

4 Fire Management Units and the Planning Process

This chapter outlines the planning work that leads to actual project implementation in support of the Fire and Fuels Management Plan. The process is summarized in Figure 4- 1. This chapter also describes in detail the parks' Fire Management Zones (hereinafter referred to as "Zones"), Fire Management Units (hereinafter referred to as FMUs), Segments, and Sub- Segments (Table 4- 5).

PROJECT PLANNING AND PRIORITIZATION

All planning efforts begin with the identification and description of areas in need of fire management action or attention. Needs are evaluated in light of park values, wildland fire hazards, and risks (Caprio et al, 1997).

- **Values** are divided into three areas: ecological, cultural, and social. Ecological values include vegetation, water, wildlife, natural processes, and air resources. For example, natural fire regimes (a natural process) are assessed through an analysis of the fire return interval departure (FRID). This analysis reflects the number of fires a piece of land has missed based on that area's maximum natural fire return interval (see special FRID explanation in Figure 4- 2). FRID is an indicator of condition class (as defined by Hann and Bunnell) and can be directly related to the national reporting standard for condition class. Cultural resource values include prehistoric and historic cultural sites, historic structures, and contemporary structures, both government- owned and private. Social values include park employees, visitors, neighboring communities, and wilderness.
- **Fire hazard** is defined as a fire's resistance to control. Hazard is determined by factors that affect fire behavior. Examples of factors that affect fire hazard include slope, aspect, fuels, and elevation.
- **Risk**, or probability of fire occurrence, includes both human and naturally caused ignitions.

While the most important attributes of value, hazard, and risk are known, others may be identified and incorporated into decision- making in the future. New research and information is constantly considered to increase the parks' ability to apply the best available knowledge to fire and fuels management. Most of the planning analysis is now done using the parks' geographic information system (GIS), although some analysis work has yet to be automated. Needs analyses are updated annually and can reflect the changes in the parks' understanding of values, hazards, and risks, and incorporate new technologies as those evolve.

With the "needs" analysis typically identifying more acres needing attention than are possible to accomplish in any one year, **priorities** have to be selected based on a combination of criteria. Each year, managers will select projects that have a high probability of success, and that move resource and hazard fuel conditions towards the desired status as defined by program goals and objectives. To assist in selecting the most important projects from all the areas needing

attention, criteria that help identify the highest priority project areas are identified and assigned numerical weight within the park GIS. These numeric values are then processed through a spatial analysis. An interdisciplinary team analyzes outputs of the analysis, and a final suite of high priority projects is selected for implementation.

Selection criteria used to identify high priority project areas may change over time as new scientific or operational considerations warrant. Though subject to change based on new information, selection criteria for the identification of high priority projects may include:

- Areas where hazard fuel conditions threaten developments, firefighter safety, and boundaries
- Areas of frequent natural or human ignition where preventative actions may be useful in preventing unwanted fire.
- Areas of special ecological or social significance (e.g. Giant Forest grove).
- Core fire management maintenance areas representative of the full range of park vegetation communities and wildlife habitats.
- Areas that are presently in good- to- excellent ecological condition as evaluated by the FRID analysis or similar index (e.g. condition class as defined by Hann and Bunnell).
- Areas at risk of moving to a more compromised FRID condition category (e.g. from moderate to high departure from natural) in the next five years.

After annual analyses are completed and priority projects are selected, site specific management actions are then designed which address one, or a combination, of the three categories of values, hazard, and risk.

The specific combination of programmatic directions and management actions vary for the three Zones (described in Section C of this chapter). For instance, the Kings Zone is primarily managed for ecological values since wilderness prevails and the ecological condition appears to be satisfactory in much of the Zone. As a result, the vast majority of natural ignitions will be managed as fire use projects. The Cedar Grove FMU within the Kings Zone was delineated to accommodate additional social values created by the presence of people, structures, and infrastructure at Cedar Grove. These social values modify the ability to use fire use projects, resulting in an increase in the suppression of natural fires in the FMU. This in turn creates a need to apply other fuels management activities to maintain ecosystem health. Finally, individual treatment segments within the Cedar Grove FMU will be identified to describe and apply specific management actions that address values, hazards, or risks.

Since successful projects take several years to plan and implement, annual project prioritization and planning will be conducted within a multi- year frame of reference – generally a five year moving window (the current planning year plus four out- years). This allows the park to anticipate planning, compliance, site preparation, and budget needs for future projects. It also allows the park to develop multi- year strategies that will result in the most efficient operations.

UPDATE, CERTIFICATION, AND REVIEW

Annual Update

Fire and Fuels Management Plan updates will occur each year to incorporate minor changes in terminology, policy, GIS analysis, and new scientific information. Other typical annual update components will include summary statistics from the previous year's fires, changes to the parks' *Preparedness Staffing Plan*, and readiness calendars. Another major function of the annual update will be to list specific prescribed fire and mechanical fuel reduction projects proposed for the upcoming season, as well as describe planning and implementation projections for an additional four years.

Program Certification

The fire management officer will present the annual updates and proposed program to the Fire Management Committee by mid- June along with an Environmental Screening Form. The Fire Management Committee will review the proposals and confirm that the changes and actions proposed are within the scope of the companion Environmental Assessment (EA) for the *Fire and Fuels Management Plan*. If the nature of any part of the proposal is found to be outside the scope of the plan's EA, additional environmental compliance will be required for the non-conforming actions. After the Fire Management Committee is satisfied with the proposed program, they will recommend adoption to the superintendent. The update and annual program must be signed by the superintendent prior to implementation.

Periodic Review

Five years after final approval, and every five years thereafter, the *Fire and Fuels Management Plan* will receive thorough review to determine whether it remains adequate to direct future fire and fuels management actions. If significant new information, policy changes, or scientific knowledge (such as new information on the effects of global climate change) needs to be incorporated into the fire and fuels management program resulting in effects or consequences not evaluated in the current EA, the plan and EA will be revised. If no substantial changes to program direction or effects are discovered during the review, the plan may be renewed for an additional five years with proper documentation.

Figure 4-1 – Annual Project Planning and Analysis Flowchart

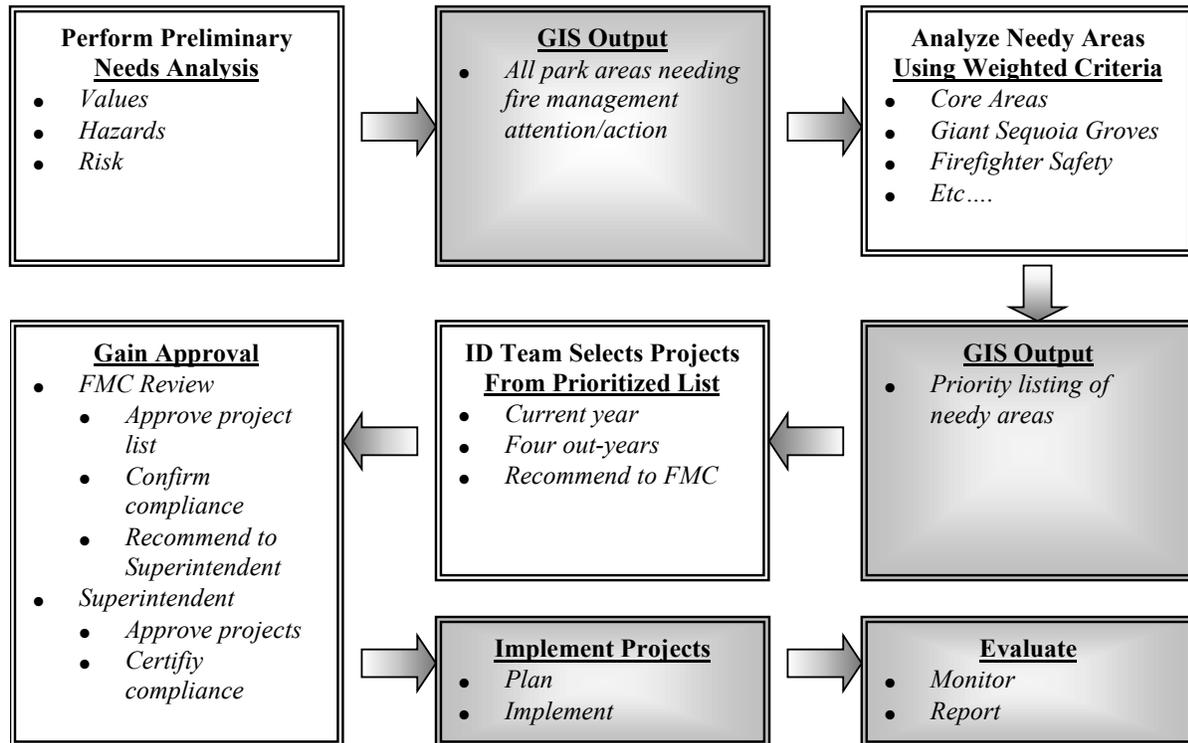


Figure 4-2 – Description of Fire Return Interval Departure (FRID) / Condition Class

Vegetation communities can change dramatically when areas have not been allowed to burn at natural intervals. A geographic information system (GIS) based analysis was used to assess landscape scale change in the ecological condition of vegetation communities in Sequoia and Kings Canyon National Parks. This analysis uses deviations from the natural fire return interval as an indicator of change in natural conditions.

A fire return interval is defined as the number of years between naturally occurring fires at a specific location that is representative of a typical stand of that vegetation. For example, an analysis of fire scar in a stand of ponderosa pine trees might show that natural fire has occurred as frequently as every two years (minimum value) to as infrequently as every six years (maximum value). The mean value for the stand would be four years.

The fire return interval for a given vegetation type can be used in conjunction with fire history maps to determine which park areas have missed natural fires. This information is known as the fire return interval departure (FRID). For example, if fires were suppressed in the above-mentioned stand of ponderosa pine trees for 60 years, the stand would have missed 30 fires based on the minimum fire return interval of 2 years, 15 fires based on the median interval of 4 years, and 10 fires based on the maximum interval of 6 years.

In general, the further vegetation communities depart from their natural fire regimes, the more unnatural conditions prevail and the higher the risk of a stand replacement wildland fire, which is not natural to most Sierran forests. Maximum fire return interval departure (FRID max) represent the most conservative estimate of how severe the deviation from natural conditions might be in terms of fuels and vegetation. Mean fire return interval departure (FRID mean) gives a more moderate view, while the minimum fire return interval departure (FRID min) presents the most extreme indication of how far the stand is from its natural condition. For planning purposes, SEKI uses the most conservative indication of change (FRID max).

The first step is to assign mean and maximum fire return intervals to fire vegetation types (see Table 9-1 in Chapter 9). The second step was to use fire scar, fire history, and fire occurrence data to create a map of when each acre of the park had last burned (Figure 4-3). Fire history maps date back to 1921 for the parks. The final step was to calculate departures from the natural fire interval and create a map that depicts the number of fire cycles missed in each area. (Figure 4-4).

As of the year 2001, results of the FRID analysis indicate that 50% of park vegetation is considered to be in acceptable ecological condition (i.e. little to no deviation from natural fire regime). These areas are expected to remain in acceptable ecological condition as long as the natural fire regime is maintained. Another 31% of the parks' vegetation shows significant deviation from natural conditions and 19% of the parks are considered highly compromised by past fire suppression actions over the past 70 years.

FRID is an indicator of condition class (as defined by Hann and Bunnell) and can be directly related to the national reporting standard for condition class as shown in the diagram below.

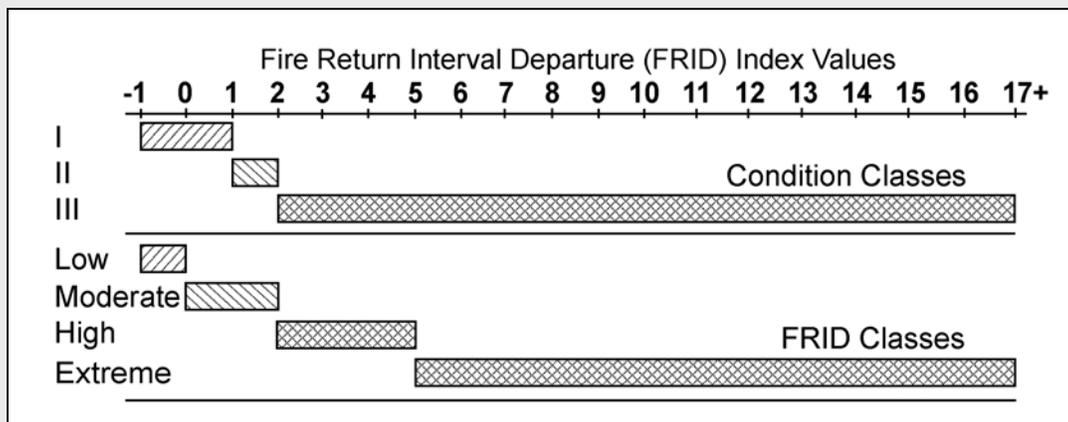


Figure 4-3 – Map of Sequoia and Kings Canyon Fire History

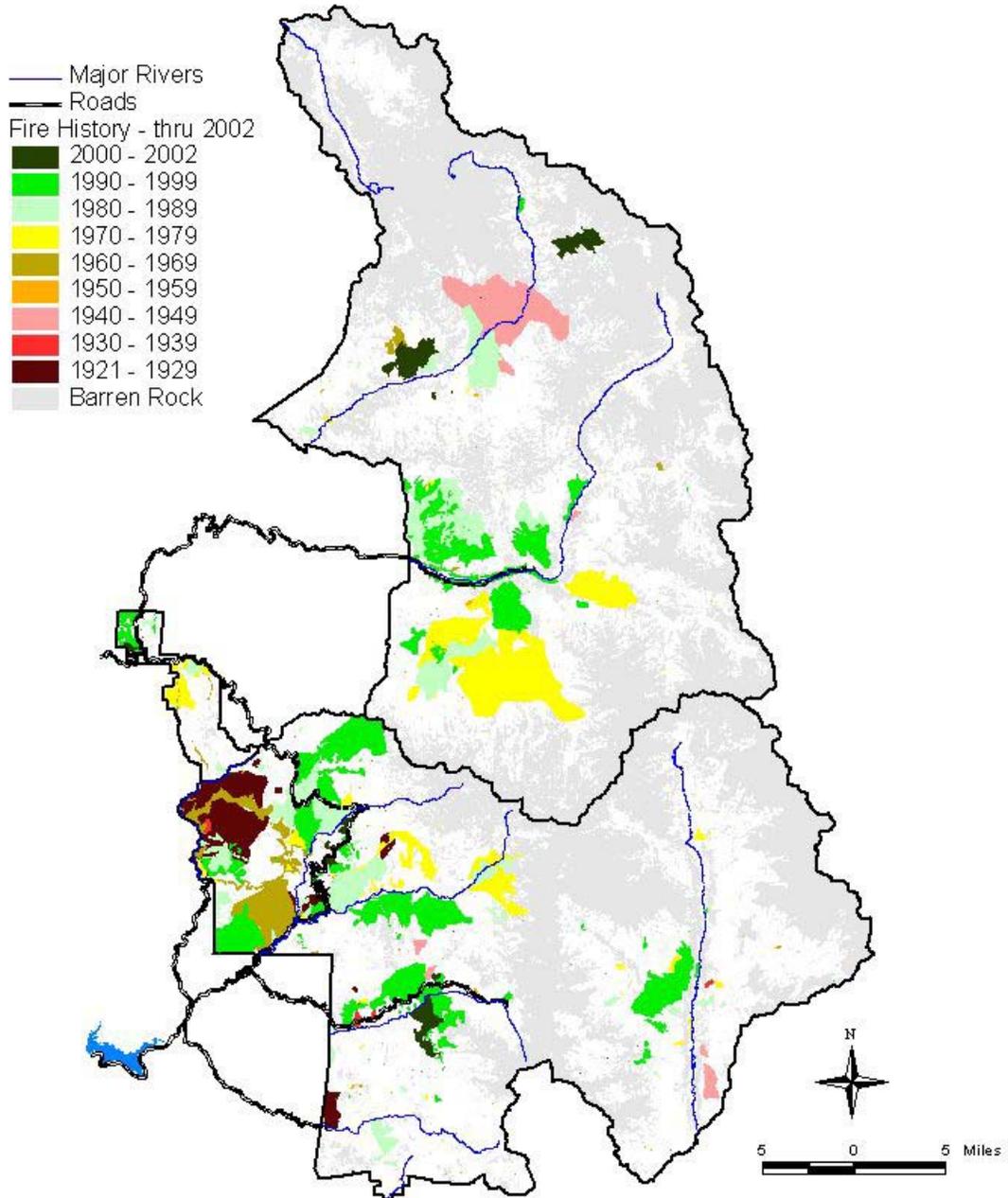
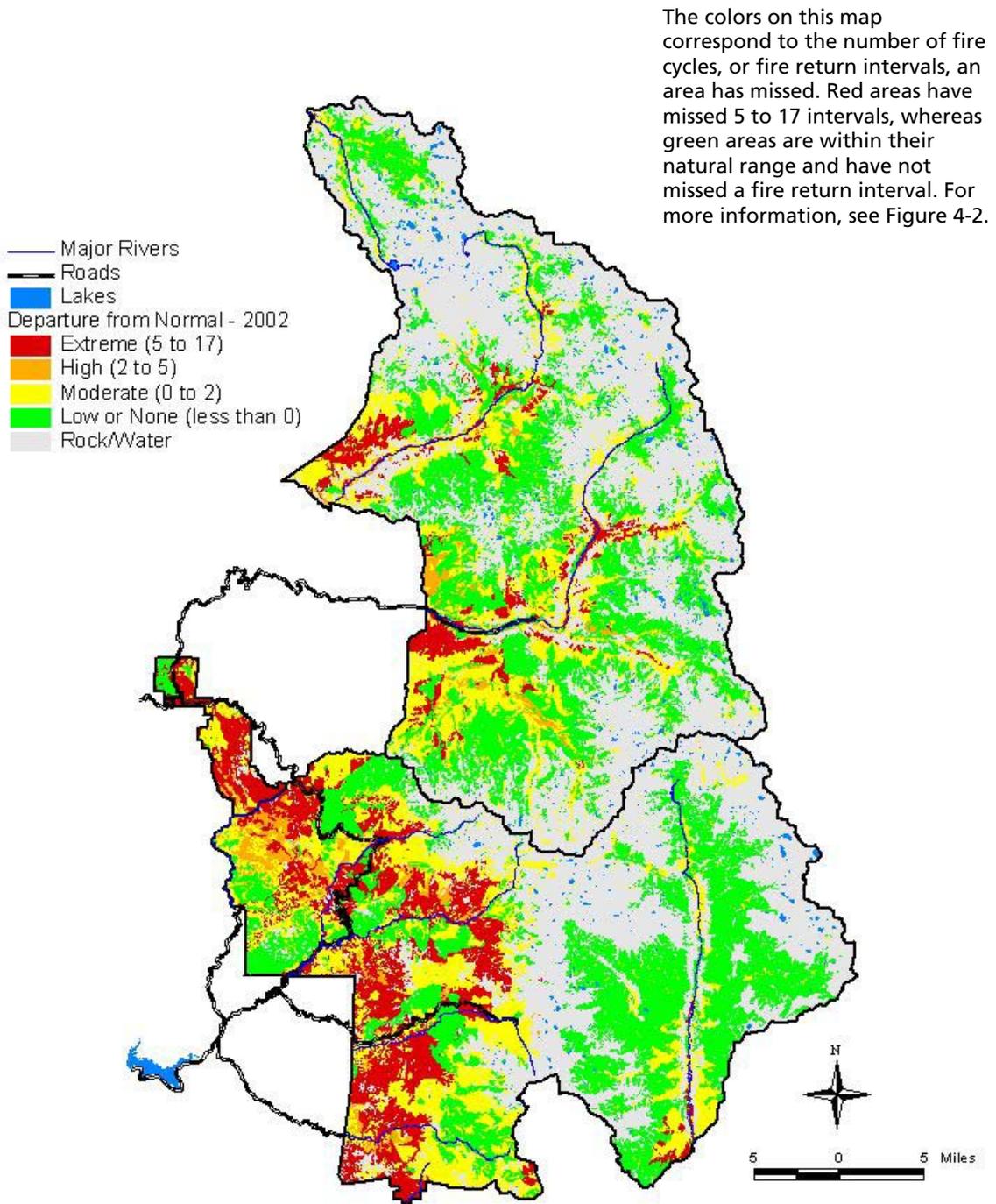


Figure 4-4 – Map of Fire Return Interval Departure (FRID)



FIRE MANAGEMENT ZONES AND UNITS

The parks are divided into three **Fire Management Zones** - the Kings, Kern, and Kaweah (see Figure 4- 6). The Zones represent, for the most part, major park watersheds resulting in an ecologically based planning framework for fire management activities. Each Zone has characteristics that allow unified fire and fuels management concepts to be applied within the Zone.

Zones may be subdivided into smaller **Fire Management Units** (see Figures 4- 10, 4- 11, and 4- 12). FMUs are generally sub- watersheds having locally unique values, hazards, and/or risks that affect the specific mix of fuels treatments and fire management activities to be used. Because the FMUs are based on sub- watersheds, ecological integrity and landscape level goals and achievements can be evaluated with some confidence.

FMUs may be further subdivided into **Segments**. Segments are comprised of a portion of a FMU that will receive uniform treatment. Segments are usually defined by natural or human created boundaries that allow for ease of management. Each segment will have a separate action plan developed (burn plan and/or fuels treatment plan). In some cases, segments may be further divided into **Sub- segments** under the same burn plan or fuels treatment plan to allow greater control and flexibility in managing the duration of the project, smoke impacts, or for other purposes.

Table 4-5 – Fire Management Zones, Units, Segments, and Sub-Segments

Planning Unit	Subset of:	Geographic Extent	Designation	
Fire Management Zone	Parks	Major watershed(s)	Kings Kern	Kaweah
Fire Management Unit (FMU)	Fire Management Zone	Sub-watershed	<u>Kings Zone</u> Sierra Crest Cedar Grove	<u>Kaweah Zone</u> Grant Grove North Fork Marble Fork Middle Fork East Fork South Fork
			<u>Kern Zone</u> Kern	
Segment	FMU	Manageable portion of a sub-watershed receiving common treatment under a single burn plan or fuels treatment plan.	Boundaries determined through annual planning process.	
Sub-Segment	Segment	Portion of a segment. Individual project to be treated along with other segments (though perhaps at different times) under a single burn plan or fuels treatment plan.	Boundaries determined through annual planning process and on-the-ground reconnaissance.	

Figure 4-6 – Map of Fire Management Zones

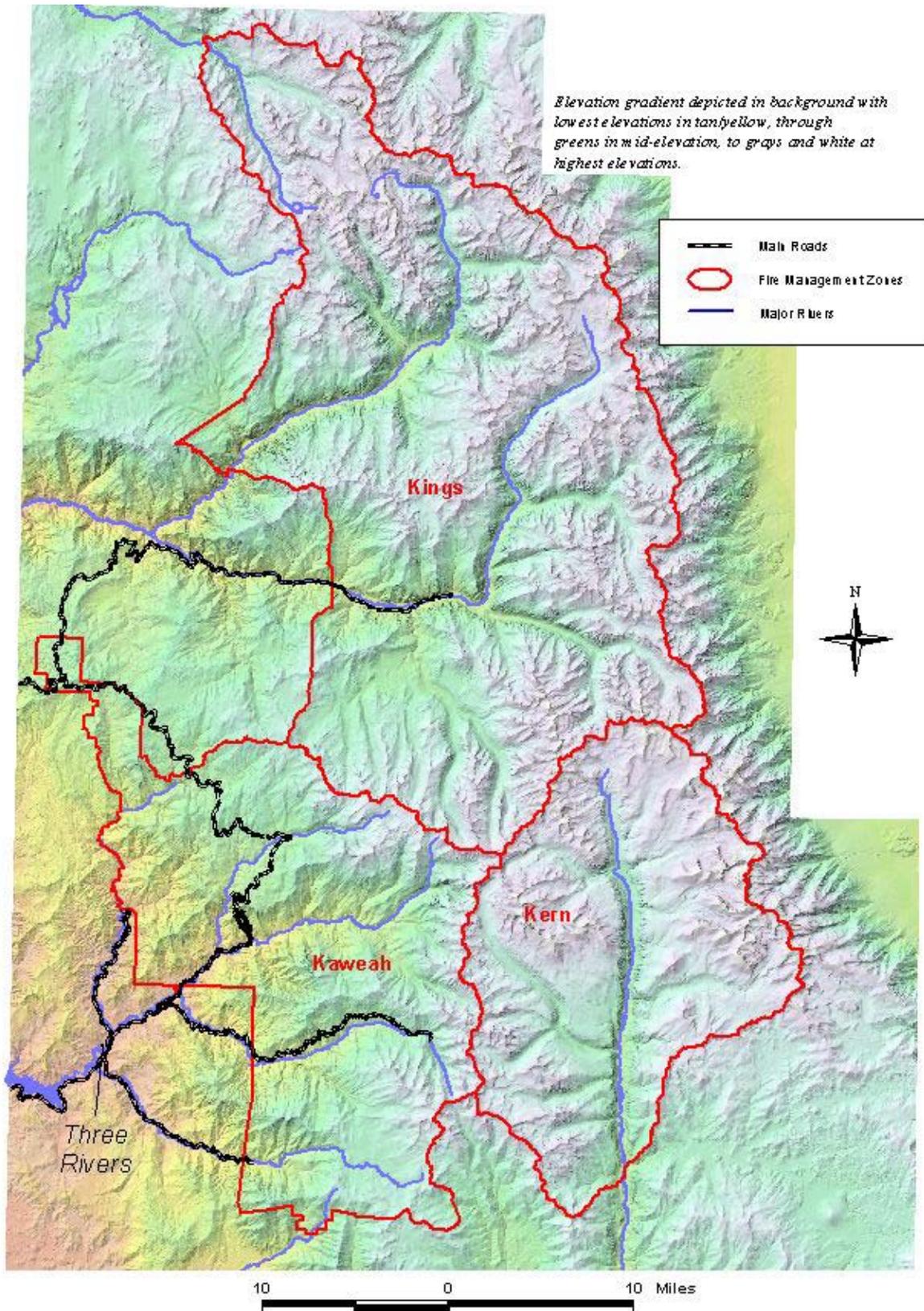


Table 4-7 – Description of Fire Management Zones

Kings Zone	Kern Zone	Kaweah Zone
<p>Description of Zone</p> <p>The Kings Zone encompasses most of Kings Canyon National Park exclusive of the Grant Grove peninsula. It consists primarily of designated wilderness (99%) with the exception of one seasonally operated non-wilderness developed area (Cedar Grove). The Zone encompasses the headwaters of the South and Middle Forks of the Kings River, as well as headwaters of the South Fork of the San Joaquin River. The forks of the Kings River are designated Wild and Scenic.</p> <p>All but three miles of the 135-mile perimeter of the Zone is bounded by NPS or US Forest Service (USFS) wilderness. The three miles of non-wilderness boundary are shared with the USFS managed Giant Sequoia National Monument.</p> <p>The Kings Zone contains two FMUs – Sierra Crest and Cedar Grove.</p> <p>As of 2001, 87% percent of the acres in the Kings Zone were in a “low” or “moderate” FRID class indicating low deviation from natural conditions. The remaining 13% fall into either the high or extreme category. The numbers indicate that vegetation and fuel conditions on most of the acres within the Zone are in fairly good condition, with some focused need for restoration and increased ecosystem maintenance, primarily in and around developments and along NPS/USFS boundaries.</p> <p>The generally good ecological and fuels conditions within the Zone are largely a result of the past 30 years of management. Most of the Zone was included in the original “natural fire zone” designated in the late 1960s and early 1970s. As a result of this designation, most</p>	<p>Description of Zone</p> <p>The Kern Zone consists of 185,569 acres of designated wilderness dominated by the north-south oriented Kern River drainage. The Great Western Divide to the west and the Sierra Nevada crest on the east and north flank the Kern Zone. Elevations in this Zone range from a low of 6,300 feet at the Kern River ranger station, to 14,495 feet at the summit of Mt. Whitney.</p> <p>The potential for fire spread out of the Zone to the north, east, and west is fully constrained by high rocky ridges and passes. Over 50% of the zone is comprised of rock or water, further limiting fire spread within the zone. Fire spread outside park boundaries onto USFS lands to the south and southeast is possible. All USFS lands adjacent to this Zone are designated wilderness and managed by the Inyo and Sequoia National Forests.</p> <p>The vegetation within the Zone consists of long needle pine forest and montane chaparral at the lower elevations. The vegetation grades rapidly with increasing elevation into lodgepole and subalpine conifer forest; with the latter comprising over 50% of the vegetated acreage in the Kern Zone. Over 83% of vegetated acres show little or no deviation from desired conditions as represented by a FRID classification of “low.” Only 2% of the vegetated acres show significant deviation from natural conditions as represented by the “high” or “extreme” FRID class.</p> <p>Other than several backcountry ranger stations and numerous trails, the Zone is free from human developments. No private lands occur within the Zone.</p>	<p>Description of Zone</p> <p>The Kaweah Zone is comprised of the various forks of the Kaweah River, as well as the headwaters of the North Fork of the Tule River, several small streams that flow into the Kings River, and a sub-watershed that flows into the Little Kern River. It is managerially the most complex of the three Zones and is subdivided into six FMUs. Topographically most of the Zone faces the San Joaquin Valley to the west and is backed by the Great Western Divide on the east – significant factors in smoke dispersion and air quality issues. As of 2002, the San Joaquin valley is classified as severe non-attainment for PM-10 and ozone.</p> <p>The Kaweah Zone contains most of the parks’ infrastructure and developments, all of the parks’ giant sequoia groves, and has the greatest diversity of boundary interface issues. The Zone includes five designated or proposed Historic Districts or Landscapes and numerous archeological sites. Due to its proximity to developed areas and typically heavy fuel loads, air quality is a primary concern in all fire management decisions in the Kaweah Zone.</p> <p>The ease of access, ability to detect ignitions, and the presence of extensive developments dating back to the late 19th and early 20th centuries resulted in most of the Kaweah Zone being significantly affected by past fire suppression. Results of those suppression actions are the high fuel loads over a significant portion of the landscape and altered ecosystems. As of 2001, over 40% of the vegetated acres in the Kaweah Zone fall into the “high” or “extreme” FRID classes, indicating extensive deviation from natural conditions. However, because of the compromised ecological state and the high</p>

Kings Zone	Kern Zone	Kaweah Zone																								
<p>natural ignitions have been managed for resource benefit over the past 30 years. Extensive prescribed burning has also occurred in and around developments in Cedar Grove, further improving overall conditions.</p>	<p>Due to its physical isolation and uniformly good fuel and ecosystem condition, the entire Kern Zone is treated as a single FMU with no subdivisions.</p>	<p>importance of restoring giant sequoia grove conditions in the Kaweah Zone, much of the parks' prescribed fire program has been focused here since 1968. As a consequence of 30 years of proactive fire management, 60% of the vegetated lands are currently in the "low" (24%) or "moderate" (36%) FRID class - indicating improving overall ecological and fuels conditions.</p>																								
<p>Fire and Fuels Objectives for Zone</p> <p>Restore and maintain natural ecosystem function to the extent possible using prescribed fire, non-fire fuel treatments, and wildland fire use, with wildland fire use expected to be used as the primary management tool throughout much of the Zone.</p> <p>Protect visitors, staff, cultural resources, and infrastructure values in the developed area and along NPS/USFS boundary areas through a program of mechanical and prescribed fire treatments.</p>	<p>Fire and Fuels Objectives for Zone</p> <p>Maintain natural ecosystem function to the extent possible using wildland fire use as the primary management tool throughout the Zone.</p> <p>Protect visitors, staff, park resources, NPS/USFS boundary interface areas, and infrastructure values through implementation of small mechanical fuels management projects and prescribed fire treatments.</p>	<p>Fire and Fuels Objectives for Zone</p> <p>Fully restore and maintain natural ecosystem function to the extent possible using prescribed fire, mechanical fuel treatments, and wildland fire use.</p> <p>Protect visitors, staff, cultural resources, communities, and infrastructure values in the developed area and along the boundary through a program of fire suppression, mechanical fuel treatments, and prescribed fire treatments.</p> <p>Minimize smoke impacts in local communities and to regional airsheds.</p> <p>Promote increased knowledge through fire research.</p> <p>Offer educational opportunities for the public to observe and/or study fire management.</p>																								
<p>Size and Composition (Acres)</p> <table border="0"> <tr> <td>Vegetation</td> <td>222,249</td> </tr> <tr> <td>Rock/Water</td> <td>221,187</td> </tr> <tr> <td>Total</td> <td>443,436</td> </tr> <tr> <td>Wilderness</td> <td>99%</td> </tr> </table>	Vegetation	222,249	Rock/Water	221,187	Total	443,436	Wilderness	99%	<p>Size and Composition (Acres)</p> <table border="0"> <tr> <td>Vegetation</td> <td>89,662</td> </tr> <tr> <td>Rock/Water</td> <td>95,907</td> </tr> <tr> <td>Total</td> <td>185,569</td> </tr> <tr> <td>Wilderness</td> <td>100%</td> </tr> </table>	Vegetation	89,662	Rock/Water	95,907	Total	185,569	Wilderness	100%	<p>Size and Composition (Acres)</p> <table border="0"> <tr> <td>Vegetation</td> <td>189,692</td> </tr> <tr> <td>Rock/Water</td> <td>44,601</td> </tr> <tr> <td>Total</td> <td>234,293</td> </tr> <tr> <td>Wilderness*</td> <td>80%</td> </tr> </table> <p>*Includes designated & proposed wilderness</p>	Vegetation	189,692	Rock/Water	44,601	Total	234,293	Wilderness*	80%
Vegetation	222,249																									
Rock/Water	221,187																									
Total	443,436																									
Wilderness	99%																									
Vegetation	89,662																									
Rock/Water	95,907																									
Total	185,569																									
Wilderness	100%																									
Vegetation	189,692																									
Rock/Water	44,601																									
Total	234,293																									
Wilderness*	80%																									
<p>Elevation Range</p>	<p>Elevation Range</p>	<p>Elevation Range</p>																								

Kings Zone	Kern Zone	Kaweah Zone
4,543 - 14,186 feet	6,300 – 14,495 feet	1,400 – 12,600 feet
<p>Values, Hazards, and Risks Each Zone is described below based on six different values: 1) special designations and features, 2) park developments, 3) vegetation, 4) private lands, 5) cultural resources, and 6) boundary interface; along with hazard and risk factors. The values are not in priority order.</p>		
<p>Value 1: Special Designations & Features</p> <p>99% of the Zone is designated wilderness.</p> <p>The South and Middle Forks of the Kings River, from headwaters to the park boundary, are designated as Wild and Scenic Rivers.</p> <p>Cedar Grove contains two buildings on the List of Classified Structures (LCS); the Knapp Cabin and the Cedar Grove storage shed (building #276).</p> <p>The Kings backcountry contains several LCS structures including the Barton-Lackey Cabin, and several “Shorty Lovelace” structures.</p>	<p>Value 1: Special Designations & Features</p> <p>The entire Zone is designated wilderness.</p> <p>In the draft <i>Wild and Scenic River Plan</i> (a component of the draft GMP), the Kern River is considered eligible for Wild and Scenic River status. The parks’ <i>General Management Plan</i> (in revision as of 2002) will determine final eligibility.</p> <p>The Kern Ranger Station, Kern River bridge, and associated features are considered cultural resources on the List of Classified Structures. They require particular protection and consideration in all fire management decisions within the Zone.</p> <p>While not carrying a special designation, the Kern hot spring is a unique geothermal feature that occurs on the canyon floor. This site is an attractive and well-used feature within the Zone.</p>	<p>Value 1: Special Designations & Features</p> <p>See Table 4-9.</p>
<p>Value 2: Park Developments</p> <p>Cedar Grove – This 2,700 acre non-wilderness development zone includes a variety of infrastructure elements including; a road system, 4 campgrounds, a 13-unit hotel, market, concession operated pack station, park offices, maintenance, park and concession employee housing, sewer and water treatment plants, a helispot, two visitor contact stations, and numerous trailheads. A portion of the Kings Wild</p>	<p>Value 2: Park Developments</p> <p>Several NPS wilderness ranger stations, along with trails and associated bridges are the sole developments in the Zone.</p>	<p>Value 2: Park Developments</p> <p>See Table 4-9.</p>

Kings Zone	Kern Zone	Kaweah Zone
and Scenic River bisects the developed area.		
<p>Value 3: Vegetation</p> <p>Mid-elevation hardwoods and ponderosa pine communities grade upward with elevation into mixed conifer, red fir, and lodgepole forests, with subalpine conifers dominating near treeline. Forested areas intermixed with meadows and montane shrublands increase diversity across the Zone. No giant sequoia groves are located in the Kings Zone.</p> <p>Local to widespread invasion of the non-native cheatgrass (<i>Bromus tectorum</i>) has been observed in recently burned areas. Research into cause and effect, and potential management responses is underway.</p>	<p>Value 3: Vegetation</p> <p>The vegetation within the Zone consists of long needle pine forest and montane chaparral at lower elevations, grading rapidly with increasing elevation into lodgepole and subalpine conifer forest. The latter comprises over 50% of the vegetated acreage within the Zone. Approximately 2,300 acres are meadow communities.</p>	<p>Value 3: Vegetation</p> <p>See Table 4-9.</p>
<p>Value 4: Private Lands</p> <p>None</p>	<p>Value 4: Private Lands</p> <p>None</p>	<p>Value 4: Private Lands</p> <p>See Table 4-9.</p>
<p>Value 5: Cultural Resources</p> <p>There are a number of known archeological sites in the Zone, and potential for unknown surface and subsurface archeological resources.</p> <p>Four historic structures on the List of Classified Structures are in the Cedar Grove FMU and several others exist in the Sierra Crest FMU. All require protection from fire. Refer to Appendix H for a current list of protected structures.</p>	<p>Value 5: Cultural Resources</p> <p>There are known archeological sites in the Zone, and potential for unknown surface and subsurface archeological.</p> <p>Five historic structures or features are on the List of Classified Structures the Kern Zone. All require protection from fire. Refer to Appendix H for a current list of protected structures.</p>	<p>Value 5: Cultural Resources</p> <p>See Table 4-9.</p>
<p>Value 6: Boundary Interface</p> <p>Three miles of boundary are shared with the USFS Giant Sequoia National Monument</p>	<p>Value 6: Boundary Interface</p> <p>All of the 80-mile Zone boundary abuts designated or proposed wilderness. Over one-</p>	<p>Value 6: Boundary Interface</p> <p>See Table 4-9.</p>

Kings Zone	Kern Zone	Kaweah Zone
<p>The remaining Zone boundary is shared with USFS wilderness (Monarch, Jennie Lakes, and John Muir) and the Sequoia-Kings Canyon Wilderness.</p> <p>Adjacent USFS areas are in the process of developing wildland fire use programs and standards which may increase the ability of the park to manage wildland fire use projects across agency boundaries. Each ignition in areas of continuous cross-boundary fuels will be managed as a unique event between the agencies with close coordination. At the present time most fires will be contained within the park.</p>	<p>half of the Zone boundary is adjacent to USFS wilderness, though a significant portion of that boundary interface does not have vegetation capable of supporting fire. The remaining portions of the Zone boundary are adjacent to NPS designated or proposed wilderness.</p>	
<p>Hazards</p> <p>As of 2001, 87% percent of the acres in the Kings Zone were in a “low” or “moderate” FRID class indicating low deviation from natural conditions. The remaining 13% fall into either the high or extreme category. The numbers indicate that vegetation and fuel conditions on most of the acres within the Zone are in fairly good condition, with some focused need for restoration and increased ecosystem maintenance, primarily in and around developments and along NPS/USFS boundaries.</p> <p>Fuels in Cedar Grove can have high rates of spread under strong canyon wind conditions common in the afternoons during fire season. The presence of developments and wildlands in Cedar Grove’s ponderosa pine, black oak, and grass-shrub communities create interface issues and concerns for visitor and staff safety.</p> <p>Continuous vegetation crossing the park boundary onto USFS lands along portions of the western boundary (especially the Crown Valley drainage) reduce opportunities for managing</p>	<p>Hazards</p> <p>As assessed by the FRID model, ecological conditions in the Kern Zone are substantially in their desired condition. Ninety-four percent of the vegetated acres in the Kern Zone are described by the parks custom fuel model 18 – conifer forests with low-moderate fuel load.</p> <p>Continuous fuels across a limited portion of the southern and southeastern boundary between NPS/USFS lands could conduct fires both into and out of the park. The USFS is currently considering changes to accommodate wildland fire use in areas adjacent to the parks. Under all present and future scenarios, the implementation of wildland fire use and prescribed fire projects will require considerable coordination and cooperation between agencies. Ignitions in the vicinity of ranger stations (especially the Kern station) require special consideration for safety, and for the preservation of infrastructure and cultural resource values.</p> <p>The Kern Canyon can experience strong canyon winds during the fire season. Thunderstorms</p>	<p>Hazards</p> <p>See Table 4-9.</p>

Kings Zone	Kern Zone	Kaweah Zone
<p>wildland use fires in those areas at the present time. The USFS is currently considering changes to accommodate wildland fire use in areas adjacent to the parks. Under all present and future scenarios, the implementation of wildland and prescribed fire projects will require considerable coordination and cooperation between agencies.</p> <p>Heavy and/or continuous fuel accumulations occur in the Sheep Creek and Lewis Creek drainages in steep terrain along the NPS/USFS boundary.</p>	<p>along the high elevation ridges may create downdrafts.</p>	
<p>Risks</p> <p>Moderate levels of backcountry visitor use combined with vehicular access to the Cedar Grove portion of this Zone increase the risk of human caused fires. Low elevation fuels consisting of long leaf pine, annual and perennial grasses and forbs, and oaks may result in fast moving fires under windy conditions typical of summer afternoons in the canyon.</p> <p>Most human ignitions in this Zone occur in close proximity to the Cedar Grove developments, and along the Rae Lakes trail corridor.</p> <p>Lightning ignited fires are common throughout the vegetated portions of the Zone, most commonly occurring in the Sheep Creek drainage, and in the Roaring River/Sugarloaf watersheds, with some also in Tehipite Valley. Other significant lightning fires have occurred on the south aspect slopes and ridges above Cedar Grove.</p>	<p>Risks</p> <p>Moderate levels of backcountry visitor use increase the risk of human caused fires, though human caused fires in this zone are rare. Low elevation fuels consisting of long leaf pine, annual and perennial grasses and forbs, and oaks may result in fast moving fires under windy conditions typical of summer afternoons in the canyon.</p> <p>Lightning ignited fires are common throughout the vegetated portions of the Zone, with most occurring on ridges and benches west of the Kern River.</p>	<p>Risks</p> <p>See Table 4-9.</p>

Table 4-8 – Description of Fire Management Units (FMUs) in Kings and Kern Zones

Note: Due to the number and complexity of FMUs in the Kaweah Zone, those descriptions are found separately in Table 4-9.

Kings Zone		Kern Zone
Sierra Crest FMU	Cedar Grove FMU	Kern FMU
<p>Description</p> <p>The Sierra Crest FMU consists entirely of designated wilderness, almost entirely contained within a much larger matrix of wilderness managed by the NPS and USFS. All of the South and Middle Forks of the Kings River are designated as Wild and Scenic.</p> <p>Geographically deep glacial canyons divided by rocky alpine ridges characterize the FMU. It is worth noting that over 50% of the FMU consists of rock, water, or similar features that dramatically limit fire spread. Fire spread between sub-drainages is rare, and is hindered by extensive rock and other natural features such as rivers and wet meadows.</p> <p>Wilderness use consisting of day hikers, backpackers, and stock parties is heavy in some areas such as the Rae Lakes loop, along the Pacific Crest Trail, and in the Roaring River drainage. Many other areas are seldom visited. Much of the FMU has been managed as a “natural fire zone” since at least 1970, with most lightning ignitions managed for resource benefit. The parks’ largest natural fire event, the 10,000 acre Ferguson fire, occurred in the Roaring River drainage in 1977.</p> <p>Because of the remote location, generally acceptable fuels and ecosystem conditions, and dissected terrain that allow for safe management of long term and widespread fire events, the primary fire management strategy in this FMU is to optimize the use of wildland fire use consistent with fire management resources, interagency concerns, and air quality issues.</p>	<p>Description</p> <p>Within the greater Kings Zone is the 25,630-acre Cedar Grove FMU. It consists of the 2,700-acre Cedar Grove developed area and two wilderness sub-watersheds adjacent to the park boundary (Sheep Creek and Lewis Creek). The Sheep Creek watershed feeds the potable water system for most Cedar Grove developments. Care is needed in burning this watershed to minimize erosion and sedimentation that will temporarily affect filtration needs for the water system immediately post-burn.</p> <p>While the overall fire and fuels management objectives for the Zone apply in this FMU, due to its proximity to USFS lands, intensive visitor developments, and lower elevation fuels – the mix of management strategies vary from those applied in the greater Kings Zone. The primary difference is a lesser reliance on wildland fire use, and a consequent increase in the use of prescribed fire and non-fire fuels management strategies to both maintain ecosystem function as well as reduce hazardous levels of fuels in and around developments. Non-fire fuel treatments are intended for use in small focused areas immediately adjacent to developments, boundaries, and infrastructure. Management of wildland fire projects may occur in this FMU, though it is expected to be a rare occurrence in the near term.</p> <p>After the Sheep Creek and Lewis Creek segments are treated with prescribed fire, the probability of allowing wildland fire use should increase and become the dominant management strategy, subject to the USFS ability and desire to accept</p>	<p>Description</p> <p>(The Kern Zone and Kern FMU are synonymous. See Kern Zone description in Table 4-7)</p>

Kings Zone		Kern Zone
Sierra Crest FMU	Cedar Grove FMU	Kern FMU
	such events across agency boundaries.	
<p>Size and Composition</p> <p>Vegetation 199,814 Rock/Water 218,240 Total Acres 418,054 Wilderness 100%</p>	<p>Size and Composition</p> <p>Vegetation 22,435 Rock/Water 2,947 Total Acres 25,382 Wilderness 90%</p>	<p>Size and Composition</p> <p>Vegetation 89,662 Rock/Water 95,907 Total Acres 185,569 Wilderness 100%</p>
<p>Actions Common to all Fire Management Units</p> <p>Human caused fires – other than those intentionally set by NPS staff or park residents under an approved burn plan or permit – will be suppressed under strategies (confine, contain, control) commensurate with firefighter safety and consideration for resource protection from suppression actions.</p>		
<p>Multi-Year Projects and Actions</p> <p>All of the Sierra Crest FMU will be managed for natural process applying wildland fire use as the primary tool.</p> <p>Minor firing and burnout operations to manage and contain wildland fire use projects will be conducted as needed, as will construction of firelines using minimum impact standards.</p> <p>Wildland fire use acreage will vary each year depending on number of natural ignitions and final fire size.</p> <p>Prescribed fire under an approved burn plan may be used along boundary areas to replace suppressed ignitions and maintain the natural fire regime within the zone. Prescribed fire ignitions will be managed to simulate the pattern and spread of natural ignitions.</p>	<p>Multi-Year Projects and Actions</p> <p>The Cedar Grove developed area of the FMU will be managed primarily through the use of prescribed fire throughout the valley, and the use of mechanical fuel removal in limited areas along boundaries and around structures. Prescribed fire projects will be planned on a schedule that mimics the natural fire regime.</p> <p>The Sheep Creek and Lewis Creek drainages will initially be managed through the use of prescribed fire, in concert with mechanical fuel removal in limited areas along boundaries to restore natural fuel conditions and fire regime.</p> <p>After restoration of natural fuel conditions, wildland fire use projects may be considered in all areas of the unit. To implement fire use projects, firing and burnout operations will be conducted as needed to contain the fire, as will construction of firelines using minimum impact standards.</p>	<p>Multi-Year Projects and Actions</p> <p>All of the Kern FMU will be managed for natural process applying wildland fire use as the primary tool.</p> <p>Minor firing and burnout operations needed to manage and contain wildland fire use projects will be conducted as needed, as will construction of firelines using minimum impact standards.</p> <p>Wildland fire use acreage each year will vary depending on number of natural ignitions and final fire size.</p> <p>Prescribed fire under an approved burn plan may be used along NPS/USFS boundary areas to replace suppressed ignitions and maintain the natural fire regime. Prescribed fire ignitions will be managed to simulate the pattern and spread of natural ignitions.</p> <p>Minor mechanical fuel treatments may be</p>

Kings Zone		Kern Zone
Sierra Crest FMU	Cedar Grove FMU	Kern FMU
		implemented to provide protection of historic structures in the vicinity of the Kern Ranger Station and around other structures as needed.
<p>Further Compliance Needs</p> <p>The scope of proposed actions and their expected effects are described in the companion Environmental Assessment (EA).</p> <p>All mitigating actions contained in the EA will be implemented for projects conducted within this unit.</p> <p>Cultural resource consultation with the park archeologist will take place during the planning phase for all projects. In addition, mechanical fuel projects will require consultation with park wildlife and plant ecologists during the planning phase to ensure adequate protection for site specific species.</p> <p>Other than actions noted above or as contained in the EA, no additional environmental compliance will be required for projects that fall within the scope of projects and effects described in the EA.</p>	<p>Further Compliance Needs</p> <p>The scope of proposed actions and their expected effects are described in the companion Environmental Assessment (EA).</p> <p>All mitigating actions contained in the EA will be implemented for projects conducted in this unit.</p> <p>Cultural resource consultation with the park archeologist will take place during the planning phase for all projects. In addition, mechanical fuel projects will require consultation with park wildlife and plant ecologists during the planning phase to ensure adequate protection for special status species.</p> <p>Other than actions noted above or as contained in the EA, no additional environmental compliance will be required for projects that fall within the scope of projects and effects described in the EA.</p>	<p>Further Compliance Needs</p> <p>The scope of proposed actions and their expected effects are described in the companion Environmental Assessment (EA).</p> <p>All mitigating actions contained in the EA will be implemented for projects conducted in this unit.</p> <p>Cultural resource consultation with the park archeologist will take place during the planning phase for all projects. In addition, mechanical fuel projects will require consultation with park wildlife and plant ecologists during the planning phase to ensure adequate protection for special status species.</p> <p>Other than actions noted above or as contained in the EA, no additional environmental compliance will be required for projects that fall within the scope of projects and effects described in the EA.</p>

Table 4-9 – Description of Fire Management Units (FMUs) in Kaweah Zone

Kaweah Zone					
Grant Grove FMU	North Fork FMU	Marble Fork FMU	Middle Fork FMU	East Fork FMU	South Fork FMU
<p>Description</p> <p>While the smallest FMU in the park, the Grant Grove unit contains significant resources including “The Nations Christmas Tree” (the General Grant tree), the largest intact giant sequoia grove (Redwood Mountain), extensive caves, and outstanding accessible wilderness areas. This FMU also contains the most intensively developed area in the parks. The NPS managed Grant Grove developed area completely surrounds Wilsonia; a private community of over 100 seasonally occupied vacation homes. The presence of extensive public and private developments creates classic wildland urban interface conditions.</p> <p>The FMU is long and narrow, and shares most of its 54-mile boundary with the USFS managed Giant Sequoia National Monument. The FMU also shares 1.6 miles of boundary with the State</p>	<p>Description</p> <p>The North Fork FMU is one of the least accessible and most varied FMUs in the Kaweah Zone. The FMU contains a wide range of plant communities - starting with low elevation foothill chaparral, changing to mixed conifer forest containing four giant sequoia groves at mid-elevation, and ranging upward into red fir forest.</p> <p>Other than the main park road bisecting the FMU at mid elevation, development in this unit is limited to a seasonally operated campground (Dorst), a seasonal park residence (Cabin Creek), and the Crystal Cave interpretive site and access road. Few trails penetrate the interior of the FMU.</p> <p>Limited access, extensive boundary exposure, continuous fuels providing connectivity between foothills chaparral and mid-</p>	<p>Description</p> <p>As the second smallest Fire Management unit in the Kaweah Zone, the Marble Fork represents the only watershed that is completely contained within park boundaries.</p> <p>The FMU contains most plant communities, including all or a portion of two sequoia groves, and the largest tree in the world (General Sherman). The Giant Forest grove extends across the Giant Forest plateau into the Middle Fork drainage, and is the only grove in the parks that spans two watersheds.</p> <p>Large portions of the Giant Forest grove are under active restoration in areas of prior development. Fire plays a significant role in the restoration program, and will be returned fully to its natural role at some point in the future (approximately 2010).</p> <p>The unit contains major</p>	<p>Description</p> <p>The Middle Fork is the largest of the Kaweah fire management units encompassing over 75,000 acres, 95% of which are in designated or proposed wilderness. This bowl-shaped drainage contains the lowest elevations in the parks as well as the Great Western Divide at its eastern boundary.</p> <p>The unit includes all of the parks’ major plant communities and fuel models. Four sequoia groves are completely contained in the unit, in addition to the southern portion of the Giant Forest grove</p> <p>Developments include the parks’ headquarters, employee housing, a visitor center, and campground.</p> <p>The upper two-thirds of the unit are remote wilderness making access difficult. The only roaded access is the main park highway along the bottom third</p>	<p>Description</p> <p>The East Fork fire management unit encompasses some of the most accessible high elevation in the park. Topographically it is a long steep west-facing drainage with high ridges forming the northern and eastern boundary. More open on the southern perimeter across the Hockett Plateau, this drainage ventilates smoke more readily than the Middle Fork.</p> <p>The East Fork contains all the parks’ vegetation communities and fuel models, including a dozen distinct giant sequoia groves.</p> <p>The ease of access is due to the Mineral King road that follows up the drainage parallel to the river from the foothills to near tree line. Along the road are various park and private developments, and the road corridor itself has been determined eligible as a National</p>	<p>Description</p> <p>The South Fork unit contains twelve giant sequoia groves, including the recently acquired Dillonwood grove.</p> <p>The Dillonwood addition will undergo a separate park planning process, and may include active restoration and fire research opportunities. Having few developments and little roaded access, the South Fork remains one of the least visited portions of the parks. Developments are limited to a single primitive campground and related entrance road just inside the west park boundary. Ninety-five percent of this unit is in proposed wilderness.</p> <p>Forming the southwest corner of the parks, the South Fork has a high proportion of its boundary shared by other federal agencies and private landowners.</p>

Kaweah Zone					
Grant Grove FMU	North Fork FMU	Marble Fork FMU	Middle Fork FMU	East Fork FMU	South Fork FMU
<p>of California at Whitaker Forest and one mile of boundary with private lands at Sequoia Lake.</p> <p>As of 2001, 66% of the vegetated acres in the Grant Grove FMU were in "high" or "extreme" FRID classes, indicating a high amount of deviation from desired natural conditions. Of all the FMUs in the park, the Grant Grove FMU has the highest rate of compromised acres. These ecological conditions are correlated with high fuel loads and a dense overstory in the mixed conifer vegetation type dominant within the FMU.</p> <p>An infrequent outbreak of the native Douglas fir tussock moth in 1998-2000 resulted in a high mortality of white fir trees throughout the FMU. The high mortality left behind increased fire fuels in all size classes.</p>	<p>elevation mixed conifer, and steep terrain all present challenges to pro-active fire and fuels management of the North Fork FMU.</p> <p>Nearly half of the acres in the FMU are in the high-extreme FRID class, the second highest deviation from desired conditions among all the FMUs in the parks. Unwanted fires, once ignited, will be difficult to access and control.</p>	<p>park developments including two campgrounds, employee housing, two visitor centers, visitor lodging and related services, and numerous roads.</p> <p>The unit is bisected in the middle elevations by the major park road – the Generals Highway. The half of the unit above the Generals Highway is completely roadless.</p> <p>The interior of the roadless areas is difficult to access and extremely steep and rugged. Few natural barriers to fire spread occur within the unit or between this unit and adjacent fire management units.</p>	<p>of the unit.</p> <p>The gateway community of Three Rivers sits at the confluence of the Middle Fork and two other rivers at the bottom of this drainage.</p> <p>Due to the unique topography of this drainage (large bowl shape and high ridges to the east) smoke from fires vents less readily here than in other drainages in the parks. The pooling of smoke results in nighttime drainage of smoke into the community under certain meteorological conditions.</p>	<p>Historic District.</p> <p>Park developments include 2 campgrounds, an entrance station, park housing and administrative functions, and a ranger station. Private developments include numerous cabins on both private and leasehold lands generally grouped into 5 small communities.</p> <p>The road as an ignition source, and the risk to interface communities and developments along the road are of particularly high concern when addressing fire management in this unit.</p>	<p>While containing most park vegetation communities, this unit has the highest proportion of chaparral of all FMUs. Chaparral fuels are generally highly volatile and available to ignite and burn through a large portion of the year. This factor, along with the large amount of external boundary exposure, strongly influences fire management decisions in this unit.</p>
Size & Composition	Size & Composition	Size & Composition	Size & Composition	Size & Composition	Size & Composition

Kaweah Zone					
Grant Grove FMU	North Fork FMU	Marble Fork FMU	Middle Fork FMU	East Fork FMU	South Fork FMU
Vegetation 14,603 Rock/Water 563 Total 15,166	Vegetation 30,147 <u>Rock/Water 746</u> Total 30,893	Vegetation 26,729 <u>Rock/Water 6,869</u> Total 33,598	Vegetation 51,225 <u>Rock/Water 22,270</u> Total 73,495	Vegetation 39,741 <u>Rock/Water 10,387</u> Total 50,128	Vegetation 27,247 <u>Rock/Water 3,766</u> Total 31,013
Wilderness* 56%	Wilderness* 86%	Wilderness* 64%	Wilderness* 90%	Wilderness* 68%	Wilderness* 95%
*Proposed wilderness.	* Includes designated and proposed wilderness.	*Includes designated and proposed wilderness.	*Includes designated and proposed wilderness.	*Includes designated and proposed wilderness.	*Proposed wilderness.
Each Kaweah FMU is described below based on six different values: 1) special designations and features, 2) park developments, 3) vegetation, 4) private lands, 5) cultural resources, and 6) boundary interface; along with hazard and risk factors. The values are not in priority order.					
<p>Value 1: Special Designations & Features</p> <p>56% of the FMU is proposed wilderness.</p> <p>Most Grant Grove developments are within the proposed "General Grant National Park National Historic District".</p> <p>Wilsonia (including some NPS structures) is a National Historic District.</p> <p>The General Grant Tree is designated by presidential proclamation as "the Nation's Christmas Tree."</p>	<p>Value 1: Special Designations & Features</p> <p>86% of the FMU is designated or proposed wilderness.</p> <p>The entire Colony Mill Road (now a trail) is on the List of Classified Structures.</p>	<p>Value 1: Special Designations & Features</p> <p>64% of the unit is designated or proposed wilderness</p> <p>The General Sherman Tree in Giant Forest grove is the largest tree in the world.</p>	<p>Value 1: Special Designations & Features</p> <p>90% of the FMU is designated or proposed wilderness.</p> <p>Historic structures include the Southern California Edison flumes and appurtenances.</p>	<p>Value 1: Special Designations & Features</p> <p>68% of the unit is designated or wilderness</p> <p>The Mineral King road and associated features are eligible for Cultural Landscape designation.</p>	<p>Value 1: Special Designations & Features</p> <p>95% of the unit is proposed wilderness.</p> <p>Critical habitat for the threatened Little Kern golden trout occurs in the Little Kern watershed in the southeastern portion of the unit.</p>
Value 2: Park	Value 2: Park	Value 2: Park	Value 2: Park	Value 2: Park	Value 2: Park

Kaweah Zone					
Grant Grove FMU	North Fork FMU	Marble Fork FMU	Middle Fork FMU	East Fork FMU	South Fork FMU
<p>Developments</p> <p>Dense development characterizes the northern segment of the FMU (Grant Grove) including three campgrounds, NPS employee housing, 100+ private homes in the Wilsonia community, 50+ overnight lodging rooms, a market, restaurant, visitor center, and other visitor support facilities.</p> <p>The southern segment of the FMU (Redwood Mountain) contains a few administrative developments and extensive tracts of sequoia groves.</p>	<p>Developments</p> <p>The North Fork is traversed by portions of the primary park road (Generals Highway) as well as the Crystal Cave Road. Other than the heavily traveled Generals Highway the unit has few developments. The seasonally operated Dorst Campground and Crystal Cave comprise the primary focal points for visitor use within the unit.</p>	<p>Developments</p> <p>Most Sequoia National Park developments are in the Marble Fork Unit. These include 2 campgrounds, 2 visitor centers, General Sherman Tree parking and associated developments, the Wuksachi Lodge development, park housing, and a significant commercial center at Lodgepole operated by the park concession.</p> <p>The Generals Highway bisects the unit, and a significant portion of the Crystal Cave road traverses the western end of the Marble Fork FMU.</p>	<p>Developments</p> <p>Park developments in the Middle Fork are clustered primarily along the Generals Highway road corridor. They include park headquarters, administrative pastures, employee housing, a picnic area, and one campground.</p> <p>A significant exception to developments being associated with the road corridor is the Bearpaw backcountry camp located deep in the Middle Fork wilderness and far from any road. This development (including an NPS campground and concession facility) may house 50 or more visitors and employees during the summer months, with no ready means of escape in case of wildfire.</p>	<p>Developments</p> <p>The East Fork contains several private inholdings and communities, as well as 2 campgrounds and numerous administrative developments.</p> <p>The seasonally occupied private cabins are primarily clustered in five different locations throughout the south aspect of the watershed. They range from small rustic cabins to at least one home valued at over 1.5 million dollars.</p> <p>Administrative developments include stables, employee housing, maintenance shops, and a visitor contact station.</p>	<p>Developments</p> <p>Few developments occur in this unit, limited to one rustic campground and a short segment of road leading in from the west.</p> <p>Dillonwood, a new addition to the park in 2001, also has several buildings and a network of logging roads that provide access into that area from the south.</p>
<p>Value 3: Vegetation</p> <p>Vegetation is more homogeneous than other FMUs in the Kaweah Zone, containing only eight of</p>	<p>Value 3: Vegetation</p> <p>This unit has high diversity in vegetation, containing 11 of the parks' 12 vegetation types.</p>	<p>Value 3: Vegetation</p> <p>This unit is similar to the North Fork FMU in vegetation composition, including all twelve vegetation communities</p>	<p>Value 3: Vegetation</p> <p>Vegetation in the Middle Fork unit is diverse, containing all 12 vegetation community types found in the parks.</p>	<p>Value 3: Vegetation</p> <p>Vegetation in the East Fork unit is diverse, containing all twelve vegetation community types found in the parks.</p>	<p>Value 3: Vegetation</p> <p>The South Fork unit also contains all 12 vegetation communities, including the largest number of sequoia acres</p>

Kaweah Zone					
Grant Grove FMU	North Fork FMU	Marble Fork FMU	Middle Fork FMU	East Fork FMU	South Fork FMU
<p>the parks 12 vegetation communities.</p> <p>It is dominated by mixed conifer forest (68% of vegetated area) with significant tracts of ponderosa pine forest and mid-elevation hardwood.</p> <p>The FMU also contains four giant sequoia grove complexes totaling 2,509 acres, proportionately the highest percentage of sequoia acres of all FMUs in the parks (17% of all Grant FMU acres).</p>	<p>Unit acres are dominated by foothill chaparral at lower elevations, followed by roughly equal components of foothills hardwoods, ponderosa pine forest, and white fir-mixed conifer as elevation increases. It is missing only the subalpine conifer forest community.</p> <p>Four giant sequoia groves occur in the unit over a total of 387 acres.</p>	<p>found in the parks (though the subalpine component is extremely small).</p> <p>It is dominated by a combination of white fir-mixed conifer and red fir forest, with significant components of ponderosa pine and lodgepole forest.</p> <p>Giant sequoia groves occur on 1,500 acres in two groves. This unit includes most of the Giant Forest grove. The entire Giant Forest grove is functionally managed as part of the Marble Fork FMU.</p>	<p>It is dominated by low elevation foothill chaparral and hardwoods, with a significant component of white fir-mixed conifer forest at the mid-elevations.</p> <p>It contains 4 sequoia groves covering 1,424 acres including a portion of the Giant Forest grove, though that grove is functionally managed as part of the Marble Fork FMU.</p>	<p>It is dominated by the higher elevation red fir forest, as well as a significant component of white fir-mixed conifer.</p> <p>The unit contains eight giant sequoia groves totaling 2,455 acres. It includes one grove, Atwell, which had been partially logged in the late 19th century.</p>	<p>of all park FMUs.</p> <p>It is dominated by red fir forest (27% of vegetated acres) with significant components of white fir-mixed conifer and lodgepole pine forest.</p> <p>With the recent addition of Dillonwood grove to the park, the unit contains approx. 3,100 acres of giant sequoias across 12 groves.</p>
<p>Value 4: Private Lands Inside the Parks</p> <p>Wilsonia is a defined community with an intermix of over 100 privately owned and NPS tracts. Cabins are primarily seasonal summer use, though a few are occupied year-round.</p>	<p>Value 4: Private Lands Inside the Parks</p> <p>None</p>	<p>Value 4: Private Lands Inside the Parks</p> <p>None</p>	<p>Value 4: Private Lands Inside the Parks</p> <p>None</p>	<p>Value 4: Private Lands Inside the Parks</p> <p>The East Fork contains substantial numbers of private lands and leasehold properties scattered throughout the drainage. Most are arranged in a wildland urban interface configuration and require pro-active management of fuels to afford protection. The</p>	<p>Value 4: Private Lands</p> <p>None</p>

Kaweah Zone					
Grant Grove FMU	North Fork FMU	Marble Fork FMU	Middle Fork FMU	East Fork FMU	South Fork FMU
				properties are: <ul style="list-style-type: none"> • Oriole Lake (privately owned – approximately 7 properties) • Silver City (privately owned – approximately 50 properties) • Kaweah Han (privately owned – single owner) • Mineral King developed areas (<i>mix of private lands [2 Disney properties], and 40-60 leasehold cabin sites on public lands</i>) 	

**Value 5:
Cultural Resources**

All areas of the parks may contain unknown surface and sub-surface archeological resources. Since it is impractical to survey 100% of park lands for potential resources prior to ignition, and since fire has the potential to affect all vegetated parklands, protections for detecting and mitigating unknown archeological resources are built into individual project planning documents and standard operating procedures.

Significant known archeological and historic resources will be protected from fire damage to the extent feasible given firefighter safety concerns. Due to the sensitive nature of known archeological site information, park cultural resource staff will be consulted on a project-by-project basis, and protection of known cultural resources will be built into each project plan as required by the park archeologist.

While some known historic resources that may likely interact with fire management actions are listed by FMU below (non-sensitive information), others may yet be unlisted or their status may change over time. When planning projects, also refer to the List of Classified Structures (LCS) and the list of designated and proposed historic districts and landscapes in Appendix H for further information.

See also the list of park protected giant sequoia trees and features listed in Chapter 5 of this plan.

Kaweah Zone					
Grant Grove FMU	North Fork FMU	Marble Fork FMU	Middle Fork FMU	East Fork FMU	South Fork FMU
<p>General Grant National Park Historic District (Proposed)</p> <p>Wilsonia National Historic District</p> <p>5 buildings on the List of Classified Structures (LCS)</p>	<p>Crystal Cave - trail, gate, generator house (LCS)</p> <p>Cabin Creek structures (LCS)</p> <p>Lost Grove Comfort Station (LCS)</p> <p>Colony Mill road (LCS)</p>	<p>Moro Rock Stairway (LCS)</p> <p>Tharps Log (LCS)</p> <p>Squatters Cabin (LCS)</p> <p>Cattle Cabin (LCS)</p> <p>District Ranger Residence #55 (LCS)</p>	<p>Ash Mountain Historic District (Proposed)</p> <p>Sycamore Historic District (Proposed)</p> <p>Redwood Meadow Ranger Station and out buildings (LCS)</p>	<p>Mineral King Road Cultural Landscape District (Eligible)</p> <p>Hockett Meadow Ranger Station (LCS)</p>	<p>Quinn Ranger Station (LCS)</p>
<p>Value 6: Boundary Interface & Local Community Issues</p> <p>The FMU shares 1.6 miles of its 28 mile external boundary with the State of California at Whitaker Forest, and one mile of boundary is shared with the privately owned Sequoia Lake facility for a total of 2.6 miles of boundary.</p> <p>The remaining external boundary is shared with the USFS Giant Sequoia National Monument and Sequoia National Park.</p> <p>An additional 2 miles of internal boundary separates the Wilsonia community from public parklands.</p> <p>Proper smoke management is a critical</p>	<p>Value 6: Boundary Interface & Local Community Issues</p> <p>The North Fork FMU shares over 19 miles of external boundary with a mix of other public (15 miles) and private lands (4 miles).</p> <p>The approximate breakdown is:</p> <p>4.6 miles – USFS Jennie Lakes Wilderness</p> <p>2.8 miles - Giant Sequoia National Monument</p> <p>7.8 miles – Bureau of Land Management</p> <p>4 miles – Private lands</p> <p>Proper smoke management is a large consideration as the North Fork drains directly into the Three Rivers community, and may result in some smoke pooling in that</p>	<p>Value 6: Boundary Interface & Local Community Issues</p> <p>This unit shares only a small amount of its perimeter, about 0.5 miles, with the USFS Jennie Lakes wilderness. The remainder of the boundary is surrounded by parklands.</p> <p>Proper smoke management is a consideration for operations in this unit, as the Marble Fork drains into the Middle Fork of the Kaweah and may affect park housing areas at Ash Mountain, or the community of Three Rivers under extreme conditions.</p>	<p>Value 6: Boundary Interface & Local Community Issues</p> <p>The Middle Fork FMU shares 5.7 miles of boundary with the Bureau of Land Management and 3.1 miles of boundary with private lands.</p> <p>The Middle Fork presents the most challenging area for smoke management. The deep wide valley surrounded by high elevations ridges and peaks has only one narrow outlet. Under less than optimal conditions, the valley tends to accumulate smoke which may drain down valley at night – carrying smoke into populated areas such as the park housing area at Ash Mountain, and the</p>	<p>Value 6: Boundary Interface & Local Community Issues</p> <p>The East Fork shares 9 miles of external boundary with other agencies and private landowners. Three miles of boundary are adjacent to the USFS Golden Trout wilderness, and additional 3.5 miles are shared with the Bureau of Land Management, and the remaining 2.5 miles are shared with private landowners.</p> <p>An additional 4 miles (approximate) of boundary separates parklands from privately held lands inside the unit.</p> <p>Proper smoke management is a consideration for all</p>	<p>Value 6: Boundary Interface & Local Community Issues</p> <p>The South Fork FMU has the greatest exposure of external boundary of all Kaweah Zone units.</p> <p>It has over 30 miles of boundary shared with:</p> <p>4.6 miles – USFS Golden Trout Wilderness</p> <p>10.2 miles – Giant Sequoia National Monument</p> <p>7.8 miles – Bureau of Land Management</p> <p>4 miles – Privately owned lands</p> <p>Proper smoke management is a consideration for fire operations in this unit, as the South Fork drains directly into the community of Three Rivers. Due to</p>

Kaweah Zone					
Grant Grove FMU	North Fork FMU	Marble Fork FMU	Middle Fork FMU	East Fork FMU	South Fork FMU
<p>concern, especially at night when smoke may pool down-slope in and around the Sequoia Lake and Hume Lake developments outside the park.</p> <p>Smoke may also drain northward into the South Fork Kings drainage, affecting visitors and concession facilities (Kings Canyon Lodge on the USFS Hume Lake district, and Cedar Grove developments in Kings Canyon NP.)</p> <p>Emergency closures and extreme smoke events may affect local businesses.</p>	<p>community at night.</p> <p>Emergency road and facility closures and extreme smoke events may affect local businesses.</p>		<p>community of Three Rivers.</p> <p>As Three Rivers is a primary gateway community for park visitors, emergency road and facility closures as a result of fire operations, events may affect local businesses. Extreme smoke events may result in fewer visitors visiting the area or reducing their stay – with the potential to affect local businesses.</p>	<p>operations in this unit, as the East Fork drains directly into the community of Three Rivers. Due to topography and distance, smoke is less prone to pool in this drainage, and concentrated nighttime smoke movement into populated areas outside of the parks is rare.</p> <p>Emergency road and facility closures during the peak visitor season, or extreme smoke events may affect local businesses.</p>	<p>topography and distance, smoke is less prone to pool in this drainage, and concentrated nighttime smoke movement into populated areas outside of the parks is rare.</p> <p>Emergency closures during the peak visitor season, or extreme smoke events may have a slight affect on local businesses.</p>
<p>Hazards</p> <p>The Grant unit has the largest departure from desired conditions of all the FMUs in the parks. Fully 66% of all acres in the FMU are in the high or extreme FRID classes, which combined with the dominance of mixed conifer fuel models (50% of acres in FM-10),</p>	<p>Hazards</p> <p>The North Fork has the second most altered fuel conditions in the park. Fully 46% of the unit’s acres show high or extreme departure from desired conditions. Thirty percent of North Fork acres are in fuel model 10, indicating high fuel loads across</p>	<p>Hazards</p> <p>The Marble Fork unit has 31% of its acres in a high or extreme FRID class. This is the lowest amount in the Kaweah Zone, and can be partially attributed to the pro-active prescribed fire and fuels management focus this area has received over</p>	<p>Hazards</p> <p>Thirty-nine percent of the acres in this unit are in a high or extreme FRID class.</p> <p>Wildfires and wildland use fires account for much of the activity that has maintained the unit in the past, though significant portions were</p>	<p>Hazards</p> <p>Similar to the Middle Fork FMU, 39% of East Fork acres are in a high or extreme FRID class.</p> <p>Numerous prescribed fires in this unit since 1995 have contributed to significantly lower fuel loads across critical areas necessary to</p>	<p>Hazards</p> <p>Nearly 34% of the acres in the South Fork are in a high or extreme FRID class.</p> <p>High fuel loads associated with fuel model 10 account for about 19% of the acres in the South Fork.</p>

Kaweah Zone					
Grant Grove FMU	North Fork FMU	Marble Fork FMU	Middle Fork FMU	East Fork FMU	South Fork FMU
<p>indicates high fuel loads across most areas.</p> <p>Added to already high fuel loads, mortality in white fir resulting from the 1998-2000 Douglas fir tussock moth created a significant new increment in fuel load across much of the FMU.</p> <p>Fuels are continuous within and across park boundaries with few natural boundaries to retard spread. There is high exposure of this unit to external boundaries and ignition sources.</p> <p>Fuel loads are generally unnaturally high across the unit.</p> <p>Developments are generally situated mid-slope with heavy fuels and potential ignition sources below.</p> <p>The northern portion of the unit is extensively roaded allowing ready access and providing some man-made holding boundaries.</p> <p>The southern portion of the unit has road access</p>	<p>much of the unit.</p> <p>Given the dominance of high deviation from natural conditions and the high percentage of the unit consisting of more flammable low elevation fuel types (chaparral and foothills hardwoods) this unit presents significant challenges to pro-active fuels management.</p> <p>In addition to high fuel loads, there is a high degree of continuity between flashy and highly flammable chaparral and foothills and mid-elevation conifer forests. Few effective natural or man-made barriers to fire spread exist.</p> <p>The unit has a high exposure to external boundaries including private lands.</p> <p>Road access is limited.</p> <p>Due to prevailing west aspect and low elevation component, the unit receives full solar radiation throughout the burn period.</p>	<p>the past 30 years.</p> <p>Approximately 20% of the acres are in fuel model 10, with the bulk of the remaining acres in custom model 18.</p> <p>Vegetation communities dominating this unit consist of those showing moderate to frequent natural fire return intervals, so consistent attention is needed to maintain and improve conditions.</p>	<p>also burned in prescribed fires in the late 1970s and early 1980s.</p> <p>High fuel loads associated with fuel model 10 account for only 17% of the acres in the Middle Fork.</p> <p>Difficult access and smoke dispersal issues make pro-active fuels management challenging in this unit.</p>	<p>protecting park developments and private inholdings.</p> <p>High fuel loads associated with fuel model 10 account for only 18% of the acres in the East Fork.</p>	<p>Fuel loads in the recently acquired Dillonwood grove are unknown at this time, though they may be substantial due to past logging activity.</p> <p>Fuels are continuous within and across park boundaries with few natural boundaries to retard spread. There is high exposure of this unit to external boundaries and ignition sources.</p>

Kaweah Zone					
Grant Grove FMU	North Fork FMU	Marble Fork FMU	Middle Fork FMU	East Fork FMU	South Fork FMU
<p>along the eastern boundary and is bisected by a rough dirt road, making the interior less accessible with few natural holding boundaries.</p> <p>Steep west aspect slopes leading into mid-slope developed areas and across boundaries are exposed to full solar radiation during the burn period.</p>	<p>The terrain is generally steep and rugged.</p>				
<p>Risks</p> <p>Anaylsis of past human-caused ignitions shows the Grant FMU having the highest incidence of human caused ignitions in the parks. This is primarily due to dense development, an extensive trail network, and highways through and around the unit.</p> <p>The unit has a low rate of lightning ignitions (2-4 per square mile over the 35-year analysis period).</p>	<p>Risks</p> <p>Human ignitions in the North Fork FMU are rare, and generally clustered around developments such as Dorst Campground and the Generals Highway.</p> <p>A moderate level of lightning ignitions occur in this unit (2-7 per square mile over 35-year analysis period), with the highest lightning ignition densities in the elevations above 6,000 feet.</p>	<p>Risks</p> <p>The Marble Fork FMU has the second highest rate of human-caused ignitions in the parks concentrated around developments and roadways. Extensive visitor facilities (especially campgrounds) and administrative developments, roads, and trails account for the higher level of human activity and associated ignitions in this unit.</p> <p>A moderate level of lightning activity occurs in the higher elevations (above 6,000 feet) of</p>	<p>Risks</p> <p>Human ignitions in the Middle Fork FMU are focused primarily around the Generals Highway corridor where overheated vehicles are a source of frequent ignition. Recreational use along the lower reaches of the Middle Fork Kaweah also contributes human ignitions in this unit.</p> <p>Lightning ignitions occur at a low to moderate rate primarily following the mid-elevation ridges.</p>	<p>Risks</p> <p>A relatively low rate of human ignitions occurs in the East Fork despite a steep winding road through the unit and numerous campgrounds.</p> <p>Lightning ignitions occur at a moderate to high rate along mid-elevation ridges and on the Hockett Plateau.</p>	<p>Risks</p> <p>Few human caused ignitions have been recorded in the South Fork unit over the past 35 years, though the potential certainly exists. The presence of a campground and hiking trails at low elevations, combined with steep terrain and flashy fuels present significant potential.</p> <p>Lightning ignitions occur at a moderate to high rate, primarily along mid-elevation ridges.</p>

Kaweah Zone					
Grant Grove FMU	North Fork FMU	Marble Fork FMU	Middle Fork FMU	East Fork FMU	South Fork FMU
		this unit, focused on the Silliman Divide, with some lightning ignitions reported in the mid-elevations (4,000-6,000 feet)			
<p>Actions Common to all Fire Management Units</p> <p>Human caused fires – other than those intentionally set by NPS staff or park residents under an approved burn plan or permit – will be suppressed under strategies (confine, contain, control) commensurate with firefighter safety and consideration for resource protection from suppression actions.</p>					
<p>Multi-Year Projects and Actions</p> <p>Prescribed fire will be used as the primary tool to fully restore and maintain fuel conditions and ecological function on all undeveloped sites. Treatments will be planned and scheduled to maintain the FMU within the range of natural variability.</p> <p>Mechanical fuel treatments will be used throughout the NPS developed area to reduce fuels, including NPS lands within and around the Wilsonia community. A 200-foot buffer out from developments will be established and maintained. Treatments will be designed to</p>	<p>Multi-Year Projects and Actions</p> <p>At mid and low elevations, prescribed fire will be used as the primary tool to restore and maintain fuel conditions and ecological function. Treatments will be planned and scheduled to maintain the FMU within the range of natural variability.</p> <p>Mechanical fuel treatments will be used throughout and surrounding the NPS developed areas to reduce fuels. A 200-foot buffer out from developments will be established and maintained. Treatments will be designed to mimic natural forest</p>	<p>Multi-Year Projects and Actions</p> <p>Prescribed fire and wildland fire use will be the primary tools used to restore and maintain ecosystem and hazard fuel conditions within acceptable standards in this unit.</p> <p>Mechanical fuel treatments may also be used in areas adjacent to developments and roads. A 200-foot buffer out from developments may be established and maintained.</p> <p>Mechanical treatments will be designed to mimic natural forest structure and composition, and will be repeated every 5-15 years as necessary to</p>	<p>Multi-Year Projects and Actions</p> <p>Prescribed fire and wildland fire use will be the primary tools used to restore and maintain ecosystem and hazard fuel conditions within acceptable standards in this unit.</p> <p>Mechanical fuel treatments may also be used in areas adjacent to developments and roads. A 200-foot buffer out from developments may be established and maintained.</p> <p>Mechanical treatments will be designed to mimic natural forest structure and composition, and will be repeated every 5-15 years as necessary to</p>	<p>Multi-Year Projects and Actions</p> <p>Prescribed fire and wildland fire use will be the primary tools used to restore and maintain ecosystem and hazard fuel conditions within acceptable standards in this unit.</p> <p>Mechanical fuel treatments may also be used in areas adjacent to private lands and public developments and roads. A 200-foot buffer out from developments may be established and maintained.</p> <p>Mechanical treatments will be designed to mimic natural forest structure and composition, and will be repeated every 5-15</p>	<p>Multi-Year Projects and Actions</p> <p>Prescribed fire and wildland fire use will be the primary tools used to restore and maintain ecosystem and hazard fuel conditions within acceptable standards in this unit.</p> <p>Mechanical fuel treatments will be used adjacent to NPS developed areas to reduce fuels. A 200-foot buffer out from developments will be established and maintained.</p> <p>Treatments will be designed to mimic natural forest structure and composition, and will be repeated every 5-15 years as necessary to</p>

Kaweah Zone					
Grant Grove FMU	North Fork FMU	Marble Fork FMU	Middle Fork FMU	East Fork FMU	South Fork FMU
<p>mimic natural forest structure and composition, and will be repeated every 5-15 years as necessary to maintain fire-safe conditions.</p> <p>Mechanical treatments may also be employed along the park boundary where the use of prescribed fire alone will constitute an unacceptably high risk to non-park lands or values.</p> <p>When adjoining agency implementation timeframes and management objectives coincide with the parks, fuels projects will be implemented across boundaries on an interagency basis.</p> <p>Wildland fire use may be considered throughout the unit in places and at times of year that will not pose an unacceptable risk to FMU values.</p> <p>Research burns in portions of the Redwood Mountain grove may be implemented as part of</p>	<p>structure and composition, and will be repeated every 5-15 years as necessary to maintain fire-safe conditions. Mechanical treatments may also be employed along the park boundary where the use of prescribed fire alone will constitute an unacceptably high risk to non-park lands or values.</p> <p>When adjoining agency implementation timeframes and management objectives coincide with the parks, fuels projects will be implemented across boundaries on an interagency basis.</p> <p>Wildland fire use may be considered throughout the unit in places and at times of year that will not pose an unacceptable risk to FMU values.</p> <p>Due to the lack of accessibility and absence of natural or man-made boundaries in this unit, the park acknowledges that wildfires may be difficult to manage or contain within this unit.</p>	<p>maintain fire-safe conditions.</p> <p>Wildland fire use may be considered throughout the unit in places and at times of year that will not pose an unacceptable risk to FMU values.</p>	<p>maintain fire-safe conditions.</p> <p>Wildland fire use may be considered throughout the unit in places and at times of year that will not pose an unacceptable risk to FMU values.</p>	<p>years as necessary to maintain fire-safe conditions.</p> <p>Wildland fire use may be considered throughout the unit in places and at times of year that will not pose an unacceptable risk to FMU values.</p>	<p>maintain fire-safe conditions.</p> <p>Mechanical treatments may also be employed along the park boundary where the use of prescribed fire alone will constitute an unacceptably high risk to non-park lands or values.</p> <p>When adjoining agency implementation timeframes and management objectives coincide with the parks, fuels projects will be implemented across boundaries on an interagency basis.</p> <p>Wildland fire use may be considered throughout the unit in places and at times of year that will not pose an unacceptable risk to FMU values.</p> <p>Research burns in portions of the Dillonwood grove may be implemented under approved study plans.</p>

Kaweah Zone					
Grant Grove FMU	North Fork FMU	Marble Fork FMU	Middle Fork FMU	East Fork FMU	South Fork FMU
<p>a larger study plan in cooperation with adjacent agencies. The Redwood Mountain grove, with portions managed by three different agencies, provides an ideal place to conduct research comparing different management strategies for giant sequoia. In the 1960s Redwood Mountain was the location of significant research documenting the role of fire in giant sequoia systems.</p>	<p>As a result, aggressive initial attack consistent with firefighter safety will be a high probability for starts below 5,000' elevation. Fires that escape initial attack at lower elevations are likely to grow large until intercepting significant natural or man-made boundaries.</p>				
<p>Further Compliance Needs</p> <p>The scope of proposed actions and their expected effects are thoroughly assessed in the companion Environmental Assessment (EA).</p> <p>All mitigating actions contained in the EA will be implemented for projects conducted in this unit.</p> <p>Cultural resource consultation with the park archeologist will take place during the</p>	<p>Further Compliance Needs</p> <p>The scope of proposed actions and their expected effects are thoroughly assessed in the companion Environmental Assessment (EA).</p> <p>All mitigating actions contained in the EA will be implemented for projects conducted in this unit.</p> <p>Cultural resource consultation with the park archeologist will take place during the</p>	<p>Further Compliance Needs</p> <p>The scope of proposed actions and their expected effects are thoroughly assessed in the companion Environmental Assessment (EA).</p> <p>All mitigating actions contained in the EA will be implemented for projects conducted in this unit.</p> <p>Cultural resource consultation with the park archeologist will take place during the</p>	<p>Further Compliance Needs</p> <p>The scope of proposed actions and their expected effects are thoroughly assessed in the companion Environmental Assessment (EA).</p> <p>All mitigating actions contained in the EA will be implemented for projects conducted in this unit.</p> <p>Cultural resource consultation with the park archeologist will take place during the</p>	<p>Further Compliance Needs</p> <p>The scope of proposed actions and their expected effects are thoroughly assessed in the companion Environmental Assessment (EA).</p> <p>All mitigating actions contained in the EA will be implemented for projects conducted in this unit.</p> <p>Cultural resource consultation with the park archeologist will take place during the</p>	<p>Further Compliance Needs</p> <p>The scope of proposed actions and their expected effects are thoroughly assessed in the companion Environmental Assessment (EA).</p> <p>All mitigating actions contained in the EA will be implemented for projects conducted in this unit.</p> <p>Cultural resource consultation with the park archeologist will take place during the</p>

Kaweah Zone					
Grant Grove FMU	North Fork FMU	Marble Fork FMU	Middle Fork FMU	East Fork FMU	South Fork FMU
<p>planning phase for all projects. In addition, mechanical fuel projects will require consultation with park wildlife and plant ecologists during the planning phase to ensure adequate protection for site specific species.</p> <p>Other than actions noted above or as contained in the EA, no additional environmental compliance will be required for projects that fall within the scope of projects and effects described in the EA.</p>	<p>planning phase for all projects. In addition, mechanical fuel projects will require consultation with park wildlife and plant ecologists during the planning phase to ensure adequate protection for site specific species.</p> <p>Other than actions noted above or as contained in the EA, no additional environmental compliance will be required for projects that fall within the scope of projects and effects described in the EA.</p>	<p>planning phase for all projects. In addition, mechanical fuel projects will require consultation with park wildlife and plant ecologists during the planning phase to ensure adequate protection for site specific species.</p> <p>Other than actions noted above or as contained in the EA, no additional environmental compliance will be required for projects that fall within the scope of projects and effects described in the EA.</p>	<p>planning phase for all projects. In addition, mechanical fuel projects will require consultation with park wildlife and plant ecologists during the planning phase to ensure adequate protection for site specific species.</p> <p>Other than actions noted above or as contained in the EA, no additional environmental compliance will be required for projects that fall within the scope of projects and effects described in the EA.</p>	<p>planning phase for all projects. In addition, mechanical fuel projects will require consultation with park wildlife and plant ecologists during the planning phase to ensure adequate protection for site specific species.</p> <p>Other than actions noted above or as contained in the EA, no additional environmental compliance will be required for projects that fall within the scope of projects and effects described in the EA.</p>	<p>planning phase for all projects. In addition, mechanical fuel projects will require consultation with park wildlife and plant ecologists during the planning phase to ensure adequate protection for site specific species.</p> <p>Other than actions noted above or as contained in the EA, no additional environmental compliance will be required for projects that fall within the scope of projects and effects described in the EA.</p>

Figure 4-10 – Map of Kings Zone Fire Management Units (FMUs)
(The Kings Zone has only two FMUs, called the Sierra Crest FMU and Cedar Grove FMU.)

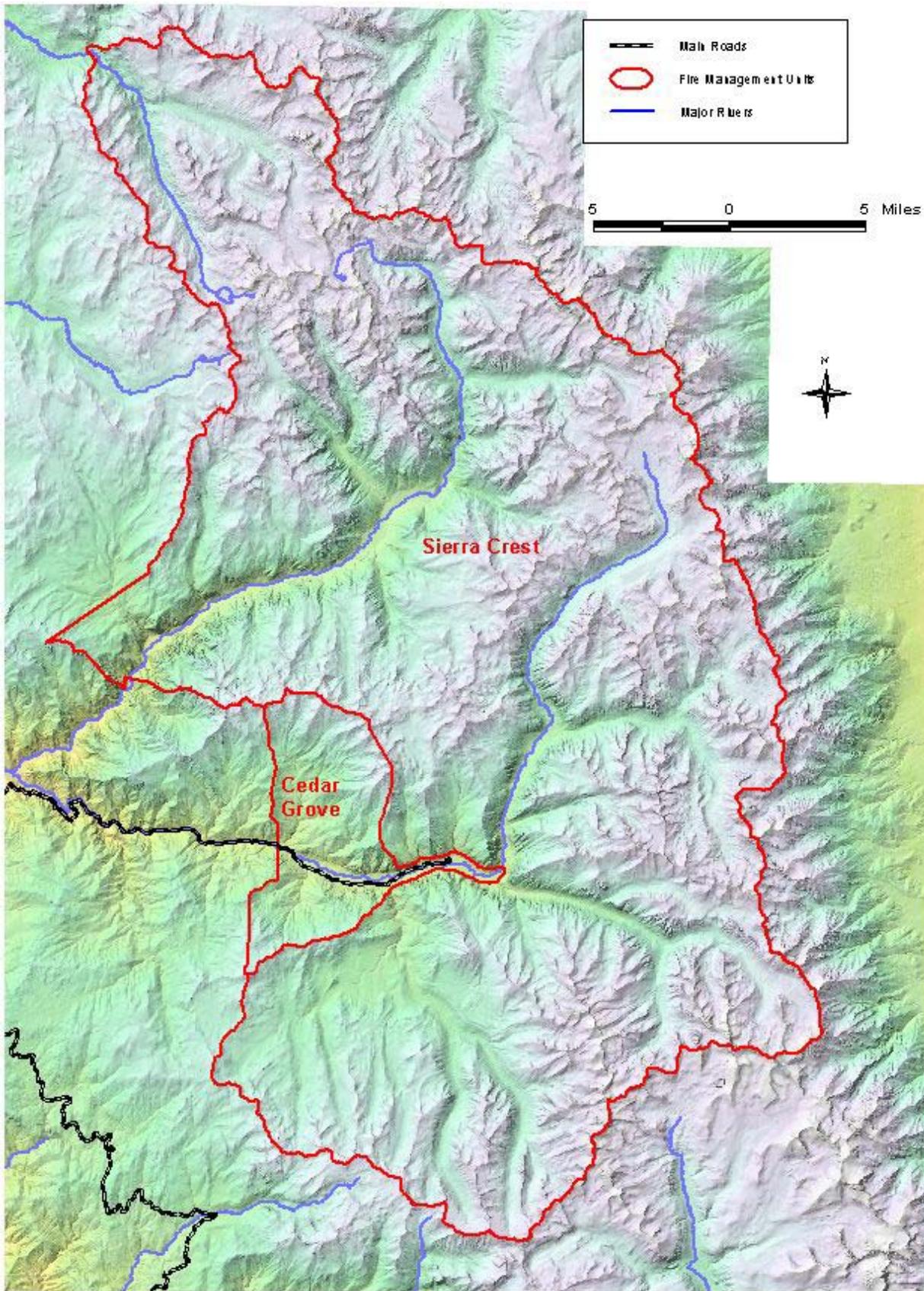


Figure 4-11 – Map of Kern Zone Fire Management Units (FMUs)

(The Kern Zone has only one FMU, called the Kern FMU.)

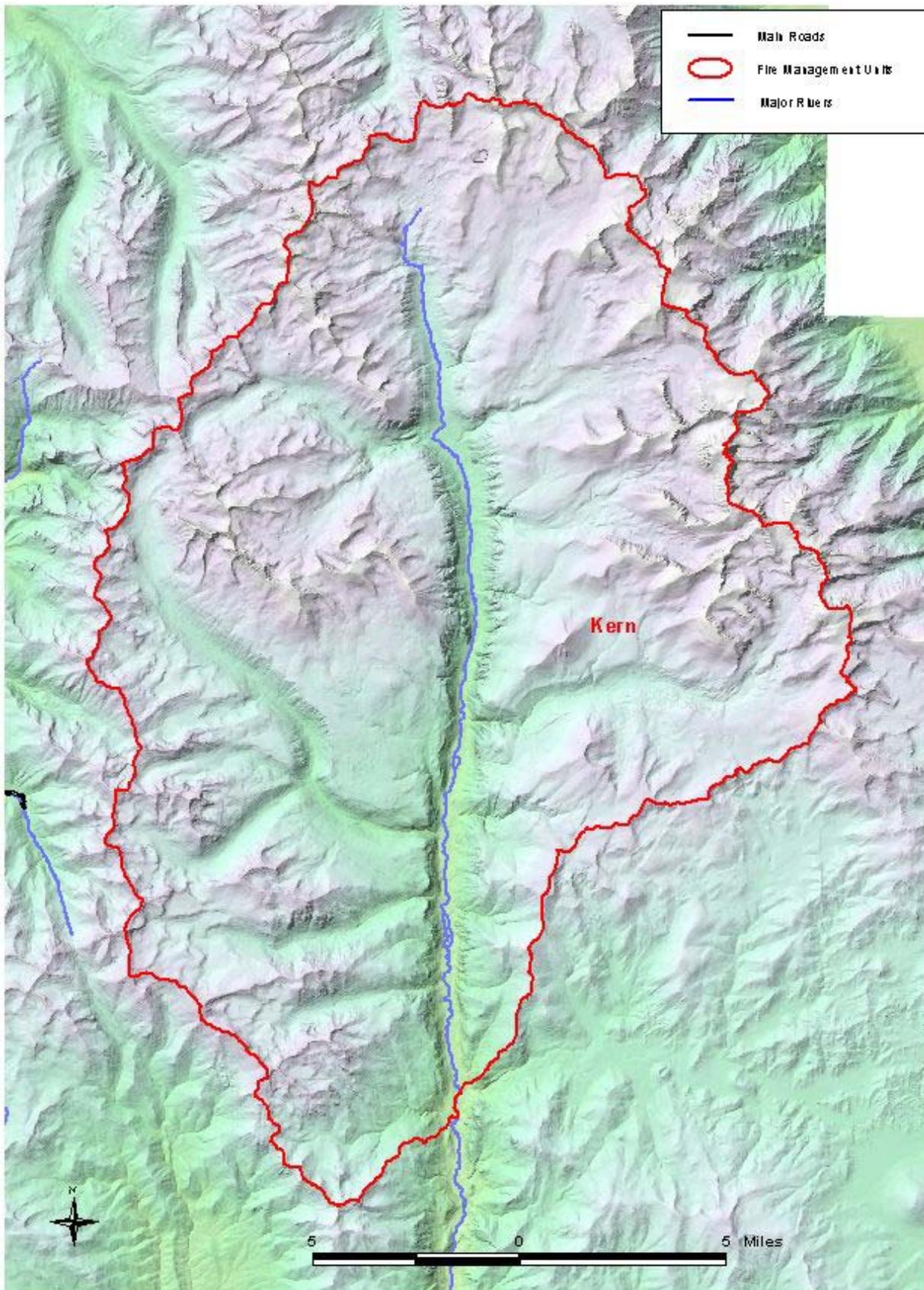


Figure 4-12 – Map of Kaweah Zone Fire Management Units (FMUs)

