rock outcroppings near the segment break on the National Forest. Fuels are best described using fire behavior fuel models (FBFM) 9, 5, and 2, respectively. Overall the potential for breach of this segment is low to moderate.

Segment II: This portion of the MMA boundary from the intersection with segment I to Wren Peak is steep and rocky. Flashy fuels, consisting of grass and brush are along this portion of the segment and are best described by FBFM 5. From Wren Peak to the end of the segment it travels through rock outcroppings with scattered isolated pockets of mixed conifer. Fuels for this portion of the segment are best described using FBFM 8. The potential for breach of this segment is low.

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Threats to Public Use and Firefighter Safety

Segment III: This portion of the MMA boundary follows rock outcroppings with scattered isolated pockets of foxtail pine. The potential for breach of this segment is very low.

Segment IV: This portion of the MMA boundary is above tree line and follows rock outcroppings and glaciers. The potential for breach of this segment is very low.

Segment V: This portion of the MMA boundary is above tree line and follows rock outcroppings and glaciers. The potential for breach of this segment is very low.

Segment VI: The portion of the MMA from Junction Rock to the lower end of Sphinx Lakes follows the rock outcroppings and is naturally defensible. From Sphinx Creek to the junction of Bubbs Creek the vegetation is lodgepole pine and red fir, which transitions to brush. Fuels are best described by FBFMs 8 and 5, respectively. The potential for breach of this segment is moderate if spotting occurs.

Threats to Public and Firefighter Safety:

Public:

- ❑ Trail closures, and possible area closures, will be implemented to limit exposure of visitors to unsafe conditions in the fire area and adjacent areas within the MMA.
- ❑ Personnel will be assigned to areas not closed to alert back country users of potential hazards.
- ❑ Firefighters may escort visitors through fire area, as deemed necessary. This will be done during optimal periods of limited fire activity (i.e. early morning).

Firefighters: the following procedures will be implemented to mitigate threats to firefighters:

- ❑ Fire personnel will approach the fire using safe routes after lookouts, good communications, escape routes, and safety zones (LCES) have been established.
- ❑ Fire personnel will follow the policies for hazard trees outlined in the Job Hazard Analysis for Sequoia/King's Canyon National Parks and the Incident Response Pocket Guide, page 73.
- ❑ Follow all other appropriate JHA.
- ❑ All fire operations will be conducted in accordance with standard operating procedures regarding PPE and strict adherence to the 10 FIRE ORDERS and 18 WATCHOUT situations. The LCES concept will be reinforced at every briefing and in each division/group assignment sheet or incident action plan.
- ❑ All aviation policies and procedures will be strictly adhered to.

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- ❑ Ensure medivac protocols and procedures are established and followed.
- ❑ Provide and maintain 24-hour communication capability with field personnel.
- ❑ See "Monitoring Actions" for smoke monitoring guidelines.
- ❑ Keep work areas and spike camps clean to avoid bear issues. Use bear boxes for food storage.
- ❑ Remain alert for possible illegal activities within the MMA including marijuana plantations.
- ❑ Stay abreast of changing weather conditions (thunderstorms) that could effect fire behavior or produce lightening.
- ❑ Reduce firefighter exposure to prolonged smoke emissions.
- ❑ Reduce firefighter fatigue with scheduled personnel rotation.

Smoke Dispersion and Effects

Fire Managers have developed smoke contingencies that can be implemented should a reduction in smoke emissions be required. Management actions with pre-identified smoke contingency lines are areas where fire spread could be directed, delayed or checked to reduce smoke emissions. These operations will require exposure of firefighters to a varying level of safety hazards, from low to high and require an expenditure of tax payer dollars. Therefore, any decision to implement these contingencies should be based on sound analysis of meteorological data and PM10 monitoring data.

The automatic default isn't total suppression, but the total range of management actions (delay, direct or check) will be considered. For example, fire spread may be checked until more favorable meteorological conditions occur. When conditions improve, fire spread may be allowed again. Under sustained unfavorable conditions, full suppression may be an option. In all scenarios, appropriate management response will be employed to manage the fire for favorable outcomes.

When Air District Long Range forecasts indicate persistent conditions of easterly flows, poor dispersion or transport, the fire managers could prepare to utilize the appropriate management, i.e. directing, checking, delaying, and/or limited suppression actions indicated below in the smoke contingency section during times of diminished smoke dispersion.

Smoke Contingency:

The fire spread can be checked to the south to minimize impacts to smoke sensitive areas in the South Fork Kings River drainage at Cedar Grove and Highway 180.

- ❑ A fire line has been constructed along the ridge from Stag Dome west connecting to the Deer Cove Trail in the Monarch Wilderness.

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- ❑ A fire line used during the spring 2005 Lewis Creek prescribed burn has been improved, and extends from Stag Dome south to Lewis Creek.
- ❑ A fire line has been constructed from Lewis Creek to the Lewis Creek/Hotel Creek Trail Junction, and the Hotel Creek trail has been improved to the east and tied into Hotel Creek to act as a fire line.

The above actions have been taken to facilitate opportunities to check the fire's spread south towards areas of higher fuel loads and smoke sensitive areas.

Fire spread to the north and east should be self-limiting at timberline. The fires spread to the west will be slowed significantly by reduced fuel loadings within recent fire perimeters (Lewis Creek Burn March 2005, Choke Fire 1997). Fire spread to the east above Cedar Grove will be slowed due to the 1998 Lewis Creek Prescribed Burn.

- ❑ All smoke management actions will be coordinated with the San Joaquin Valley Air Pollution Control Districts (SJVAPCD) and Great Basin Unified Air Pollution Control Districts.
- ❑ A meeting with compliance staff from San Joaquin Valley Unified Air Pollution Control District occurred on August 2 to discuss air quality issues. Support to proceed with the Comb Wildland Fire Use project exists.
- ❑ For monitoring of smoke, see the section titled "Monitoring Actions." If further effects analysis is desired, fuel consumption and emissions production can be estimated using CONSUME, NFSPUFF or other emission production models.
- ❑ SJVAPCD will receive weekly fire updates, and more often as requested. In addition, they will be contacted prior to implementation of any burnout operations and during periods of smoke impacts.

Other Threats

Other Threats

- ❑ Wilderness and backcountry
- ❑ Smoke Management
- ❑ Cultural Resources
- ❑ Natural Resources
- ❑ T&E Species
- ❑ Sensitive Species
- ❑ Caves
- ❑ Old growth Pinyon Pine
- ❑ Administrative Sites
- ❑ Infrastructure outside the MMA

MONITORING ACTIONS

Describe

Monitoring is important to document fire weather, fire behavior, smoke

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Monitoring Actions, Frequency, Duration	<p>dispersal and volume, and to validate fire behavior predictions. Monitoring variables that are important include: smoke dispersal, live and dead fuel moistures, daily weather observations, mapping fire perimeter and progression, and observed fire behavior. Monitoring locations and frequency will depend upon fire activity, safe access for firefighters, and proximity of fire to critical resource concerns.</p> <ul style="list-style-type: none">❑ Photographic documentation will be used to document smoke movement, fire behavior, fuel types and other site-specific information. Digital photos will be saved for future use.❑ Smoke production and movement can be documented by monitors on scene and aerial recon. This documentation may be supplemented by helicopter over flights. Currently E-Bam's are located at: Cedar Grove, Hume Lake, Trimmer, and Pinehurst to track particulate matter emissions. Note: FS E-Bam's monitor 2.5 NPS E-Bam's monitor PM10. The Air District will be kept informed on smoke production and dispersal through daily 1300-hour conference calls led by the California Air Resources Board.❑ On site fire personnel will record smoke and weather observations. In addition the Cedar Grove Remote Automated Weather Stations (RAWS) will provide 24 hour weather conditions. Other RAWS are located at Sugarloaf and Park Ridge.❑ Fine dead fuel moisture content may be evaluated using dead fuel moisture reference tables and from the Cedar Grove RAWS computed values. When requested, fire personnel will collect live and dead fuel moisture samples and provide them to the fire behavior section of the identified fire management team for processing documentation and use.❑ Fire behavior will be monitored from aerial reconnaissance and by ground personnel. Mapping of fires to obtain current size, fire growth, and proximity to management action points and critical resource concerns will be conducted by aerial reconnaissance and on-the-ground fire personnel. Data will be relayed to the affected agency and requisite fire management team for map production and documentation.❑ Specific monitoring locations, frequency, and necessary personnel will be identified in Incident Action Plans.❑ Buck Rock Lookout, Hume Lake RD, will monitor smoke volume and smoke dispersal.
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MITIGATION ACTIONS

Mitigation Actions for cultural, natural, and admin.	<p>Management actions were developed to protect Wilderness and backcountry resources, cultural resources, natural resources, and administrative sites to the greatest extent possible while providing for firefighter and public safety. Many of the mitigation actions presented below are common to the entire MMA.</p>
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resources.

Mitigation Actions:

Wilderness and Backcountry Mitigations:

- Brief all personnel assigned to the incident on Minimum Impact Suppression Tactics and Fireline Rehabilitation Specifications standards (Appendix II & III). Integrate these standards into all operations including spike camps.
- Field Resource Advisors will be assigned to line operations, as deemed necessary.

Cultural Resources:

- Minimize impacts to all identified sensitive cultural and historical resources affected by tactical and logistical operations. Coordinate all mitigation actions involving resources with Resource Advisors and archeologists.
- Consult Park and Forest Resource Advisors and archeologists when assessing all new starts in the Comb Creek MMA.
- Avoid ground disturbance in the known site south of Frypan Meadow along the Lewis Creek Trail.

Natural Resources:

Exotic & Invasive Plant Species

- Brief and provide all assigned and incoming personnel on the following documents:
 - Preventing Introduction and Spread of Invasive Non-Native Plants (Appendix IV)
 - Non-Native Invasive Plants: A growing Problem (Appendix V)
 - Front Country to Backcountry Travel Guidelines. (Appendix VI)
- All incoming resources must have their vehicles inspected for accidental transportation of non-native plants. Vehicles contaminated by non-native plants must be washed and cleaned prior to driving through the Park. This will be coordinated by the WFU logistics lead.

Threatened & Endangered & Sensitive Species

- No impacts to spotted owls, Goshawks, or Fishers are anticipated.

Sensitive Plant Species

- No impacts to identified sensitive plants including Tomkins Sedge, Unexpected Larkspur, or Buckwheat are anticipated in the vicinity of Junction Ridge and Choke Fire areas.
- Update Forest Wildlife Biologist on status of fire.
- Avoid handline construction in known populations of Carex tompkinsii along the Hotel Creek Trail above Cedar Grove (Appendix VII).

Caves

- All ground personnel should avoid the Boyden Cave Area. However if management actions are taken in this general area coordinate with

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Describe Holding Actions and Other Mitigation Actions, and Management Action Points that initiate these actions, and Key to Map if necessary

the District Resource Advisor prior to taking action. No impacts to cave resources are anticipated.

Old Growth Pinyon Pine:

- Natural fire regime for old growth pinyon pine is infrequent stand replacement fire. Previous fire history indicates this is not a common occurrence. However, it is predictable that this fire behavior could be characterized in future fire events. Minimize burnout operation impacts to known old growth pinyon pine stands located throughout the rock band above Cedar Grove.

Administrative Sites:

- Implement management actions to protect recreation developments (refer to MAP G).

Management Action Points (MAPS) are described as eight separate and distinct points in time or physical location. They signal the need to carryout measures to mitigate fire threats to personnel, public safety, resources, and/or the MMA.

MAP A: When fire crosses Lewis Creek to the west.

Segments Affected: None.

Threats to Mitigate: None

Mitigation Actions: Initiate management actions to mitigate firefighter and public safety concerns if fire continues to spread to the west.

- Monitor fire behavior and fire effects. Map fire perimeter.
- Improve the integrity of the Lewis Creek Prescribed Fire (2005) handline from Stag Dome into Lewis Creek.
- Construct handline from H-2 southwest down the ridgeline to the Deer Cove Trail.
- Improve the integrity of the Hotel Creek Trail from the Lewis Creek Trail junction to the cliff band above Cedar Grove at Hotel Creek.
- Construct handline from the junction of Hotel Creek Trail and Lewis Creek Trail west down the ridgeline and tie into Lewis Creek.
- Construct handline from the Hotel Creek Trail east along the cliff band above Cedar Grove and tie into Hotel Creek.

Resources Need: 1-20 person handcrew, 1-10 person handcrew, 1-Type 3 Helicopter, 2- FOBS, 2-5 FEMO's .

Estimated Time to Complete: 2-3 days.

MAP B: Fire reaches drainage north of the Hotel Creek and Lewis Creek Trail junction prior to October 1.

Segments Affected: I

Threats to Mitigate: Infrastructure associated with Cedar Grove. Public safety.

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Mitigation Actions:

- ❑ Monitor fire behavior and effects. Map fire perimeter.
- ❑ Check fire from backing south into Cedar Grove by burning out Hotel Creek Trail. Limit or eliminate aggressive burnout effects to old growth pinyon pine stands. Initiate burnout actions when the fire is approximately 3-5 chains from the Trail, staying even with the natural spread of the fire.
- ❑ Implement closure of Hotel Creek Trail restricting public access.

If fire reaches MAP B after October 1.

- ❑ Monitor fire behavior and fire effects. Map fire perimeter.
- ❑ Patrol Cedar Grove.
- ❑ Consider closing entrance gate to Cedar Grove.

Resources Needed Prior October 1: 1-10 person crew or Fire Use Module, 1-type 3 helicopter, 3-5 FEMO's.

Resources Needed Post October 1: 2 - 5-FEMO's, 2-Type 3 or 6 engines.

Estimated Time to Complete: Varies depending on rate of fire progression/spread.

MAP C: Fire crosses north/south administrative boundary between NPS/FS.

Segments Affected: II

Threats to Mitigate: Breach of MMA. Public safety. Smoke management.

Mitigation Actions:

- ❑ Monitor fire behavior and effects. Map fire perimeter.
- ❑ If fire crosses administrative boundary close Deer Cove Trail (30E01), Happy Gap (30E02), and Choke Creek (30E03) and associated trail network on Sequoia NF.
- ❑ If fire crosses between H-1 and H-2 check fire spread to the southwest by burning out handline from H-2 to Deer Cove Trail. Implement burnout actions to produce a low intensity fire. Initiate these actions when the fire is approximately 3-5 chains from the handline, staying even with the natural spread of the fire.

Resources Needed: 1-10 person handcrew or 1-Fire Use Module, 3-5 FEMO's, 4 firefighters to sign and sweep trail network.

Estimated Time to Complete: 1-day to close trail. Checking and directing actions will vary depending on fire activity.

MAP D: Fire reaches the East Fork of Lewis Creek or the ridgeline west of the administrative boundary.

Segments Affected: None.

Threats to Mitigate: Public safety.

Mitigation Actions:

- ❑ Close the Lewis Creek Trail from Frypan Meadow to Kennedy

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Pass to the public. Assess administrative use.

Resources Needed: 2-4 personnel.

Estimated Time to Complete: 1 day

MAP E: Fire reaches the MAP from Deer Cove Trailhead to H-2 to Lewis Creek prior to October 1.

Segments Affected: I

Threats to Mitigate: Breach of MMA, public safety, smoke management

Mitigation Actions:

- ❑ Monitor fire behavior and effects. Map fire perimeter.
- ❑ Check and delay fire spread by burning out handline, if not already completed in MAP C. Implement burnout actions to produce a low intensity fire. Initiate these actions when the fire is approximately 3-5 chains from the Lewis Creek Prescribed Fire handline, staying even with the natural spread of the fire.

Resources Needed: 1- Type 1 Crew or 1-2 Fire Use Modules, 1 helicopter with bucket capacity of at least 300 gallons, 3-5 FEMO's.

Fire reaches MAP E after October 1:

Segments Affected: I

Threats to Mitigate: Breach of MMA.

Mitigation Actions:

- ❑ Monitor fire behavior and effects. Map fire perimeter.

Resources Needed: 3-5 FEMO's.

MAP F: Fire reaches the management action point between Deer Cove Trail and Grand Dike Ridge prior to October 1.

Segments Affected: I and II

Threats to Mitigate: Breach of MMA. Smoke Management. Public Safety.

Mitigation Actions:

- ❑ Monitor fire behavior and fire effects. Map fire perimeter.
- ❑ Delay fire spread southwest with bucket drops. Initiate this action to reduce smoke emissions in the area with heavier fuel loadings.
- ❑ Ground personnel are not recommended due to steep rugged terrain and heavy fuel loadings.

Resources Needed Prior October 1: 1- Type 2 helicopter with bucket capacity of at least 300 gallons, 3-5 FEMO's.

Estimated Time to Complete: Varies depending on rates of spread.

If fire reaches MAP F after October 1:

- ❑ Monitor fire behavior and effects. Map fire perimeter.
- ❑ Coordinate with California Department of Transportation to assess the need to close Highway 180.
- ❑ Sign and patrol Highway 180 as fire approaches. Coordinate

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	<p>with NPS to discuss and coordinate possible gate closure into Cedar Grove.</p> <ul style="list-style-type: none"> □ Ground personnel are not recommended due to steep rugged terrain and heavy fuel loadings. <p>Resources Needed After October 1: 3-5-FEMO's, aerial recon as appropriate.</p> <p>Estimated Time to Complete: Varies depending on fire progress and rates of spread.</p> <p><u>MAP G: Fire reaches the Monarch Wilderness boundary above Highway 180.</u></p> <p>Segments Affected: Segment I</p> <p>Threats to Mitigate: Grizzly Picnic Area and Deer Cove Trailhead.</p> <p>Mitigation Measures:</p> <ul style="list-style-type: none"> □ Monitor fire behavior and effects. Map fire perimeter. □ Construct handline around wooden improvements. <p>Resources Needed: 2- Type 3 engines, 2-5 FEMO's (as needed)</p> <p>Estimated Time to Complete: 1 to 3 days.</p> <p><u>MAP H: Fire reaches the management action point between the 7750' high point on the forest boundary south of Wildman Meadow, west to the 6400' elevation contour that intersects Grizzly Creek.</u></p> <p>Segment affected: Segment I</p> <p>Threats to mitigate: Firefighter safety and Smoke Management.</p> <p>Mitigation Actions:</p> <ul style="list-style-type: none"> □ Monitor fire behavior and effects. Map fire perimeter. □ Delay fire spread south using bucket drops to delay spread into heavy fuel loadings to reduce smoke emissions. <p>Resources needed prior to September 15: 2 FEMOs, 1 T1 or 2 T2 helicopters.</p> <p>Estimated time to complete: Varies depending on rate of spread.</p> <p>Resources needed after to September 15: TBD based on existing and projected burning conditions.</p>
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RESOURCES NEEDED TO MANAGE THE FIRE UNDER EXPECTED WEATHER CONDITIONS

Describe resources necessary to accomplish ignition, holding, other	Resources needed to continue management of the Comb Complex are located in (Appendix VIII).
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mitigation actions, and monitoring actions

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CONTINGENCY ACTIONS

Describe Contingency actions, management action points that initiate them, resources needed, etc.

If fire crosses MMA, the appropriate management response will be initiated. This may include suppression through direct and indirect attack or confinement using manmade and/or natural barriers. If containment of the breach cannot be accomplished within 48-hours, the Comb WFU will be converted to a wildfire, and a WFSA will be prepared to select the appropriate strategic alternative and identify necessary resources. These resources may include handcrews, aircraft, miscellaneous overhead other support personnel and equipment.

Segment I

Values at Risk: Values at risk include Cedar Grove infrastructure of buildings, utilities and visitor use sites, and the structures associated with Boyden Cave (ticket booth, gift shop) and Kings Canyon Lodge (rustic restaurant, privately owned and not historic).

Management Actions: High Value infrastructure to be protected using direct attack with engines and bucket drops. Burnout between barriers (roads, river) as practical.

Resources Needed Cedar Grove: Five (5) T3 engines; one (1) STEN; two (2) IHCs; two (2) T3 helicopters w/300 gallon bucket (minimum).

Duration: Two (2) days

Estimated Costs: \$30,000

Resources Needed Boyden Cave: 2-3 Type 3 engines.

Duration: One to two days.

Estimated Costs: \$3,000 – \$6,000

Resources Needed Kings Canyon Lodge: 2-3 Type 3 engines.

Duration: 1-2 days.

Estimated Costs: \$3,000 – \$6,000

Segment II

Professional judgment and experience by local fire management personnel and the results from the long term analysis indicate the segment boundary extending east from Eagle Peak (along Junction Ridge) to Mount Harrington has a very low probability of being breached. If fire crosses the MMA boundary at any point along

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Junction Ridge, west from Eagle Peak to the Segment I junction, the appropriate management response will be initiated. Due to the extremely rugged terrain in this area it is recommended that actions be restricted to bucket drops and/or confinement using natural barriers.

Segments III, IV, and V.

Professional judgment and experience by local fire management personnel and long term analysis indicate segments III, IV, and V are protected by various peaks and ridges that make up the High Sierra Crest and have a very low probability of being breached.

Segment VI

Professional judgment and experience by local fire management personnel and long term analysis indicate the segment boundary extending from Sphinx Lakes Basin south to the Segment V Junction to have a low probability of being breached. If the fire crosses the MMA boundary at any point from the Sphinx Lakes Basin north towards the Segment I junction, the appropriate management response will be initiated.

INFORMATION PLAN

Describe Information Plan, Contacts, Responsibilities, etc.

The National Park Service and the U.S. Forest Service understand that fire use projects provide excellent educational opportunities for visitors and local residents.

The document, *Standard Operating Procedures for Fire & Fuels Management Plan at Sequoia & Kings Canyon National Parks, Public Information & Education*, (Appendix IX) will serve as the Information Plan for the Comb Complex. The goals of plan are to ensure that visitors, employees, local residents, neighboring agencies, and the media understand the fire objectives for this specific project as well as general fire ecology and history of the area, and that targeted audiences are provided accurate and timely information. All information should be reviewed by the fire-use manager and/or the fire management officer for the park and forest.

Activities planned to meet the goals include the following:

- Prepare press releases or daily fire updates for distribution by fax and email. These lists include employees for the Sequoia National Forest and National Park, cooperating and neighboring agencies, media, local residents, businesses, visitor centers, entrance stations, regional/national offices, adjacent land owners and other interested parties. The update will include current status on fire activity, anticipated planned actions, and other pertinent

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	<p>information regarding such things as smoke management, structure protection, closures, etc.</p> <ul style="list-style-type: none"> ❑ Post press releases and/or information on park bulletin boards, community bulletin boards and temporary bulletin boards strategically placed near the incident, and in the park and forest. ❑ Work with park and forest personnel to ensure that affected trailheads and roads accessing the fire area are posted with appropriate safety messages. ❑ Record “fire message” on the park and forest phone systems that is accessible to visitors explaining fire activity and any closures. ❑ Host media site visits and facilitate interviews for print, radio, and television reporters. ❑ Make personal phone calls to smoke sensitive residents in the affected area. ❑ Provide information to update the forest and park internet web sites including, but not limited to; fire maps, narratives, and updates about the fire. ❑ Work in conjunction with the assigned Resource Advisor(s) to ensure information interest needs are met. ❑ Coordinate with the forest Public Affairs Officer and park Fire Information Officer to ensure public issues are addressed in a coordinated and consistent manner. Arrange and coordinate information requests from political officials, local air districts and other interested parties. ❑ Work with supervisors in interpretive services to provide current project information that can be incorporated in visitor center contacts, scheduled hikes, walks, and campfire programs. ❑ Provide appropriate training opportunities for park and forest personnel.
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ESTIMATED COSTS OF MANAGING THE FIRE

<p>Describe costs in terms of resources needed, projected duration, etc.</p>	<p>A cost summary will be prepared by the team at the close out and will be included in the transition plan.</p> <p>Cost will vary dependent on which MAPs are implemented. See Appendix X for a summary of estimated costs by MAP.</p>
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POST-BURN EVALUATION

<p>Describe post-burn evaluation procedures, resource</p>	<p>Post-burn evaluations will be conducted to evaluate the degree of accomplishment of stated objectives and desired fire effects. Secondly, an evaluation of the total operation is vital to improvement of programmatic efficiency. Specific areas to be evaluated include, but are not limited to:</p>
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**requirement,
costs,
duration, etc.**

- ❑ Management and mitigation of safety, risks, and hazards.
- ❑ Use of best available science, including weather and fire behavior forecasts, long-term risk assessments, fire growth simulations if applicable.
- ❑ Public information and education, notification of individuals, groups, and areas potentially impacted by the fires.
- ❑ Strategy and tactic development and implementation.
- ❑ Consistency with Delegated Authority directions.
- ❑ Consistency with land and resource management plans and fire management plans.
- ❑ Attention to resource management issues and concerns.
- ❑ Adequacy of local agency involvement and support.
- ❑ Evaluations will be conducted to determine rehabilitation needs and urgency.
- ❑ Use of minimum impact suppression tactics.
- ❑ Long-term evaluations will be carried out to assess rehabilitation accomplishments.
- ❑ Post fire CBI fire severity sampling and analysis will be conducted 2006.

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SIGNATURES

Include signatures / titles / dates for preparing, approving, and any concurring individuals

Prepared & Recommended by: Roy Hall, IC SW FUMT
Reviewed & Recommended by:
Reviewed & Recommended by:
Reviewed & Recommended by:
Reviewed & Approved by:
Reviewed & Approved by:
Review & Concurrence: Sharron Wedro, Air Quality

