



KAIBAB NATIONAL FOREST

FIRE MANAGEMENT PLAN

2011



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Interagency Federal fire policy requires that every area with burnable vegetation must have a Fire Management Plan (FMP). This FMP provides information concerning the fire process for the Kaibab National Forest and compiles guidance from existing sources such as, but not limited to, the Kaibab National Forest Land and Resource Management Plan (LMP), national policy, and national and regional directives.

The potential consequences to firefighter and public safety and welfare, natural and cultural resources, and values to be protected, help determine the management response to wildfire. Firefighter and public safety are the first consideration and are always the priority during every response to wildfire.

The following chapters discuss broad forest and specific Fire Management Unit (FMU) characteristics and guidance.

Chapter 1 introduces the area covered by the FMP, includes a map of the Kaibab National Forest, addresses the agencies involved, and states why the forest is developing the FMP.

Chapter 2 establishes the link between higher-level planning documents, legislation, and policies and the actions described in FMP.

Chapter 3 articulates specific goals, objectives, standards, guidelines, and/or desired future condition(s), as established in the Kaibab National Forest LMP, which apply to all the Kaibab National Forest's FMUs and those that are unique to the Forest's individual FMUs.

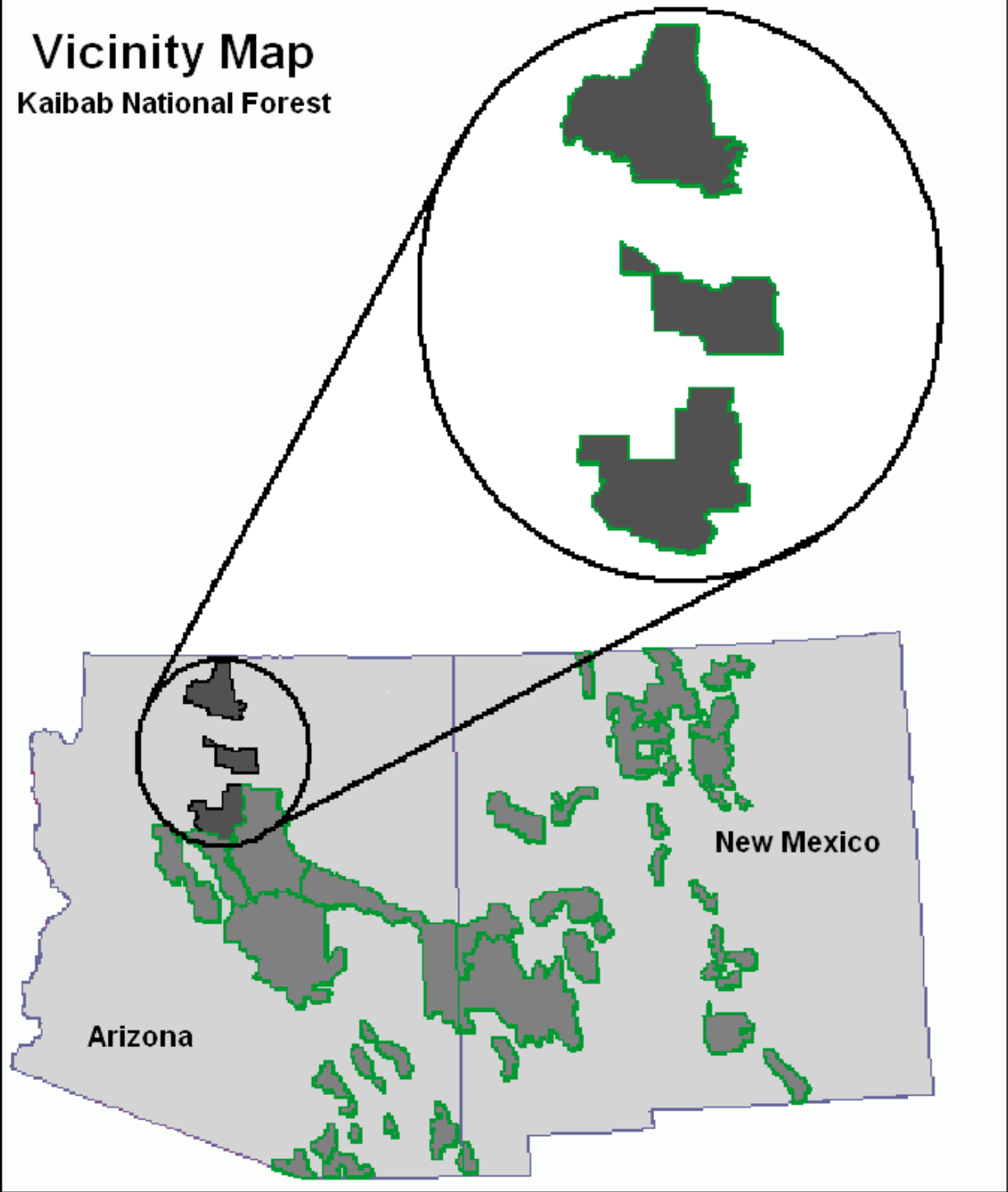
Chapter 1. INTRODUCTION

The Kaibab National Forest developed this FMP as a decision support tool to help fire personnel and decision makers determine the management response to an unplanned ignition. FMPs do not make decisions. Instead, they provide information, organized by FMUs, which provides a finer scale summarization of information than is possible at the Forest level. These descriptions bring specific detail about the identifiable areas on the ground. FMPs are not static documents. They will evolve and be revised as conditions change on the ground and as modifications are made to the Forest's LMP.

Wildfire will be managed to meet the goals and objectives set forth in the LMP, the core principles of the 10-year Comprehensive Strategy, and the National Fire Policy. This includes using a suppression objective for all human caused fires on the Forest and any fire within the Mixed-Conifer FMU on the North Kaibab R.D. The Forest will manage all other unplanned ignitions using multiple objectives, to protect, maintain, and enhance resources and, as nearly as possible, allow fire to function in its natural ecological role.

Vicinity Map

Kaibab National Forest



Land Management Plan Areas

Kaibab National Forest

Legend





geographic area

-  01 - W. Williams Woodland
-  02 - Williams Forestland
-  03 - N. Williams Woodland
-  08 - Tusayan Woodland
-  09 - Upper Basin
-  10 - Tusayan Forestland
-  12 - W. North Kaibab Woodland
-  13 - Kaibab Plateau Forestland
-  16 - E. North Kaibab Woodland



geographic area - special area

-  11 - Kanab Creek Wilderness
-  19 - Saddle Mountain Wilderness



land use zone - special area


-  04 - Kendrick Mountain Wilderness
-  06 - Arizona Bughane Botanic Area
-  07 - Garland Prairie Research Natural Area
-  20 - Franks Lake Geologic-Botanic Area

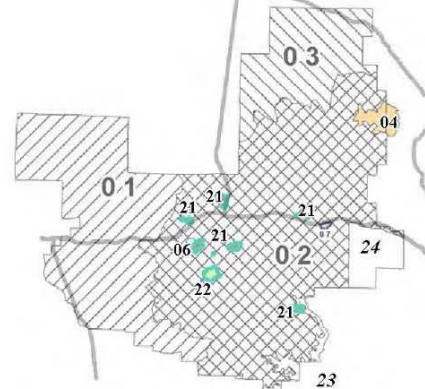
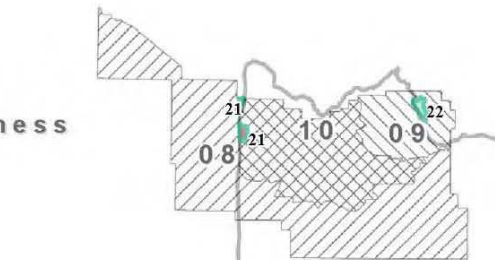
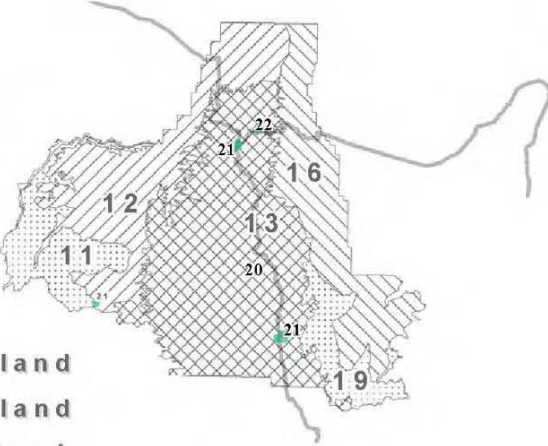
land use zone

-  21 - Existing Developed Recreation Sites
-  22 - Proposed Developed Recreation Sites

other - not in Land Management Plan area

-  23 - Sycamore Canyon Wilderness
-  24 - Camp Navajo

 highways



Chapter 2. POLICY, LAND MANAGEMENT PLANNING, AND PARTNERSHIPS

The regulations and policy in the following documents guide the fire management program for the Kaibab NF as outlined in this FMP.

2.1. National and Regional Fire Management Policy

Forest Service policy and direction that are relevant to this plan include:

- 1995 Federal Wildland Fire Management Policy and Program Review (January 2001)
- National Fire Plan
- Forest Service Manual 5100
- Forest Service Handbook 5109
- Guidance for Implementation of Federal Wildland Fire Management Policy (February 2009)
- Interagency Standards for Fire and Fire Aviation Operations (Red Book)

2.2. Kaibab National Forest Land and Resource Management Plan

- Kaibab National Forest Land and Resource Management Plan and Record of Decision (April 1988, as amended April 1989, as amended April 1990, as amended June 1996, as amended August 2000, as amended February 2003, as amended October 2004, as amended November 2004).
- Environmental Assessment, Biological Assessment and Evaluation, Biological Opinion and Decision Notice associated with the amendment, August 2000, Kaibab National Forest.

2.3. Partnership

Due to the Grand Canyon National Park's proximity to the Forest, annual coordination occurs between both agencies in order to establish guidance for wildfire strategies that may affect each other's lands. Activities such as training, preparedness, aviation, resource benefit objectives, cost sharing, etc. are looked at prior to each season in order to create a more efficient and cost effective organization. The two agencies' resources are dispatched out of the Williams Interagency Dispatch Center (WDC) under an interagency agreement. The North Kaibab RD (KNF) and the North Rim District (GCP) also have an interagency agreement that covers the management of both programs under one fire management organization.

The Forest has agreements with agencies within the Grand Canyon Zone of the Northern Arizona Area, which includes the Grand Canyon National Park, Truxton-Canyon Field

Office (BIA), and Arizona State Forestry Division. Direction for the Grand Canyon Zone can be located in the Northern Arizona Area Operating Plan.

Chapter 3. FIRE MANAGEMENT UNIT DESCRIPTIONS

The primary purpose of developing FMUs in fire management planning is to assist in organizing information in complex landscapes. FMUs divide the landscape into smaller geographic areas that easily describe safety considerations, physical, biological, social characteristics and to frame associated planning guidance based on these characteristics.

The following information, including the summaries of fuels conditions, weather and burning patterns, and other conditions in specific FMUs, helps determine the management response to an unplanned ignition and provides a quick reference to the strategic goals in the Forest's LMP.

3.1. Fire Management Considerations Applicable to All Forest Fire Management Units

3.1.1. Kaibab Land and Resource Management Plan Guidance

- **Desired Conditions:** No forest-wide desired conditions have been identified in the Forest plan that specifically reference fire or fire behavior. Each individual geographic area (GA) addresses specific desired conditions related to fire or fire behavior.
- **Goals:** The two goals that have been specifically identified in the Forest plan are:
 1. Manage wilderness use to maintain or enhance enduring, high quality, wilderness values while providing for quality wilderness recreation experiences. Allow wildfire to play a more natural role. Protect the current status of air quality related values (AQRVs) in the Sycamore Canyon Wilderness Class I Airshed and in other wildernesses - (page 18).
 2. Use prescribed fire and wildfire as resource management tools where they can effectively accomplish resource objectives. *Areas approved for wildfires with, resource management objective implementation and their prescriptive criteria, will be identified within the fire management plan.* Fire management, prevention, and control are used to protect life, property, and resources - (page 20).
- **Standards and Guidelines:** The information found in the following tables reference and provide guidance for fire related activities found in the LMP.

Ponderosa Pine Geographic Areas (FMU 1)

GA #	SIZE (Acres)	DESCRIPTION	FIRE
2	308,394	Williams R.D. Ponderosa Pine, 6,500 – 9,388’	The fuel profile is conducive to high intensity wildfires that can result in destruction or heavy damage to resources and developed facilities. Prompt fire suppression must be instituted when the threat of high intensity fire exists. (LMP page 36)
10	86,250	Tusayan R.D. Ponderosa Pine, 6,700-6,900’	The fuels profile is variable with areas of high hazard fuel loading and areas of very sparse fuels. (LMP page 36)
13	268,719	North Kaibab R.D., Ponderosa Pine, 7,000 – >9,000’	The fuel profile is conducive to large high intensity wildland fires with the potential for very high resource damage. (LMP page 37)
GUIDELINES			<p>1. Air & Watershed Resource Operations & Improvements (LMP page 42)</p> <ul style="list-style-type: none"> ▪ Rehabilitate areas impacted by wildfire. <p>2. Activity & Natural Fuel Operations & Improvements (LMP page 47)</p> <ul style="list-style-type: none"> ▪ In Northern Goshawk suitable nesting areas, preferred method for treating woody debris is fire use, next, lopping and scattering, and lastly, hand piling. ▪ In Northern Goshawk replacement nesting areas, preferred method for treating woody debris is fire use, next, lopping and scattering, and lastly, hand piling. Avoid slash piling with crawler tractor. ▪ In Northern Goshawk PFAs, preferred method for treating woody debris is, in order, fire use, lopping and scattering, hand piling, machine grapple piling, and lastly, crawler tractor piling. ▪ In other forested areas, preferred method for treating woody debris is, in order, fire use, lopping and scattering, hand piling, machine grapple piling, and lastly, crawler tractor piling. ▪ Priority for fuel treatment investment is given to: <ul style="list-style-type: none"> a) Rural-urban interface. b) Areas which exceed the burning conditions which yield the historical, 50 percentile rate of fire spread in fuel model K (NFDRS).

- c) Maintenance of existing fuel breaks and fuel reduction corridors.

3. Fire Protection Operations and Improvements (LMP pages 47 & 48)

- Do not allow wildfires to spread to lands of other ownership.
- Protect human life and improvements.
- Provide fire protection to restrict wildfire size to 20 acres.
- Minimize acreage burned by high intensity fires (200+ BTU/FT/SEC).
- Long term average annual burned area should not exceed 70 acres.
- Fires from natural ignitions may exceed these size limits when burning within an approved area and declared a wildland fire use action.
- Fires which exceed, or are expected to exceed the size objective for the Ecosystem management area are considered escaped and appropriate management response is determined by a Wildland Fire Situation Analysis (WFSA). The WFSA will consider at least the following:
 - a) The resource management emphasis of threatened ecosystem management areas.
 - b) Suppression costs commensurate with resources protected.
 - c) Effects on air quality, aesthetics, soil, and watershed.
 - d) Social acceptance of acreage burned.
 - e) Current availability of suppression resources.
 - f) Size objectives are based on continuous area of high intensity burn.
 - g) Impacts on heritage resources.

Woodlands Geographic Areas (FMU 1)

GA#	SIZE (Acres)	DESCRIPTION	FIRE
1	169,041	Woodland vegetation (pinyon/juniper), Western portion of the Williams R.D., 5,500 – 6,800’.	<p>The fuel profile in this area is not conducive to large, high intensity fires. The potential for resource damage is very low and most fires are beneficial and not damaging. (LMP page 49)</p> <p>Management Direction for Fire Protection: Provide fire protection to restrict wildfire size to 200 acres. Emphasize suppression responses and tactics which minimize fire fighting costs. Long term average annual burned area should not exceed 3,400 acres. Fires from natural ignitions may exceed these size limits when burning within an approved area and declared a wildland fire use action. Priority for fuel treatment investment is low and should be limited to rural/urban interface and protection of adjacent, higher value ecosystem management areas. (LMP page 51)</p>
3	65,533	Woodland vegetation (pinyon/juniper), North end of the Chalender R.D., 6,500 – 7,700’.	<p>The fuel profile is not conducive to large, high intensity fires, with a very low potential for damaging fires. (LMP page 52)</p> <p>Management Direction for Fire Protection: Provide fire protection to restrict wildfire size to 200 acres. Emphasize suppression responses and tactics which minimize fire fighting costs. Long term average annual burned area should not exceed 1,300 acres. Fires from natural ignitions may exceed these size limits when burning within an approved area and declared a wildland fire use action. Priority for fuel treatment investment is low and should be limited to rural/urban interface and protection of adjacent, higher value management areas. (LMP page 54)</p>
8	195,118	Woodland vegetation (pinyon/juniper), Southern portion of the Tusayan R.D., 6,200 – 6,700’.	<p>The fuel profile is not conducive to large, high intensity fires. The potential for resource damage is very low and most fires are more beneficial than damaging. (LMP pages 55 & 56)</p> <p>Management Direction for Fire Protection: Provide fire protection to restrict wildfire size to 200 acres. Emphasize suppression responses and tactics which minimize fire fighting costs. Long term average annual burned area should not exceed 3,900 acres. Fires from natural ignitions may exceed these size limits when burning within an approved area and declared a wildland fire use. Priority for fuel treatment investment is low and should be limited to rural/urban interface and protection of adjacent, higher value management areas. (LMP page 57)</p>
9	43,377	Woodland vegetation (pinyon/juniper), Upper Basin of the Tusayan R.D., 6,200 – 6,700’.	<p>The fuel profile is not conducive to large, high intensity fires. The potential for resource damage is very low and most fires are more beneficial than damaging. (LMP page 59)</p> <p>Management Direction for Fire Protection: Provide fire protection to restrict wildfire size to 200 acres. Emphasize</p>

			<p>suppression responses and tactics which minimize fire fighting costs. Long term average annual burned area should not exceed 900 acres. Fires from natural ignitions may exceed these size limits when burning within an approved area and declared a wildland fire use action. Priority for fuel treatment investment is low and should be limited to rural/urban interface and protection of adjacent, higher value management areas. (LMP Page 61)</p>
12	146,480	Woodland vegetation (pinyon/juniper), Western, northern, and eastern portions of the North Kaibab R.D., 5,200 – 6,800’.	<p>The fuel profile is not conducive to large, high intensity fires. The potential for resource damage is very low and most fires are more beneficial than damaging. (LMP page 62)</p> <p>Management Direction for Fire Protection: Provide fire protection to restrict wildfire size to 200 acres. Emphasize suppression responses and tactics which minimize fire fighting costs. Long term average annual burned area should not exceed 2,900 acres. Fires from natural ignitions may exceed these size limits when burning within an approved area and declared a wildland fire use action. Priority for fuel treatment investment is low and should be limited to rural/urban interface and protection of adjacent, higher value management areas.</p>
16	131,221	Woodland vegetation (pinyon/juniper), Eastern half of the North Kaibab R.D., 5,200 – 8,200’.	<p>The fuel profile is not conducive to large, high intensity fires. The potential for resource damage is very low and most fires are more beneficial than damaging. (LMP Page 66)</p> <p>Management Direction for Fire Protection: Provide fire protection to restrict wildland fire size to 200 acres. Emphasize suppression responses and tactics which minimize fire fighting costs. Long term average annual burned area should not exceed 2,600 acres. Fires from natural ignitions may exceed these size limits when burning within an approved area and declared a wildland fire use action. Priority for fuel treatment investment is low and should be limited to rural/urban interface and protection of adjacent, higher value management areas. (LMP Page 68)</p>
GUIDELINES			<ol style="list-style-type: none"> 1. Wildlife, Surveys, Planning, Prescriptions, Monitoring, Coop, and Administration <ul style="list-style-type: none"> ▪ Take all reasonable precautions, consistent with policies regarding jeopardy to human life and property, during fire suppression, search and rescue, or other emergency operations to conserve and protect threatened and endangered species, candidate species, sensitive species and their habitats. (LMP page 73-1) 2. Wildlife Non-structural Habitat Improvement <ul style="list-style-type: none"> ▪ Sagebrush: Periodically burn drainage bottoms dominated by sagebrush. (LMP page 77)

	<p>3. Range Non-structural Improvement</p> <ul style="list-style-type: none"> ▪ Re-treat improved forage areas as determined in project level analysis using mechanical, chemical, or fire use means and in accordance with the following guidelines: <ul style="list-style-type: none"> a. The area to be re-treated is situated on one or more of the following soil mapping units: 8, 16, 17, 18, 19, 23, 27, 30, 32, 40, 112, 162, 250, 251, 254, 255, 256, 257, 258, 260, 261, 263, 264, 272, 273, 280, 289, 502, 503, 507, 513, 514, 520, 543, 588, 590, 599, 632, 633, and 634. b. Opening is not larger than 40 acres excepting that in primary pronghorn antelope range. c. The maximum width of the opening is 10 chains excepting that in primary pronghorn antelope range. d. The maximum sight distance within the opening is 15 chains excepting that in primary pronghorn antelope range. e. The minimum distance between any two openings is 10 chains. <p>4. Administration</p> <ul style="list-style-type: none"> ▪ Rehabilitate areas impacted by wildfire to minimize loss of site productivity. <p>5. Fire Management Planning and Analysis</p> <ul style="list-style-type: none"> ▪ Do not allow fires to spread to lands of other ownership. ▪ Protect human life and improvements. <p>6. Escaped Fire Suppression</p> <ul style="list-style-type: none"> ▪ Fires which exceed, or are expected to exceed, the size objective for the management area are considered escaped and appropriate response is determined by a Wildland Fire Situation Analysis (WFSA). The WFSA will consider at least the following: <ul style="list-style-type: none"> a. The resource management emphasis of threatened management areas. b. Suppression costs commensurate with the resources protected. c. Effects on air quality, aesthetics, soil, and watershed. d. Social acceptance of acreage burned. e. Current availability of suppression resources. f. Size objectives are based on continuous area of high intensity burn. g. Impacts on heritage resources. <p>7. Treatment of Activity Fuels</p>
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	<ul style="list-style-type: none">▪ NZ: All activity created fuels are promptly removed from areas designated with visual management objectives of “retention foreground” or “partial retention foreground” (VQO map).▪ Activity created fuels in other areas are treated so that maximum size objectives can be met under the burning conditions which yielded the historical, 50 percentile rate of spread in fuel model “K” (NFDRS).▪ Fuel treatment objectives are met with a combination of treatment methods. Preferred treatments are: Fuelwood utilization, broadcast burning (prescribed fire and wildland fire use), pile and burn, and mechanical re-arrangement such as chipping and lopping.
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Wilderness Geographic Areas (FMU 3)

GA#	SIZE (Acres)	DESCRIPTION	FIRE
4	6,651	Kendrick Mountain Wilderness, vegetation is diverse (mixed-conifer, ponderosa pine, pinyon/juniper, aspen) 7,000 – 10,000’.	<p>1. Fire Management Planning and Analysis (LMP page 90)</p> <ul style="list-style-type: none"> ▪ Permit lightning fires to play, as nearly as possible, their ecological role. Minimize the suppression impacts and acreage burned by person-caused fires. ▪ Do not allow fires to spread to lands of other ownership. ▪ Protect human life and improvements. ▪ Allow fire to exceed wilderness boundary only if the objectives of the threatened management area can be met. ▪ Maximum size objective for lightning fires is 150 acres. ▪ Maximum size objective for person-caused fires is 20 acres. <p>2. Initial Attack Fire Suppression (LMP page 90)</p> <ul style="list-style-type: none"> ▪ Mechanized equipment, except line building equipment, can be used if approved by the Forest Supervisor and if it is necessary to meet fire suppression objectives. The use of mechanized line building equipment must be approved by the Regional Forester. ▪ Monitor all lightning fires and confine when necessary to meet size objective. ▪ Economically control all person-caused fires within the size objective. <p>3. Escaped Fire Suppression (LMP page 90)</p> <ul style="list-style-type: none"> ▪ Fires which exceed or are expected to exceed the size objective are considered escaped and appropriate response is determined by an escaped fire situation analysis (EFSA). The EFSA will consider at least the following: <ol style="list-style-type: none"> a) Ignition source of the fire (lightning or person-caused). b) If lightning caused, the appropriateness of the predicted burn with respect to the objectives of fire management in wilderness. c) Resource management emphasis and protection objectives of threatened management area. d) Suppression costs commensurate with resources protected. e) Effects of suppression tactics on wilderness values, air quality, aesthetics, soil, and watershed. f) Social acceptance of acreage burned. g) Current availability of suppression resources. h) Safety of personnel.

			<p>4. Treatment of Natural Fuels (LMP page 90)</p> <ul style="list-style-type: none"> ▪ Use fire with both prescribed and wildland fire use to break up unnaturally large areas of continuous fuel and create a more natural “mosaic” of fuelbeds. Target stand size is 50 to 150 acres.
11	68,340	Kanab Creek Wilderness, vegetation is dominated by desert shrub blackbrush, 3,500 – 6,000’.	<p>1. Fire Management Planning and Analysis (LMP page 100)</p> <ul style="list-style-type: none"> ▪ Permit lightning fires to play, as nearly as possible, their ecological role. Minimize the suppression impacts and acreage burned by person-caused fires. ▪ Do not allow fires to spread to lands of other ownership. ▪ Protect human life and property. ▪ Allow fire to exceed wilderness boundary only if the objectives of the threatened management area can be met. ▪ Allow lightning fires to burn naturally within the wilderness. ▪ Maximum size objective for person-caused fires is 200 acres. <p>2. Initial Attack Fire Suppression (LMP page 100)</p> <ul style="list-style-type: none"> ▪ Mechanized equipment, except line building equipment, can be used if approved by the Forest Supervisor and if it is necessary to meet fire suppression objectives. The use of mechanized line building equipment must be approved by the Regional Forester. ▪ Monitor all lightning caused fires and confine within the wilderness. ▪ Economically control all person-caused fires within the size objective. <p>3. Escaped Fire Suppression (LMP page 100)</p> <ul style="list-style-type: none"> ▪ Fires which exceed or are expected to exceed the size objective are considered escaped and appropriate response is determined by a Wildfire Fire Situation Analysis (WFSA). The WFSA will consider at least the following: <ul style="list-style-type: none"> a) Ignition source of the fire (lightning or person-caused). b) If lightning caused, the appropriateness of the predicted burn with respect to the objectives of fire management in wilderness. c) Resource management emphasis and protection objectives of threatened analysis area. d) Suppression costs commensurate with resources protected. e) Effects of suppression tactics on wilderness values, air quality, aesthetics, soil, and watershed. f) Social acceptance of acreage burned.

			<p>g) Current availability of suppression resources.</p> <p>4. Treatment of Natural Fuels (LMP page 100)</p> <ul style="list-style-type: none"> ▪ Use prescribed fire and wildland fire use to reduce unnatural accumulations of fuel.
19	40,610	Saddle Mountain Wilderness, vegetation is diverse (mixed-conifer, ponderosa pine, pinyon/juniper, aspen), 6,000-8,000'.	<p>Parts of the area have heavy fuel accumulations with a potential for resource damaging wildfires, however, most of the wilderness can be managed to maintain a natural mosaic of fuels. (LMP page 101)</p> <p>1. Fire Management Planning and Analysis (LMP page 104)</p> <ul style="list-style-type: none"> ▪ Permit lightning fires to play, as nearly as possible, their ecological role. Minimize the suppression impacts and acreage burned by person-caused fires. ▪ Protect the aquatic habitat in North Canyon. ▪ Do not allow wildfires to spread to lands of other ownership. ▪ Protect human life and property. ▪ Allow wildland fire to exceed wilderness boundary only if the objectives of the threatened management area can be met. ▪ Allow lightning fires to burn naturally within the wilderness. ▪ Maximum size objective for person-caused fires is 200 acres. ▪ The maximum size objective for any wildfire within a two mile radius of North Canyon Spring is five acres. <p>2. Initial Attack Fire Suppression (LMP page 104)</p> <ul style="list-style-type: none"> ▪ Mechanized equipment, except line building equipment, can be used if approved by the Forest Supervisor and if it is necessary to meet fire suppression objectives. The use of mechanized line building equipment must be approved by the Regional Forester. ▪ Monitor all lightning caused fires and confine within the wilderness. ▪ Economically control all person-caused fires within the size objective. ▪ Use appropriate suppression methods to control all wildfires within a 2-mile radius of North Canyon Spring. <p>3. Escaped Fire Suppression (LMP page 104)</p> <ul style="list-style-type: none"> ▪ Fires which exceed or are expected to exceed the size objective are considered escaped and

			<p>appropriate response is determined by a Wildland Fire Situation Analysis (WFSA). The WFSA will consider at least the following:</p> <ul style="list-style-type: none"> a) Ignition source of the fire (lightning or person-caused). b) If lightning caused, the appropriateness of the predicted burn with respect to the objectives of fire management in wilderness. c) Resource management emphasis and protection objectives of threatened analysis area. d) Suppression costs commensurate with resources protected. e) Effects of suppression tactics on wilderness values, air quality, aesthetics, soil, and watershed. f) Social acceptance of acreage burned. g) Current availability of suppression resources. <p>4. Treatment of Natural Fuels (LMP page 104)</p> <ul style="list-style-type: none"> ▪ Fire use should be considered to reduce unnatural accumulations of fuel.
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Special Geographic Areas (FMU 2)

GA #	SIZE (Acres)	DESCRIPTION	FIRE
6	490	This is a botanical area for the protection of AZ Bugbane. It is located in a canyon bottom on the north face of Bill Williams Mountain.	<p>Design fire suppression actions to prevent damage to the plant colony and habitat. (LMP page 92)</p> <p>1. Fire Management Planning and Analysis (LMP page 93)</p> <ul style="list-style-type: none"> ▪ Protect human life and improvements; minimize acreage burned. ▪ Do not allow fires to spread to lands of other ownership. ▪ The maximum fire size objective is one acre. ▪ The average annual burned area objective is 1/10th acre. <p>2. Initial Attack Fire Suppression (LMP page 93)</p> <ul style="list-style-type: none"> ▪ Direct attack and control all fires. <p>3. Escaped Fire Suppression (LMP page 93)</p> <ul style="list-style-type: none"> ▪ Fires which exceed or are expected to exceed the maximum size objective are considered escaped fires and appropriate response is determined by a Wildland Fire Situation Analysis (WFSA). The WFSA considers at least the following: <ol style="list-style-type: none"> a) Resource management emphasis of threatened management areas. b) Suppression costs commensurate with resources protected. c) Minimization of acreage burned in the analysis area. <p>4. Treatment of Activity Fuels (LMP page 93)</p> <ul style="list-style-type: none"> ▪ Dispose of all activity created slash.
7	300	Garland Prairie Research Natural Area, Williams R.D.	<p>1. Fire Management Planning and Analysis (LMP page 96)</p> <ul style="list-style-type: none"> ▪ Permit lightning fires to play, as nearly as possible, their ecological role. Minimize the suppression impacts and acreage burned by person-caused fires. ▪ Do not allow fires to spread to lands of other ownership. ▪ Protect human life and improvements. ▪ Allow fires to exceed area boundary only if the objectives of the threatened management area can be met. ▪ Allow lightning fires to burn naturally within the area. ▪ Maximum size objective for person-caused

			<p>fires is one acre.</p> <p>2. Initial Attack Fire Suppression (LMP page 96)</p> <ul style="list-style-type: none"> ▪ Do not construct fire line or apply chemical retardant in the area. ▪ Monitor lightning fires within the area and initiate appropriate response to meet objectives of threatened analysis area. ▪ Direct attack and control all person-caused fires. <p>3. Escaped Fire Suppression (LMP page 96)</p> <ul style="list-style-type: none"> ▪ Fires which exceed or are expected to exceed the maximum size objective are considered escaped and appropriate response is determined by a Wildland Fire Situation Analysis (WFSA). The WFSA considers at least the following: <ul style="list-style-type: none"> a) Ignition source of the fire (lightning or person-caused). b) If lightning caused, consider the appropriateness of the predicted burn with respect to the objectives of fire management in natural area. c) Resource management emphasis and protection objectives of threatened management area. d) Suppression costs commensurate with resources protected. e) Effects on air quality, aesthetics, soil, and watershed. f) Current availability of suppression resources. g) Minimize suppression impacts. h) Time interval since the area was last burned.
20	145	Franks Lake Geologic-Botanical Area, North Kaibab R.D., 8,550’.	<p>1. Fire Management Planning and Analysis (LMP page 106)</p> <ul style="list-style-type: none"> ▪ Protect human life and improvements. Minimize acreage burned. ▪ Do not allow fires to spread to lands of other ownership. ▪ The maximum fire size objective is one acre. ▪ The average annual burned area objective is 1/10th acre. <p>2. Initial Attack Fire Suppression (LMP page 106)</p> <ul style="list-style-type: none"> ▪ Direct attack and control all fires. <p>3. Escaped Fire Suppression (LMP page 106)</p> <ul style="list-style-type: none"> ▪ Fires which exceed or are expected to exceed the maximum size objective are considered escaped and appropriate response is determined by a Wildland Fire Situation Analysis

			<p>(WFSAs). The WFSAs consider at least the following:</p> <ul style="list-style-type: none">a) Resource management emphasis of threatened management areas.b) Suppression costs commensurate with resources protected.c) Minimization of acreage burned in the analysis area. <p>4. Treatment of Activity Fuels (LMP page 106)</p> <ul style="list-style-type: none">▪ Dispose of all activity created slash.
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Recreation Site Geographic Areas (FMU 2)

GA #	SIZE (Acres)	DESCRIPTION	FIRE
21	1,556	Includes the 15 major existing public and private sector developed recreational sites and other smaller sites (trailheads, interpretive sites, etc.).	<p>1. Fire Management Planning and Analysis (LMP pages 110 & 111)</p> <ul style="list-style-type: none"> ▪ Protect human life and improvements. Minimize acreage burned. ▪ Do not allow fires to spread to lands of other ownership. ▪ The maximum fire size objective is one acre. ▪ The average annual burned area objective is five acres. <p>2. Initial Attack Fire Suppression (LMP pages 110 & 111)</p> <ul style="list-style-type: none"> ▪ Direct attack and control all fires. <p>3. Escaped Fire Suppression (LMP pages 110 & 111)</p> <ul style="list-style-type: none"> ▪ Fires which exceed or are expected to exceed the maximum size objective are considered escaped and appropriate response is determined by a Wildland Fire Situation Analysis (WFSA). The WFSA considers at least the following: <ol style="list-style-type: none"> a) Resource management emphasis of threatened management areas. b) Suppression costs commensurate with resources protected. c) Effects on air quality, aesthetics, soil, and watershed. d) Social acceptance of acreage burned. e) Current availability of suppression resources. f) Minimization of acreage burned in the analysis area. <p>4. Treatment of Activity Fuels (LMP pages 110 & 111)</p> <ul style="list-style-type: none"> ▪ NZ: Dispose of all activity created slash. <p>5. Treatment of Natural Fuels (LMP pages 110 & 111)</p> <ul style="list-style-type: none"> ▪ Encourage utilization of natural fuels in and adjacent to this area for on-site fuelwood needs.
22	2,228	Includes the proposed public and private sector developed recreational sites and other smaller sites (trailheads, interpretive sites, etc.).	<p>1. Fire Management Planning and Analysis (LMP pages 113 & 114)</p> <ul style="list-style-type: none"> ▪ Protect human life and improvements. Minimize acreage burned. ▪ Do not allow fires to spread to lands of other ownership. ▪ The maximum fire size objective is one acre. ▪ The average annual burned area objective is 2 acres. <p>2. Initial Attack Fire Suppression (LMP pages 113 & 114)</p> <ul style="list-style-type: none"> ▪ Direct attack and control all fires.

			<p>3. Escaped Fire Suppression (LMP pages 113 & 114)</p> <ul style="list-style-type: none"> ▪ Fires which exceed or are expected to exceed the maximum size objective are considered escaped fires and appropriate response is determined by a Wildland Fire Situation Analysis (WFSA). The WFSA considers at least the following: <ul style="list-style-type: none"> a) Resource management emphasis of threatened management areas. b) Suppression costs commensurate with resources protected. c) Effects on air quality, aesthetics, soil, and watershed. d) Social acceptance of acreage burned. e) Current availability of suppression resources. f) Minimization of acreage burned in the analysis area. <p>4. Treatment of Activity Fuels (LMP pages 113 & 114)</p> <ul style="list-style-type: none"> ▪ NZ: Dispose of all activity created slash. <p>5. Treatment of Natural Fuels (LMP pages 113 & 114)</p> <ul style="list-style-type: none"> ▪ Encourage utilization of natural fuels in and adjacent to this area for on-site fuelwood needs.
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3.1.2. Other Documents' Guidance and Tools that Apply to All Fire Management Units

- **Kaibab NF Communication Plan:** The Forest has a communications plan that identifies the two sets of frequencies designated for fire management and other Forest activities. The district north of the Colorado River uses one set and the two districts south of the Colorado River use the other set.
- **Fire Behavior Indices:** The Williams Dispatch Center tracks and publishes the Energy Release Component (ERC) and Burning Index (BI) daily. Both ERCs and BIs provide information for fire managers and field personnel for both the Kaibab NF and the Grand Canyon NP. Pocket cards developed for the Forest and Park include both indices. ERCs are primarily used to determine preparedness levels for the Forest and Park. BIs reflect the day-to-day variations in fire potential to guide daily readiness of fire crews during the fire season.
- **National Fire Danger Rating System (NFDRS) Operating Plan:** The Forest has an interagency NFDRS operating plan it shares with the Grand Canyon NP. All pertinent weather stations are identified in this plan.

3.2. Fire Management Considerations for Specific Fire Management Units

3.2.1. FMUs' Snap Shot

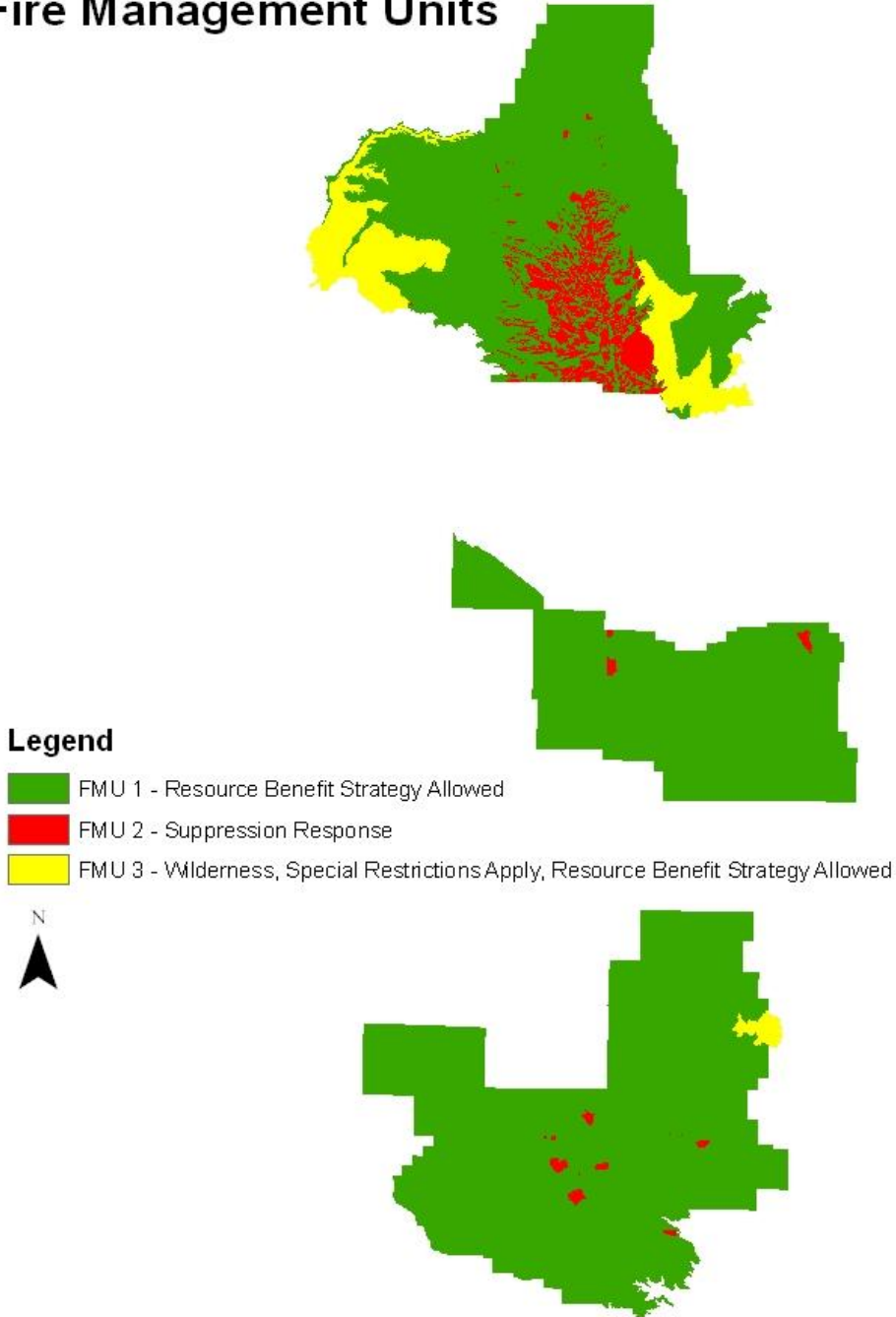
- Three FMUs have been identified for the Forest. They are (see map on following page):
 1. FMU1, Resource Benefit Strategy Allowed
 2. FMU2, Suppression Response
 3. FMU3, Wilderness, Special Restrictions Apply, Resource Benefit Strategy Allowed
- **Duty Officers:** Each district/zone and SO has daily identified duty officers. The preparedness plan identifies the required level of qualifications for the duty officer.
- **IA Dispatch Office:** Williams Dispatch Center (WDC)
- **Options available for response to unplanned ignitions:**
 1. FMU1 – full range of options available including full suppression to resource benefit strategies.
 2. FMU2 – requires a suppression oriented response.
 3. FMU3 - full range of options available including full suppression to resource benefit strategies. Special restrictions apply.

Special Restrictions and Concerns for Wilderness (FSM 2326.1)

Motorized/Mechanical Request	Authorization for Non-Emergency	Authorization for Emergency
Chainsaws/Pumps	Regional Forester	Forest Supervisor
Helicopters/Fixed-Wing <ul style="list-style-type: none"> • Retardant delivery • Bucket Work • Personnel Shuttle • Long-line 	Regional Forester	Forest Supervisor
Transport & supply by aircraft, air drop, & mechanical transport	Regional Forester (FSM 2326.1)	Forest Supervisor
Helispot construction	Regional Forester	Forest Supervisor
Motor Vehicle	Regional Forester	Forest Supervisor
Tractors (Heavy Equipment)	Regional Forester	Regional Forester
BAER projects in the Wilderness	Regional Forester (FSM 2323.04c.11)	Forest Supervisor

FMU Map

Kaibab National Forest Fire Management Units



3.2.2. FMU Characteristics

3.2.2.1. Safety

These safety issues occur on all three FMUs of the Forest:

- **No matter what FMU activities are occurring in, firefighter and public safety is always the Forest's #1 objective!**
- The Forest is primarily flat. However, there are scattered hills, mesas, mountains, drainages, and canyons, which can affect fire behavior either topographically or by influencing weather patterns. Steep and rocky terrain are also encountered.
- Road systems dissect all of the districts. Some of these roads provide only one-way in and out egress/access. Visibility may be affected due to dust, shadows, and sunlight. Limited pull-outs and blind corners are also a factor on the Forest road system.
- Major interstates and state highways dissect the districts providing hazards when wildfires are adjacent to these travelways.
- The Forest draws a great number of recreationists due to the accessibility, hunting opportunities, recreational opportunities, and the vicinity of the Grand Canyon NP. Dispersed camping and vehicles on and along the road system are always of major concern to fire management activities.
- Lightning is always a factor in the southwest. Lightning is most prevalent during the monsoon season, which occurs primarily during the second week of July. It can occur at other times depending on weather patterns.
- Aviation hazards have been identified and can be located on the annually updated Forest Aviation Hazard Maps. Most aviation hazards that occur are powerlines, communication/electronic sites, and air tour traffic (near the Grand Canyon). The California Condor needs to be considered when operating near the Grand Canyon NP.

3.2.2.2. Physical

FMU 1, Resource Benefit Strategy Allowed

This FMU is characterized by a dominance of ponderosa pine vegetation with large expanses of pinyon-juniper on the western and eastern edges.

- Ponderosa Pine Fuels:

These fuels can range from open stands of pine with grass understory to closed stands with heavy accumulations of dead and down woody debris. The open parklike stands generally cause little control problems except during drought conditions when passive crown fire behavior is possible. The closed stands are generally associated with heavy unnatural accumulations of dead

and down woody material and are generally multistoried with low crown base heights. All of these conditions can lead to passive and active crown fire behavior during late May and into July.

- Pinyon/Juniper Fuels:

These fuels range from open P/J with grass understory to more closed stands with very little herbaceous fuels. Fire spread is very limited due to the lack of ground fuels but can support some active crown fire during the most extreme fire conditions. Spread is from crowning and spotting ahead.

Fire Regime I and II is representative of this FMU. Conditions within these Fire Regime's are in general altered from their historical range due to human intervention. Fire exclusion, livestock grazing, logging, and invasion of exotic species are the primary causes of this departure. They are at "high" (most acres are Condition Class 3) risk of loss of native plant and animal habitats, reduced air quality due to wildland fire smoke, degraded water quality and at "high" risk of catastrophic fires that will further degrade watersheds, reduce commodity outputs, and risk the health and safety of our publics and fire fighters alike.

FMU 2, Suppression Response

This FMU consists mainly of mixed-conifer fuels on the North Kaibab plateau. Lower elevation mixed-conifer consists mainly of an overstory of fir and pine with some dispersed Douglas fir intermixed with clumps of Aspen. Dead and down fuels include greater quantities of 3-inch or larger limb-wood resulting from the over mature or natural events that create a large load of dead material on the forest floor. Lack of fire over the past century has contributed to an increasing amount of later successional young white fir in the understory. The mixed-conifer stands at the higher elevations consist of closed canopy stands of short-needle conifers and hardwoods of spruce, fir, and aspen. The litter layer consists mainly of compacted leaves, needles and twigs.

This FMU is a mix of Fire Regime III in the lower elevations and Fire Regime IV in the upper elevations. Conditions in Fire Regime III are as described above. In Fire Regime IV conditions are closest to their historical range due primarily to their geographic location or their timber value. Within III and IV, conditions have not been altered as dramatically as in Fire Regime I but the more subtle effects of homogenization and increased woody fuel loadings have created risks to the ecosystem. Fire exclusion, livestock grazing, logging, and invasion of exotic species are the primary causes of this departure. Most acres are classified as Condition Class 3.

FMU 3, Wilderness, Special Restrictions Apply, Resource Benefit Strategy Allowed

All conditions mentioned above exist in this FMU. In addition, brush fuel models exist in the lower elevations and are associated with steep slopes. Decadent stands of manzanita and turbinella oak can support very active fire behavior on these steep slopes.

All Fire Regimes are representative of this FMU along with the conditions as described above. Most acres are classified as Condition Class 3.

- When dealing with fire activity within the Forest's managed wilderness areas, the following must be complied with (FSM 2326.1):
 1. Notify the Forest Wilderness Resource Advisor (WRA). They will determine whether there is a need for a full time advisor. If the Forest WRA is not available, order one for large fire events and delegate authority to them.
 2. Give preference to using methods and equipment that cause the least:
 - a. Alteration of the wilderness landscape,
 - b. Disturbance to the land surface,
 - c. Disturbance to visitor solitude,
 - d. Reduction of visibility during periods of visitor use, and
 - e. Adverse effect on other air quality related values (FSM 2324.23).
 3. Guidelines for Minimum Impact Suppression Tactics (MIST) and Leave No Trace (LNT) will be followed and can be obtained from the Forest WRA.
 4. Follow the Minimum Requirement Process when exceptions for temporary roads or structures, or use of motorized equipment or mechanical transport, must be used. The Forest WRA will supply this direction.
 5. Burned Area Emergency Rehab (BAER) will only be allowed in wilderness if:
 - a. Necessary to prevent an unnatural loss of the wilderness resource or,
 - b. To protect life, property, and other resource values outside of wilderness.
Note: Normally use hand tools and equipment to install selected land and channel treatments (FSM 2323.43b) during rehabilitation activities.
 6. Activities that use water resources or that may affect water resources must be coordinated with the Forest WRA prior to its use.
 7. Any helispots or spike camps that may be required to manage the fire within the wilderness will be coordinated with the Forest WRA prior to development.

3.2.2.3. Biological

- See Geographic Area Guidance

3.2.2.4. Resources

- See Geographic Area Guidance

3.2.3. FMU Fire Environment

3.2.3.1. Fire Behavior

The majority of the forest consists of Ponderosa Pine and mixed conifer. Ponderosa pine is the dominant tree species, but Gambel Oak is often represented with an understory of grass and shrubs. At the higher elevations, they grade into mixed conifer forests and into pinyon-juniper woodlands and chaparral at the lower elevations. The absence of fire due to successful suppression activities over the past century has led to an unnatural fuel build up of both the live and dead fuels. Multi-storied stands, dog hair thickets and overstocked multi-aged second growth stands of these trees support active crown fire. Fuel Models 2, 9, and 11 are representative. Fuel Model 11 is used wherever there has been an absence of fire and unnatural fuel loads contribute to spread and intensity.

Within the mixed conifer fuels, fire burns in the surface and ground fuels with greater intensity than in the pure Ponderosa Pine fuels. The density of young White Fir in the understory increases fire intensity and provides the ladder fuels to spread surface fire into the crowns. Crowning out, torching, and spotting are more frequent in this vegetation type than in the other Forest fuel types. Fuel Model 10 is representative. In the higher elevation spruce/fir fuels, only under severe weather conditions involving drought, high temperatures, wind, and very low relative humidity do these fuels exhibit problematic fire behavior. The compacted leaves, needles and twigs support slow-burning ground fires with low flame lengths. Fuel Model 8 is representative.

In the pinyon/juniper these fuels range from open P/J with a grass and sage understory to more closed stands with very little herbaceous fuels. Fire spread is very limited due to the lack of ground fuels but can support some active crown fire during the most extreme fire conditions. Spread is from crowning and spotting ahead. Fuel Model 8 is representative unless associated with grass and sage, which makes Fuel Model 6 more representative.

Fire potential measures the potential for a fire to spread once it starts and its resistance to control. It is a function of stand structure and density, topography, fuel loading, the arrangement of both live and dead fuels, and the amount of heat energy these fuels are capable of producing during the passing of the fire front. Heat energy is a product of how dry the fuels are and is measured by the daily outputs of indices and components from the National Fire Danger Rating System. The Burning Index and Energy Release Component are both indicators of the potential for fire behavior from and initiating fire.

The Forest Plan requires Fire Management to strive to keep fires in the timber type to 20 acres or less. Fires with potential to exceed 20 acres are considered to have high potential and are characterized by active crown fire behavior (fire spreading through the crowns of the trees independent or along with the ground fire). Fires with moderate potential range from 10-20 acres and characterized by passive crown fire behavior (running surface fires with individual trees or clumps of trees torching). Low fire potential is characterized by fires less than 10 acres in size and by running surface fires. Generally, areas having crown closures less than 60 percent will have a low to moderate fire potential, although potential may be higher on steeper slopes or in areas with heavy fuel loads. Fire behavior in these areas will be limited to passive-type crown fires. Under the average worst case burning conditions, fires in stands with less than 60 percent crown closure will have moderate rates of spread and moderate resistance to control. Areas having crown closures greater than 60 percent are more susceptible to active and independent type crown fires. In such areas, fires will have high rates of spread and high resistance to control.

During the period of 1991-2010, the Forest averaged 178 fires per year, burning an average of 12,149 acres annually. During this 20-year period, there was a significant change in the moisture regime of the first 10-year period from the second half. In the early 80's and into the early 90's the southwest was considered to be in a wet cycle but since then the weather has been significantly drier and predicted to stay this way for the near future. In general, the average number of fires per year did not change much from the first 10-year period but there has been a significant change in acres burned. The chart below shows the breakdown of size class and cause and acres burned by 10-year period. The more recent 10-year average is a better descriptor of changing conditions in the southwest in relation to climate and occurrence. Approximately 95% of these wildland fires are Size Class A and B incidents (less than 10 acres in size). The average annual acres burned are skewed by four large-scale stand replacement fires, which occurred during the drought years of 1996, 2000, 2002, and 2006. The Eagle Rock Fire of 2010 was of significant size but does not occur in a drought year. It does slightly skew the average annual acre numbers due to its size (3,240).

	1981-1990	1991-2000	2001-2010
Fires			
Human Caused	551	476	297
Lightning Caused	1457	1372	1416
Total	2008	1848	1713
Size Class (acres)			
A = 0.1 - .25	1647	1450	1231
B = .26 – 9.9	322	362	384
C = 10 – 99.5	30	22	42
D = 100 – 299	7	7	17
E = 300 – 999	0	2	15
F = 1,000 – 4,999	2	1	17
G = 5,000 +	0	4	7
Acres Burned	6068	82598	160383

On average, lightning accounts for approximately 76% of the annual number of fires while a variety of human caused fires accounts for the remaining 24%. Historically, abandoned campfires comprise the largest proportion (36%) of the total human-caused fires. The majority of fires are relatively insignificant in terms of size and fire intensity with fire behavior characterized as a slow to moderate moving surface fire. Initial attack crews are successful in suppressing 99% of the fires at less than one acre. The other 1% is usually suppressed under 10 acres and characterized as running surface fires with some individual or groups of trees torching. A very small portion of fires escape initial attack and have the potential to exceed 100 acres. These fires start out as running surface fires and at some point transition from surface spread into the crowns of the trees leading to extreme fire behavior and the highest resistance to control to suppression action. Strong winds are usually the catalyst for these types of events and elevated moderate fire danger to high and high to extreme leading to the potential for large and catastrophic fires. These infrequent stand replacement events typically burn at high fire intensity levels (FIL 4 and 5) and result in incidents on the scale of thousands of acres. The largest event on the Forest during the analysis period occurred in 1996 when the Bridger Knoll/Jump Fires burned together for 53,680 acres.

3.2.3.2. Weather

Weather patterns influencing fire behavior and historical analysis for all FMUs in general.

Strong southwest winds and low humidity are prevalent from mid-April to mid-June, resulting in mainly wind driven fire behavior. Hot, dry and unstable conditions

usually occur from mid-June to early July, leading to the potential for plume dominated fire behavior. The potential for dry lightning is most prevalent from June to early July but is uncommon. The monsoon, accompanied by higher humidity and rainfall potential, less wind and subdued fire behavior, begins during the first or second week in July and ends in the second or third week in September when dry and mild conditions return leading to a period of increased fire behavior potential before the onset of winter conditions.

Fire season determination for all FMUs in general.

Elevation and the difference in winter weather patterns affecting the North Kaibab Plateau leads to a difference in the length of the fire season between the North and South Kaibab. The North Kaibab generally receives more winter precipitation delaying the onset of fire season in the spring and ending sooner in the fall as the jet stream begins to move further south and with it the tailing end of pacific storms moving across the Rockies. These storms bring light precipitation to the North Kaibab but generally mean windy and dry conditions for the south. The fires analysis tools, in the Fire Family Plus program, were utilized to determine the general fire season and is as follows:

North Kaibab: May - September
South Kaibab: April - October