INTRODUCTION

Over the past 5 years, the national emphasis on fire and fuels management has increased as a result of large fires, droughts, increasing forest health concerns, and impacts on communities. New policies and laws incorporated in the DLMP/DEIS alternatives would provide direction to manage wildfires more effectively, reduce hazardous fuels (especially in wildland urban interface areas), restore and maintain fire-dependent ecosystems, and promote collaboration with local communities in order to address wildfire-related issues. (The complete text of this analysis is presented in the Analysis of the Management Situation (AMS), which is on file at the SJPLC.)

LEGAL AND ADMINISTRATIVE FRAMEWORK

LAWS

- ***The Healthy Forest Initiative and Healthy Forest Restoration Act, August 2002***: This act directs agencies to improve the condition of public lands, increase firefighter safety, and conserve landscape attributes valued by society.

REGULATIONS AND POLICIES

- ***Federal Wildland Fire Policy, December 12, 1995***: This provides common policies for wildland fire by the U.S. Departments of Agriculture (USDA) and the U.S. Department of the Interior (USDOI).
- ***The National Fire Plan, August 2000***: This was designed to address five topics: firefighting, rehabilitation, hazardous fuels reduction, community assistance, and accountability.

DESIGN CRITERIA

Management guidelines and design criteria describe the environmental protection measures that would be applied to all of the alternatives at the project level in order to protect, enhance, and, where appropriate, improve resources fire and fuels management. Guidelines and design criteria are presented in Part 3 of Volume II of the DLMP/DEIS.

AFFECTED ENVIRONMENT

EXISTING CONDITIONS AND TRENDS

There is a growing recognition that past land-use practices, combined with the impacts of fire exclusion, can result in heavy accumulations of dead vegetation and altered fuel arrangements, as well as in changes in vegetative structure and composition. When dead fallen material (including tree boles, tree and shrub branches, leaves, and decaying organic matter) accumulates on the ground, it increases fuel quantity and creates a continuous supply of fuel. When this occurs, surface fires may ignite more quickly, burn with greater intensity, and spread more rapidly and extensively than in the past. On the other hand, uses such as grazing can sometimes reduce fine fuels, precluding periodic surface fires that would typically burn in these areas. Without fire, encroachment of woody species may occur in some savannah and grassland ecosystems.

In contrast, rather than eliminating fire, exclusion efforts (combined with other land use practices) have, in many places, dramatically altered fire regimes (circumstances of fires including frequency, intensity, and spatial extent) so that today's fires tend to be larger and more severe. No longer a matter of slow accumulation of fuels, today's conditions present the likelihood of more rapid, extensive ecological changes beyond any experienced in the past. Addressing these changes, and the challenges they present, requires understanding and acceptance of the role of wildland fire, and the adoption of land management practices that integrate fire as an essential ecosystem process.

While other management techniques (including mechanical removal) may be used in order to reduce heavy fuels, they cannot always replace the ecological role that fire plays. Fire not only reduces the build-up of dead and downed fuel, it performs many other critical ecosystem functions. Fire can recycle nutrients that might otherwise be trapped for long periods of time in the dead organic matter that exists in many environments with slow rates of decay. It can also stimulate the production of nutrients and provide the specific conditions (including seed release, soil, light, and nutrients) that are critical for the reproduction of fire-dependent species.

The planning process for the SJPL considers the historic role of fire as an ecological disturbance agent. This knowledge is used to determine the appropriate use of fire and fire surrogate treatments in order achieve desired conditions on the landscape. Numerous studies, locally as well as across the region, have shown that ponderosa pine forests have missed many fire cycles and are now characterized by dense conditions across the landscape. Reducing fire hazard means thinning the forests and bringing fire back into ponderosa pine forests. In this situation, fuels reduction objectives are in line with restoration objectives. Therefore, in terms of the amount and pattern of thinning and application of fire, prescriptions for fuels reduction projects in ponderosa pine forests would strive to meet restoration objectives.

The opposite situation exists in the pinyon-juniper woodlands, where recent research suggests current dense conditions are typical for pinyon-juniper woodlands, Floyd et al. 2000). Fuels projects designed to mitigate fire hazard in the pinyon-juniper woodlands are driven solely by public safety concerns. Ecological information about pinyon-juniper woodlands favors development of an overall fuels strategy that minimizes adverse impacts to the overall pinyon-juniper landscape while, at the same time, providing protection in the urban interface. The SJPLC fire and fuels management program would use ecological, social, and economic concerns in order to develop future fire and fuels management strategies.

Fire Regimes

Fire regimes describe the historical ecological role of fire in creating, and maintaining, vegetation communities for a period before Euro-American settlement activities, and before active fire suppression began. Fire regimes, or more generally, disturbance regimes, are a key component of historical range of variability (HRV) characterizations for forest and vegetation types. HRV reference conditions are useful in developing desired future conditions, which, in turn, can be used as guidelines in developing program strategies and designing fuels restoration projects.

This discussion focuses on fire; however, the role of other disturbance agents is also acknowledged. Fire Regime Condition Class (FRCC) is a standardized interagency tool that utilizes the concept of HRV in order to assess a current landscape's departure from historical (natural) conditions (Hann et al. 2003). The fire regime description includes HRV characterizations of the local forest or vegetation type, and their assigned biophysical group (bps), as defined by FRCC protocol. Fire regimes are typically described by fire frequency, intensity, size, and vegetation type (Heinselman 1981; Kilgore 1981; Sando 1978).

Vegetation types by fire regime are listed in Table 3.8.,1 based on FRCC definitions (Hann et al. 2003). Existing vegetation types are found in the Vegetation Diversity section of this chapter, which describes current vegetation and the potential natural vegetation community that would develop in the absence of disturbance. However, each existing vegetation type has experienced a characteristic pattern of succession and natural disturbances (including fires and insect outbreaks) that occurred at varying intervals and characteristic intensities. These natural disturbances were key to maintaining a diversity of seral communities and, therefore, a variety of plant and wildlife habitat across the landscape.

Table 3.8.1 – Historic Fire Regimes for the SJPL Geographic Area

FIRE REGIME CLASS	FREQUENCY (FIRE RETURN INTERVAL)	SEVERITY	EXISTING VEGETATION TYPES	ACRES OF SJPL	PERCENTAGE (%) OF SJPL LAND
I	0 – 35+ years, frequent	Predominantly low	Ponderosa Pine Warm-Dry Mixed-Conifer	411,790 95,392	11 3
II	0 – 35+ years, frequent	Replacement	Mountain Grasslands Semi-desert Shrubland Sagebrush Shrublands	304,314 95,380 210,030	8 3 6
III	35 – 100+ years, less infrequent	Mixed and low	Cool-Moist Mixed-Conifer	199,412	6 10
IV	35 – 100+ years, less infrequent	Replacement	Aspen Mountain Shrubland Sagebrush Pinyon-Juniper Shrubland Semidesert Grassland Semidesert Shrubland Riparian and Wetland	346,384 450,190 ** ** 301,538 95,380 77,964	12 8
V	200+ years	Replacement and other fires occurring within this frequency range	Spruce-fir Pinyon-Juniper Woodland Alpine	510,220 444,147 186,494	14 12 5

Condition Class

The first step of FRCC[1] characterizes HRV conditions for vegetation types. These are the reference conditions used to assess whether or not a landscape (forest type) is outside its HRV. The second step of FRCC is a condition class (CC) assessment of a landscape's degree of departure from its HRV conditions. For the SJPL Geographic Area, the reference period for this analysis spans the Seventeenth Century to the late Nineteenth Century. This period is based on the most reliable span in fire history data. The reference period is the time period when ecosystems, along with their natural disturbance regimes, were still intact and functioning in sustainable landscapes (before Euro-American settlement activities). Tree-ring fire chronologies show the last widespread fire occurred in the 1880s. The year 1890 is a good date to designate the beginnings of fire exclusion (Brown and Wu 2005; Grissino-Mayer et al. 2004; Wu 1999). Current condition departure assessments are based on missed (or increased) fire occurrences, uncharacteristic fire behavior, current species composition, structural stage, age and canopy closure, and fuel accumulations compared to conditions under the historic disturbance regimes.

[1] Fire Regime Condition Class (FRCC) is a standardized interagency tool for assessing a current landscape's departure from historical (natural) conditions (Hann et al. 2003). Historical or reference period is defined as the time period when ecosystems, along with their natural disturbance regimes, were still intact and functioning in sustainable landscapes (before Euro-American settlement activities). Current condition departure assessments are based on fire frequency and intensity, current species composition, structural stage, age and canopy closure, and fuel accumulations compared to conditions under the historic disturbance regimes.

Table 3.8.2 defines the three FRCC condition classes. Low departure (CC1) is considered to be within HRV. Moderate departure (CC2) indicates that components of the fire regime (including fire frequency) have been altered, resulting in changes in vegetation and landscape patterns. These areas may require varying levels of management actions before fire can be restored and allowed to play its historical natural role.

Table 3.8.2 – Fire Regime Condition Class Descriptions

CONDITION CLASS	DESCRIPTIONS
CC1 LOW DEPARTURE	Fire regimes are within the historical range and the risk of losing key ecosystem components is low. Vegetation attributes (including species composition and structure) are intact and functioning within their historical range.
CC2 MODERATE DEPARTURE	Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from the historical frequencies by one or more return intervals (either increased or decreased). This may result in moderate changes to one or more of the following: fire size, intensity and severity, and landscape patterns. Vegetation attributes have been moderately altered from their historical range.
CC3 HIGH DEPARTURE	Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals. This may result in dramatic changes to one or more of the following: fire size, intensity and severity, and landscape patterns. Vegetation attributes have been significantly altered from their historical range.

High departure (CC3) means that fire regimes and vegetation are significantly altered from historical conditions. Uncharacteristic fire behavior and fire impacts will occur under certain conditions. This would result in vegetation composition and assemblages not known to exist during reference conditions. (Condition class is a calculated number and the protocols are outlined in the FRCC Guidebook, Volume 1.2 (Hann et al. 2003).) However, the SJPL's condition class assigns CC values based on a vegetation polygon's type and fire regime, and would be updated with the new FRCC map.)

Table 3.8.3 shows each major vegetation type by its assigned CC. In general, ecosystems with the longest return fire intervals (including spruce-fir and pinyon-juniper) have not missed fire intervals and, therefore, on a stand level, their structure and species composition is well within estimated HRV conditions. From an ecological perspective, fires can be allowed to burn in these forests under any conditions and will burn with characteristic intensity and with characteristic impacts. Some concerns about landscape structure and mosaic exist and need to be assessed. However, due to the long fire intervals, the landscape is probably still within HRV. Spruce-fir is in CC1 and pinyon-juniper is in CC2. Even though its fire regime and macro woody structure is intact, pinyon-juniper is only considered CC2 because of grazing, chainings, and degraded herbaceous composition. Over time, the current cheatgrass invasion may push pinyon-juniper to CC3. Cheatgrass cover will introduce frequent surface fire to this low frequency-high intensity fire regime, and alter post-fire successional pathways.

Aspen is currently assigned to CC1, but is trending toward CC2. The current distribution and age structure across the landscape is an assemblage within HRV; however, it appears to be on the longer extreme of its HRV. Many stands succeeding to conifer would benefit from burning in order to regenerate the stands. An important question to aspen persistence on the landscape is how long a clone can remain viable after its last stand replacement fire.

Cool-moist mixed-conifer is assigned to CC2 because, although it has missed some fire intervals, its vegetation composition and landscape mosaics are still within HRV (with fires still behaving characteristically and producing characteristic impacts). This is true for the other vegetation types listed in CC2; however, the semi-desert vegetation types and sagebrush types are threatened by cheatgrass and other noxious weeds, and have the same situation described for pinyon-juniper.

Table 3.8.3 – Fire Regime Condition Class by Existing Vegetation Type

CONDITION CLASS (ASSIGNED)	EXISTING VEGETATION TYPE	ACRES OF PUBLIC LANDS	PERCENTAGE (%) OF PUBLIC LANDS
1	Spruce-fir Alpine Aspen	510,220 186,494 346,384	14 5 10
2	Cool-Moist Mixed-Conifer Mountain Grasslands Mountain Shrublands Pinyon-Juniper Woodlands Pinyon-Juniper Shrublands Semidesert Grasslands Semidesert Shrublands Sage Shrublands Ponderosa Pine	199,412 304,314 450,190 444,147 ** 301,538 95,380 210,030 411,790	6 8 12 12 8 3 6 11
3	Warm-Dry Mixed-Conifer	95,392	3
0	Riparian and Wetland	77,964	2

Ponderosa pine and warm-dry mixed-conifer are both frequent surface fire regimes, and have been the most affected by fire suppression, logging, and grazing since Euro-American settlement; therefore, they are assigned to CC3. They have missed numerous fires relative to historic patterns, and as a result their stand structures are overly dense, their understory herbaceous life is degraded, and white-fir is overtaking ponderosa pine in the warm-dry mixed-conifer types. Forest fire regimes have shifted from high frequency-low intensity surface fire to low frequency-high intensity stand replacement fire.

Fire Hazard

Fire hazard is directly related to vegetation or fuel conditions (including type of vegetation, age, structure, density, and amount of live and dead material), topography (including slope, aspect, and elevation), and weather conditions (including wind speed and direction, and fuel moisture). These elements all impact fire behavior, as well as the intensity and rate of spread of fires. Fire hazard changes with changing conditions.

Fire hazard for the planning area was modeled for current vegetation conditions (topography is considered to be constant) under the 97th percentile weather conditions. This is based on weather data taken from the Remote Automated Weather Station (RAWS) located throughout the planning area. Data was summarized from 1990 to 2004. Modeled weather conditions included wind gusts of 23 mph, coming from the west and southwest.

Historic Fire Activity

Historic fire activity records, from 1980 through 2004, were evaluated for the planning area. Table 3.8.4 summarizes the number of fires, the causes, and the number of acres burned for each year. Figure 3.8.3 displays fire start locations and causes for this same period. Only fires that burned within the planning area are included.

Table 3.8.4 – Fire Activity 1980-2004, SJPL Geographic Area

	LIGHTNING CAUSED		HUMAN CAUSED		TOTAL FIRES	
YEAR	NUMBER OF FIRES	ACRES BURNED	NUMBER OF FIRES	ACRES BURNED	NUMBER OF FIRES	ACRES BURNED
1980	55	143	13	20	68	163
1981	60	41	6	3	66	45
1982	31	44	4	0	35	45
1983	22	5	10	6	32	11
1984	30	13	3	0	33	13
1985	47	177	3	1	50	178
1986	23	11	4	16	27	27
1987	32	831	17	339	49	1,169
1988	54	87	7	18	61	104
1989	127	679	31	165	158	844
1990	72	1,358	8	8	80	1,365
1991	49	100	14	99	63	199
1992	39	27	13	12	52	40
1993	32	13	12	3	44	16
1994	163	2,079	11	280	174	2,359
1995	52	376	12	12	64	388
1996	159	4,662	14	700	173	5,362
1997	43	73	8	6	51	79
1998	64	1,776	13	52	77	1,829
1999	24	9	13	6	37	15
2000	181	4,854	19	122	200	4,975
2001	65	780	13	107	78	888
2002	119	80	23	74,121	142	74,202
2003	225	4,615	6	7	231	4,622
2004	124	673	14	62	138	734
GRAND TOTAL	***1,892***	***23,505***	***291***	***76,167***	***2,183***	***99,672***
% OF TOTAL	***87%***	***24%***	***13%***	***76%***	***100%***	***100%***

Fire Management and Coordination Efforts

Fire management in the SJPL region is coordinated between multiple agencies through the Durango Interagency Dispatch Center, which serves the SJPLC, Mesa Verde National Park, the Southern Ute Agency and the Ute Mountain Ute Agency of the BIA, as well as the surrounding 12 counties. The dispatch center provides support for initial attack and large incidents, and oversees air operations (e.g., air tankers, smokejumpers, and helicopters).

Since the mid-1990s, fire management policy has evolved beyond just suppression actions to include a variety of management options, as described in the National Fire Plan. The four primary goals of the Fire Plan include improving fire prevention and suppression, reducing hazardous fuels, restoring fire-adapted ecosystems, and promoting community assistance.

Fire management policy differs between the various agencies and landowners (the USFS, the BLM, the NPS, the State of Colorado, and private property owners) that have jurisdiction in the SJPL region. Wildfires on private lands are suppressed by rural and county fire departments. Full suppression of fires is the goal of these agencies. For the SJPLC, four categories of treatment options guide fire management and fuels treatment (described in the San Juan Fire Plan, April 1997, amended to the SJPL Fire Management Plan, 2004). This plan allows the use of prescribed burns and WFU under the following categories:

A. ***Fire Suppression***: This includes areas where wildfire is not desired. Without mitigation, unplanned ignitions may have adverse impacts on resource values (including WUI lands, cultural resources, and areas with unnatural fuels build-up). Fire suppression would be aggressive. However, prescribed burns and/or mechanical treatments may be considered in order to reduce hazards when resource concerns can be mitigated.

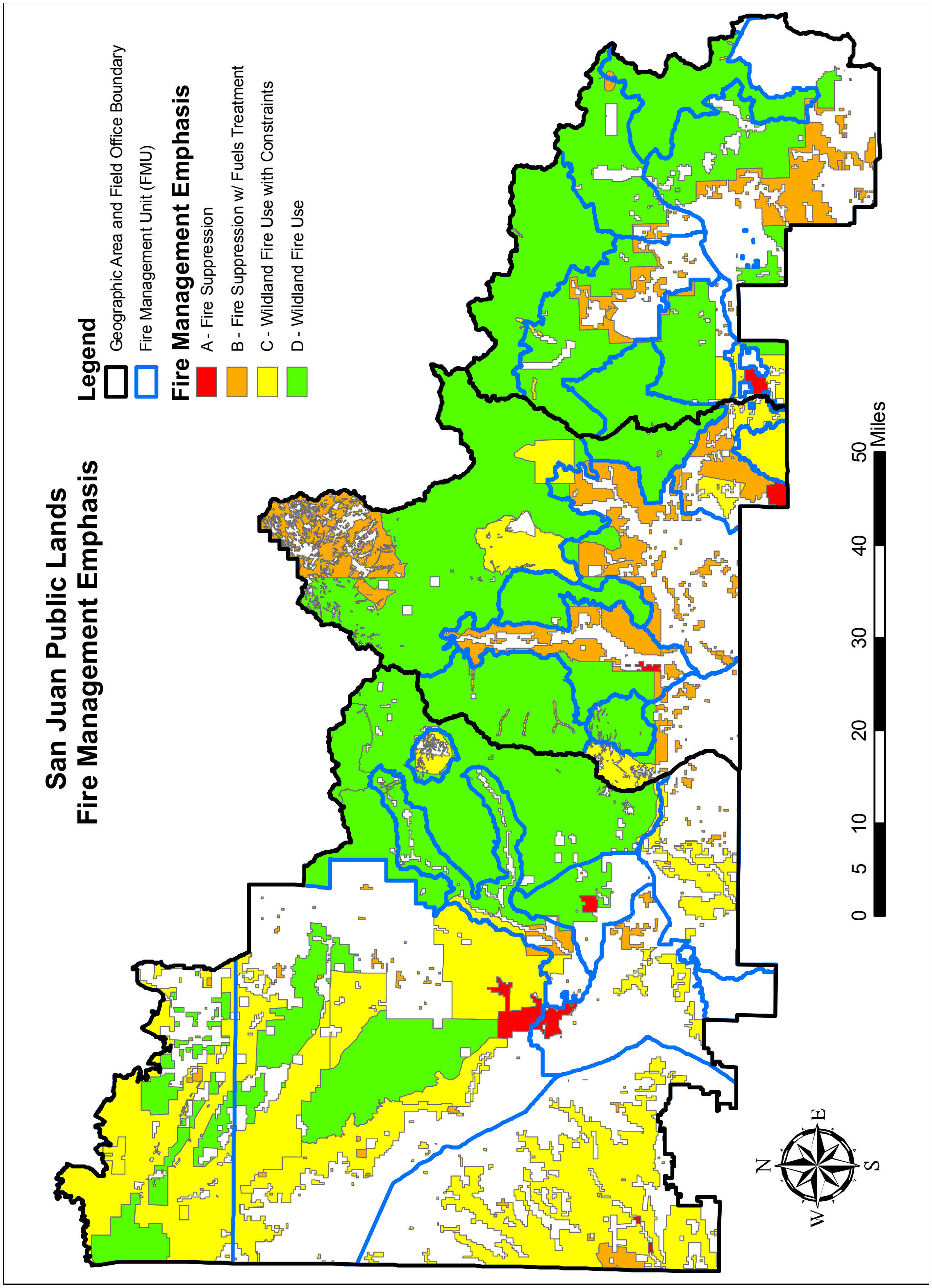
B. ***Fire Suppression with Fuels Treatment***: These include areas where fire is desirable; however, social, economical, and ecological constraints must be considered (including State air quality emission standards, and wildlife species and habitats). A variety of suppression efforts may be used. Prescribed burns and mechanical fuels reduction treatments are acceptable tools for meeting resource objectives.

C. ***WFU with Constraints***: These include areas where fire is desired and where there are few resource constraints to its use. Fires may be managed under a WFU strategy, which allows a full range of appropriate management responses. Prescribed burns and mechanical fuels reduction treatments are also acceptable tools for meeting resource objectives.

D. ***WFU***: These include areas where fire is desired and where there are few resource constraints to its use. Fires may be managed under a WFU strategy that allows a full range of appropriate management responses. Prescribed burns and mechanical fuels reduction treatments are also acceptable tools for meeting resource objectives.

Areas where the four categories described above would be applied have been identified and are displayed in Figure 3.8.5.

Figure 3.8.5 – Fire Management Emphasis



Wildland Fire Use
WFU is defined as the application of the appropriate management response to naturally ignited wildland fires in order to accomplish specific resource management objectives in predefined designated areas outlined in fire management plans. Wildland fires would be used in order to protect, maintain, and enhance resources and, as nearly as possible, be allowed to function in their natural ecological role. Use of fire would be based upon approved fire management plans, and would follow specific prescriptions contained in operational plans.
In 1997, the San Juan National Forest (SJNF) was the first public lands office in the State, or in the Rocky Mountain Region, to initiate a WFU program via an environmental assessment (EA). Since that time, the program has evolved throughout most Federal land management agencies and can be used if WFU is part of an approved fire management plan, and it is consistent with local land and resource management plans.

KEY FINDINGS

- The five historic fire regimes distribution on the SJPL are: I - < 1%, II – 22%, III – 25%, IV – 5%, and V – 41%. Water and bare/rock areas that do not burn make up the remaining 7%.
- Since 1980, 2,183 wildfires have occurred on USFS and BLM lands, burning 99,672 acres. Approximately 87% were caused by lightning, and 13% were human-caused. Most of these fires were very small (74% were less than 0.25 acres, and 21% were between 0.25 and 10 acres), accounting for 1.2% of the total area burned. The Missionary Ridge fire accounts for 73% of the total burned area.
- Based on 25 years of fire history, the planning area is at a relatively moderate risk for fire occurrences.
- WUI areas occur on approximately 25% of the public lands.

MANAGEMENT CHALLENGES

Between 1980 and 2004, there was no clear trend in human-caused fires; in 12 years the number of human-caused fires was above the 13% average. The period from 1995 to 2004 had 6 years with numbers above the average, with an overall percentage of 11% being human-caused fires. The period from 1985 to 1994 also had 6 years with numbers above the average, with an overall percentage of 15% being human-caused fires. Lightning-caused fires tend to be more weather related. There has been a short upward trend in the number of lightning-caused fires over the past few years. The associated trend in lightning acres burned between 1980 and 2004 has been upward.

Over the past 30 years, the trend in acres impacted by fire is related to trends in vegetation conditions, including increasing age, density, and fuel loading in all woodland and forest cover types. Specific examples of this trend are found in the ponderosa pine zone, with dense canopy cover and heavy oak brush ladder fuels and the pinyon pine/Utah juniper woodland, which has witnessed intense beetle kill and an invasion of fast-burning cheatgrass. These conditions have the potential to allow fires to spread to larger areas and burn with higher intensities than would have occurred historically.

Fire size trends are also related to weather conditions. Over the past 5 years, drought conditions have prevailed in western Colorado. These weather conditions not only stress vegetation, making it more susceptible to insect attack and mortality, but also result in increases in drought-caused mortality. The result is increasing amounts of dead fuel building up within the planning area.

Development of private land within public land boundaries is dramatically increasing as land use changes from livestock ranching to subdivisions.

DIRECT AND INDIRECT IMPACTS

All of the alternatives utilize wildland fire in order to maintain public land conditions within the HRV while, at the same time, recognizing that other resource and social values may determine the appropriate management responses. Use of wildland fire, along with mechanical and other fuels management strategies, may create forest conditions that meet desired conditions for the natural vegetation types within the planning area. Recognizing that effective fire management spans jurisdictional boundaries, the fire and fuels program would also use partnerships, and would assist local counties and communities in developing community wildfire protection plans in order to reduce the risk of wildfires.

Acres of Fuels Treatment by Alternative

Estimates were made of the number of acres of fuels treatment attainable annually under each alternative. These estimates were based on values at risk, historic funding levels experienced by the public lands over the last few years, and management objectives for each alternative. The highest priority for mechanical treatments would continue to be adjacent to high-value areas, communities at risk, and areas identified in Community Wildfire Protection Plans.

Fires in long return interval fire regimes are typically high-intensity, stand-replacing fires; therefore, fuel treatments adjacent to high-value areas would likely concentrate on defensible space. Among the high-value areas within the planning area are communities, primary residences, summer homes, campgrounds, administrative sites, ski areas, and areas of high-resource values. All fuel breaks created would require maintenance. The type and interval of the maintenance would be determined through project-level planning. The highest priority for use of prescribed burns would be in Fire Regimes 1, 2, and 3 (with condition classes of 2 or 3), and for maintenance of condition class. Prescribed burns would be safely implemented in order to reduce fuel hazard adjacent to high-value areas (with those areas receiving preference). It is important to note that while prescribed burning results in benefits to the fuels profile and/or to the condition class, often a goal of the burn would be to improve wildlife habitat or range condition for domestic livestock.

Based on the current budget trends and known capability to achieve fuels treatments for the agencies on the SJPL, a yearly target of approximately 13,000 acres of combined mechanical and prescribed burns would be the average for the future. (This average could change, based on budget, environmental conditions, and approved burn plans.) Alternatives A through D have different management area delineations; however, this may not measurably impact the amount of treatments and acreage completed (because treatments may simply be located elsewhere).

WFU is the most natural disturbance process for the land. Due to its unpredictable nature, the amount of acres impacted by WFU cannot be estimated accurately. The objectives below, as presented in Volume II of this DLMP/DEIS as desired conditions, indicate the amount of WFU that could be effectively managed in any given year.

- For the next 10 years, complete an average of 8,000 acres of hazardous fuels reduction in the WUI each year.
- For the next 10 years, complete an average of 5,000 acres of fuels reduction and resource enhancement within the planning area each year.

Table 3.8.5 – Fuels Treatment Acreage by Cover Type and Method (per year, decade 1)

		ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D
Pinyon-Juniper	Mastication	1,000 acres	1,000 acres	1,000 acres	1,100 acres
Mixed Shrubland/ No Pine	Mastication	1,500 acres	1,500 acres	1,500 acres	1,600 acres
	Prescribed Fire	1,500 acres	1,500 acres	1,500 acres	1,500 acres
Oakbrush Understory in Pine	Mastication	2,500 acres	2,500 acres	2,500 acres	2,700 acres
Ponderosa Pine	Mechanical	1,500 acres Restoration Treatment*	1,500 acres Restoration Treatment*	1,500 acres Restoration Treatment*	2,000 acres Restoration Treatment*
	Prescribed Fire	4,000 acres	4,000 acres	4,000 acres	4,000 acres
Warm-Dry Mixed-Conifer	Mechanical	500 acre Restoration Treatment*	500 acres Restoration Treatment*	500 acres Restoration Treatment*	600 acres Restoration Treatment*
	Prescribed Fire	500 acres	500 acres	500 acres	500 acres
Mixed Vegetation Types	WFU	1 to 30,000 acres	1 to 30,000 acres	1 to 30,000 acres	1 to 30,000 acres
Spruce-Fir	WFU	1 to 30,000 acres	1 to 30,000 acres	1 to 30,000 acres	1 to 30,000 acres

WFU may overlap several cover types (including shrubland to pine to cool-moist mixed-conifer into spruce).

Acres Burned by Wildfire

It is very difficult to predict the number of acres that will be burned by wildfire in future years. Conditions that dictate the severity of fire seasons tend to vary significantly year to year. Weather, which is the primary influence on availability of fuels for ignition, is very difficult to predict with any degree of reliability more than a few days into the future. Research suggests that large stand-replacing fires are more likely to occur as the result of weather conditions than of fuel accumulations. Most large fires occur in years with elevated weather variable values, and fires in those years account for the majority of the area burned. Prediction of major influences (including the occurrence of drought) is improving, but is still not very reliable. For these reasons, the best method for predicting the acreage that will burn in the future is to base the prediction on historical fire occurrence.

Large fires within the planning area are frequently the result of wind events, and account for considerable fire spread in a relatively short period of time. The growth and spread of large fires are influenced by the presence of closed canopy forests, especially those with dense ladder fuels (including oak brush and white-fir). Much of the pinyon-juniper woodland burns under the effects of wind, but usually loses its energy after one or two burning periods. It is difficult to predict the number of acres that would burn in wildfires in the future; however, it is reasonable to expect that large fires would continue to occur within the planning area, as they have historically, when weather and fuel conditions are conducive for large fire growth. Some of these fires may involve significant acreages.

Impacts Related to Timber Management

The fuel profile, and subsequent fire behavior, would be impacted in sites where timber harvesting occurs. Impacts to the fuel profile and to fire behavior may be both positive and negative. Surface-fuel loading, crown-base height and crown-bulk density are the primary stand attributes influencing crown fire initiation and spread. Depending upon the silvicultural system being implemented, timber harvesting may impact each, or all, of these attributes. At a minimum, with a silvicultural system that thins the timber stand, crown-bulk density may be reduced, which may, in turn, impact the potential for the spread of fire through the canopy within the treated stands. After such a timber harvest, a fire may transition into the crowns of individual trees (known as passive crown fire or torching), but movement of fire through the canopy (known as active or independent crown fire) would be inhibited through reduced crown-bulk density.

When the intensity of a surface fire exceeds a critical level, fire can spread vertically into the canopy. Ground fuels in the form of slash would be temporarily increased as a result of timber harvesting, but the manner in which slash is treated after harvesting may play a major role in potential surface fire intensity. Treatment of the slash by various methods (including piling, lopping, scattering, and burning) would mitigate much of this impact by reducing available fuels, which may, in turn, reduce the potential intensity of surface fires.
Timber harvesting units may affect the spread of fire across the landscape; however, the extent of this impact would depend upon the size of the harvesting units, the location of units in proximity to fire spread, and the intensity of the fire. High intensity, stand-replacing fires would most often involve spotting well ahead of the fire front, in which case, timber harvesting units may have little to no effect in slowing or stopping fire progress. In the case of a smaller, less intense fire, treatment units could serve to slow the fire's advance. Harvesting units may also provide anchor points for fireline construction, and safety zones for fire-suppression resources for a period of time after slash is treated.

Timber harvesting operations, and associated road construction, may present a slightly increased potential for fire occurrence caused by mechanized equipment and other increased activity in the short-term (while operations are in progress). Thus, the more timber harvests implemented, the greater the potential for these types of human-caused fires. Timber sale contracts include clauses that address fire prevention and suppression, which would mitigate most of the potential human-caused fires.

DLMP/DEIS Alternatives: Since timber harvesting may have some long-term beneficial impacts in regard to fuels reduction, the alternatives with the highest projected allowable wood-fiber removal may result in the greatest benefit. These alternatives may also have a slightly higher, short-term, human-caused fire risk (due to equipment operation; slash generation, and a drier microclimate created by harvesting). Benefits due to fuels reduction may be greatest under Alternative A, followed by Alternatives D and B. These benefits may be minor under Alternative C, which would emphasize natural processes in order to sustain ecological systems.

Impacts Related to Travel Management and Recreation

Historically, fires within the planning area were not accessible by road, but this varied between the west zone of the SJPL (which has a denser road system) and the central and east zones (which are more remote). Roads can aid in fighting fires by providing ground access to the wildfires and access for fuel treatments. However, they also provide access for recreation use, which may, in turn, increase the potential for human-caused ignitions. Increased human use of the planning area may also result in faster reporting of fires, which may, in turn, result in fewer acres burned. Roads can serve as anchor points for fireline construction by suppression forces, and can also serve as barriers to the spread of low-intensity fires. High-intensity fires would likely exhibit extreme radiant heat and spotting well ahead of the fire front. This may make roads ineffective as barriers to high-intensity fire spread. For less intense fires, roads can be an effective barrier to fire spread. When a fire is accessible by road, response times for initial attack are reduced, and road access during extended attack improves logistics (thus reducing costs) of managing fires.

DLMP/DEIS Alternatives: Alternative D may increase the miles of roads within the planning area, resulting in both the positive impacts of better access to manage fires and the adverse impacts of a higher risk of human-caused fires. Recreation use of the public lands is expected to increase over the next few decades, regardless of the road or trail density or alternative chosen. Alternative C may decrease road miles, which may result in positive impacts (by decreasing human use and the chance for human-caused ignitions) and adverse impacts (by reducing accessibility for firefighting equipment). Overall, none of the alternatives may result in a substantial increase, or decrease, in the existing road density; therefore, there would likely be a negligible change in current conditions related to the number of new fire starts.

Impacts Related to Wilderness Areas, WSAs, and RNAs

There are two objectives of fire management in Wilderness Areas: 1) to permit lightning-caused fires to play their natural ecological role within Wilderness Areas as much as possible, and 2) to reduce, to an acceptable level, the risks and consequences of wildfire within Wilderness Areas or escaping from the Wilderness (Forest Service Manual 2324.21). BLM Manual H-8550-1 states that WSAs should be managed in order to preserve their Wilderness characteristics. From a fire standpoint, WSAs would be managed as if they were Wilderness Areas.

With the implementation of the final approved LMP, fire management strategy would occur in accordance with the Fire Management Plan, Operational (WFU) Plans, and individual Wildland Fire Implementation Plans. Although WFU may be desirable in the Wilderness Areas, WSAs, and RNAs, it is possible that it may not be applicable in some of these areas (due to the size of the area, the proximity to high-value areas, or to the unbroken expanses of fuels leading to areas of high-value resources or improvements). High-value areas represent a wide range of values, from private property, to areas that are of high resource value for watersheds, to areas with high historic values. All areas would be evaluated based on the local situations, values to be protected, management objectives, and external concerns. Small areas are often not feasible for application of WFU. This would be due to the potential for the fire to move into areas where WFU is not desired. In general, the larger the area, the more feasible it would be to implement WFU. For any fires within designated Wilderness Areas, WSAs, or RNAs requiring suppression, the logistics may be more difficult and the cost of suppression may be higher than in other areas. This would be due to restrictions on the use of mechanized equipment and access limitations.

These impacts may be off-set by reduced costs associated with WFU (instead of expending funds for suppression), and by the resource benefits derived from allowing fire on the landscape. Through implementation of WFU, fire would be allowed to play its natural role in the ecosystem, which may, in turn, restore, improve, or maintain the health of the ecosystem. Plant species that regenerate through fire, as well as animal species that require snag habitat, may benefit from implementation of WFU and prescribed burns. Areas in which WFU fires actually occur may be less likely to experience fuels build-up that result in uncharacteristically intense fires, which may, in turn, result in losses of key ecosystem components.

DLMP/DEIS Alternatives: Alternatives with the most lands in Wilderness Areas, WSAs, and RNAs may provide the greatest opportunity for allowing WFU, and consequently, may yield more of the benefits associated with WFU and prescribed burns. Alternative C would propose the greatest amount of Management Area 1 (where natural processes dominate) with the inclusion of additional RNAs. Alternative C would provide the greatest opportunity for WFU and its benefits, followed by Alternatives B and D. However, such opportunities would be reduced under Alternative A (which would result in more developed areas and infrastructure where the use of natural fire is generally less feasible).

Impacts Related to Livestock Grazing and Big Game Use

Grass and forbs are the primary carriers of surface fire in open forested areas, shrublands, and grasslands; therefore, grazing (by domestic livestock and, to a lesser degree, by wildlife) may have the effect of reducing fire intensities by reducing available fuels. The degree to which fire intensities may be reduced would be dependent upon how much grass and forb production is removed through grazing. Grazing may also have an impact on the ability to successfully implement prescribed burns. For example, it is sometimes necessary to rest an area from livestock grazing for a season prior to burn implementation in order to have sufficient grass to carry the fire.

Grazing would continue to have the most effect on reducing fire behavior in Fire Regimes 1, 2, and 4 (which includes ponderosa pine, grass communities, and shrublands). Fire Regime 3 (which includes Douglas-fir and a moister climate) does not generally produce heavy grass/forb fuel loads due to predominantly wet sites along with cooler temperatures. Fire Regime 5 (which includes long-interval fire regimes with dense pinyon-pine/juniper, spruce, and subalpine-fir) has a minimal grass/shrub component and may, therefore, notice little impacts related to grazing. In aspen stands, grazing impacts the understory, and may limit regeneration.

DLMP/DEIS Alternatives: The level of livestock grazing would be very similar between all of the alternatives; therefore, the impacts related to grazing on fire and fuels may be nearly identical under all of the alternatives.

Impacts Related to Insects and Disease

Insect and disease outbreaks in forested communities impact the fuels profile, and have a subsequent effect on fire behavior and fire-suppression activities. The extent of the impacts from dead and dying trees would depend upon the scope of the infestation. Small endemic occurrences of insect infestations or disease may have little or no impact on fire behavior or suppression activities; however epidemic or large-scale outbreaks may result in major impacts. Both types of outbreaks have naturally occurred within the planning area throughout time. When tree mortality occurs as a result of insects or disease, the needles die; however, they may persist on the branches for several years. The length of time the needles persist depends on the tree species. This creates a situation conducive for transition from surface fire to the canopy, and possibly fire spread through the canopy. Among the variables determining whether or not a fire remains on the surface or transitions to a crown fire include surface fire intensity, vertical fuel arrangement (availability of ladder fuels), and crown flammability (live foliar moisture or fine dead-fuel moisture). In a healthy stand, during normal climate conditions, foliar moisture content is relatively constant, averaging about 100%. However, when a tree dies, the dead needles respond to climate as a 1-hour fuel. It is common for 1-hour fuel moistures to drop to 4% and, occasionally, lower during periods of hot temperatures with low relative humidity. As a result, a dead tree with needles still attached to the branches is much more susceptible to torching than a live green tree. Whether the fire, after transitioning into the crowns, becomes an active crown fire in which the fire moves independently through the crowns is dependent upon the crown spacing. Stands in which crowns are closely spaced are more likely to sustain active crown fire than would open-stand conditions.

As time passes, the needles gradually fall from the trees and eventually become part of the duff layer. In the short term, this adds to the surface fuel loading. However, since it occurs over a relatively long period of time, the impact is gradual and is mollified as the needles become compacted and, thus, less available to burn. Although the smaller fuels (as described above) are the most important in regard to fire intensity at the flaming front, large fuels are also impacted. Dead trees eventually fall to the ground, often as a result of wind. This greatly increases the fuel loading; however, it does not substantially increase the fire intensity at the flaming front. The primary importance of this increase in large down fuels is an increase of intensity following the passage of the flaming front. This equates to a longer residence time, influencing fire impacts. Probably the greatest impact related to increased loading large down fuels is in resistance to control during suppression operations. These heavy down fuels can generate considerable intensity, making direct fireline construction infeasible and inhibiting the line-building process. Standing dead trees or snags are a recognized safety hazard in suppression activities. This is due to the possibility of the snags falling on firefighters, as well as to their propensity for showering embers across firelines (thereby increasing the potential for spot fires).

DLMP/DEIS Alternatives: Alternatives emphasizing timber management, such as Alternative D, may have the highest potential to limit the spread of insect or disease outbreaks (by the harvesting of diseased or insect-infested trees), and stands at high risk for disease or insect problems, where stands are accessible. These alternatives may also have the most potential to harvest dead and dying trees before they accumulate into a hazardous fuels problem. Alternatives emphasizing timber management may have more potential to salvage dead trees. This would limit fuels build-up from insect and disease mortality, which may, in turn, reduce resistance to control of fires. Alternatives with the lowest projected levels of timber harvesting may have the most potential for insect and disease mortality (adding to fuel loadings due to less salvage harvesting). Alternative A would have the highest wood-fiber removal and, therefore, may have the greatest benefits for managing insects and disease, followed by Alternatives D and B. These benefits may be the least apparent under Alternative C, which would emphasize natural processes.

Impacts Related to Noxious and Invasive Species

Increases in fire activity (wildfire and/or prescribed burns) may result in increasing noxious weed spread (due to disturbance from the fires directly and from fire-suppression operations). Additionally, stand replacement fires create conditions conducive to invasion of noxious weeds if seed sources are present. Wildfire severity and occurrence are largely a function of weather (which cannot be accurately predicted more than a few days into the future) and subsequent fuel conditions. It is not possible to predict differences in wildfire occurrences or sizes of fires between alternatives; therefore, the potential for invasive species spread must be based on other criteria. Alternatives with the most potential for WFU may have more potential for disturbance from fires. However, they may have less potential for disturbance from suppression actions. Fuel treatments can create disturbance, which may, in turn, lead to the spread of noxious/invasive species with the presence of a seed source; therefore, those alternatives with the highest level of fuel treatment may present the greatest potential for noxious weed spread.

DLMP/DEIS Alternatives: When all of the above factors are taken into consideration, there may be is a negligible difference between alternatives in respect to their impacts on noxious and invasive species.

CUMULATIVE IMPACTS

Fire-suppression activities have changed fire regimes and condition classes, particularly in ponderosa pine, pinyon-pine/juniper, sagebrush and warm-dry mixed-conifer types. (See Appendix V, Volume 3.)

Large catastrophic fires occurring during recent drought years have stressed the need to treat wildland fuels in order to reintroduce fire into fire-adapted ecosystems, to increase public and firefighter safety, and to reduce the potential for resource and property loss from wildland fires. The National Fire Plan, and various legislation, have encouraged treatment of wildland fuels. Recent legislation (including the Healthy Forest Initiative and the Healthy Forest Restoration Act) continues to increase this emphasis. Based on the need, as well as on the current emphasis, both mechanical fuels treatments and prescribed burn activities are expected to increase on all ownerships, although to a higher degree on federally managed lands, during this planning period.

Historic, current, and reasonably foreseeable future cumulative impacts related to fire and fuels were considered and analyzed. The following cumulative impacts are discussed in the context of impacts expected over the next 10- to 15-year period. The area of consideration for these cumulative impacts is primarily encompassed within the boundary of the planning area, with condition class and expected treatments on lands of similar fuel types and directly adjacent to the planning area also taken into consideration. Fire statistics used in estimating fire risk and acres burned by wildfire included the years 1980 through to the present.

Condition Class

Fire-suppression activities have had the effect of increasing condition class, particularly in ponderosa pine, pinyon/juniper and warm-dry mixed-conifer (Fire Regimes 1, 2, and 4) vegetation types. The trend under all of the alternatives would be for current condition classes in Fire Regimes 1, 2, and 4 (short to moderate fire-return interval fire regimes) to experience a net increase, while Fire Regimes 3 and 5 (long fire-return interval fire regimes) would not experience a noticeable change during this planning period. As a result, Fire Regimes 1, 2, and 4 may continue to experience an increase in the potential for uncharacteristically severe fires during this planning period. This is based on the potential levels of timber harvesting, fuels treatment, and wildfire occurrences probability analysis. The increase in condition class may be slightly less for those alternatives with higher timber harvesting and fuel treatment levels. Thus, the increase may be the smallest under Alternative D, followed by Alternatives B, A, and C, respectively. Due to the treated acres, in comparison to total acres, the increase may be minor on a public lands basis.

Fire Risk

The risk of ignition from lightning would be the same under all of the alternatives. The risk of human-caused ignitions may increase as public use of the lands increases, and as development within and adjacent to the planning area increases. Regardless of the alternative, development within the WUI (private lands within and adjacent to the Federal lands) is anticipated to continue, and would most likely increase. It is anticipated that development of private tracts of land within and around public lands are likely to continue to grow. The anticipated trend toward continued growth in the WUI may increase the values at risk from wildfire, and would potentially increase the incidence of human-caused ignitions. Growth of the WUI also creates greater importance for fire prevention and mitigation activities, and increases the complexity and cost of wildland fires that occur in those areas (due to safety considerations for firefighters and residents, as well as to the values at risk). The fire risk and the acreage expected to be burned by wildfires is anticipated to be similar under all of the alternatives.

Air Quality

Generally, the smoke created by individual wildfires or by prescribed burns within the planning area does not have a noticeable impact on air quality, unless the fires become large and last for many days. However, there is a potential for cumulative impact to adversely impact air quality. The emphasis on treating fuels on all land ownerships indicates that fuel treatment (including prescribed burns) would increase in the future. None of the alternatives would result in any impacts on the amount of fuel treatments on adjacent non-Federal ownerships; therefore, any prescribed burns implemented or wildfires occurring on adjacent lands may have the potential to cumulatively impact air quality (especially if multiple ownerships conduct prescribed burns during the same time frames). Any Federal fire agency that conducts prescribed burning projects within the State of Colorado must comply with the CDPHE smoke management regulations. Implementation of burning within the requirements of these regulations would increase the potential to maintain air quality. These smoke management regulations would minimize the chance that air quality would be cumulatively degraded by the implementation of burns conducted by multiple burners at the same time.

It is anticipated that the level of fuels treatments would be similar under all of the alternatives; therefore, the differences between the alternatives with regard to overall cumulative impacts may be minor (indicating that potential cumulative impacts may be almost the same under all of the alternatives).