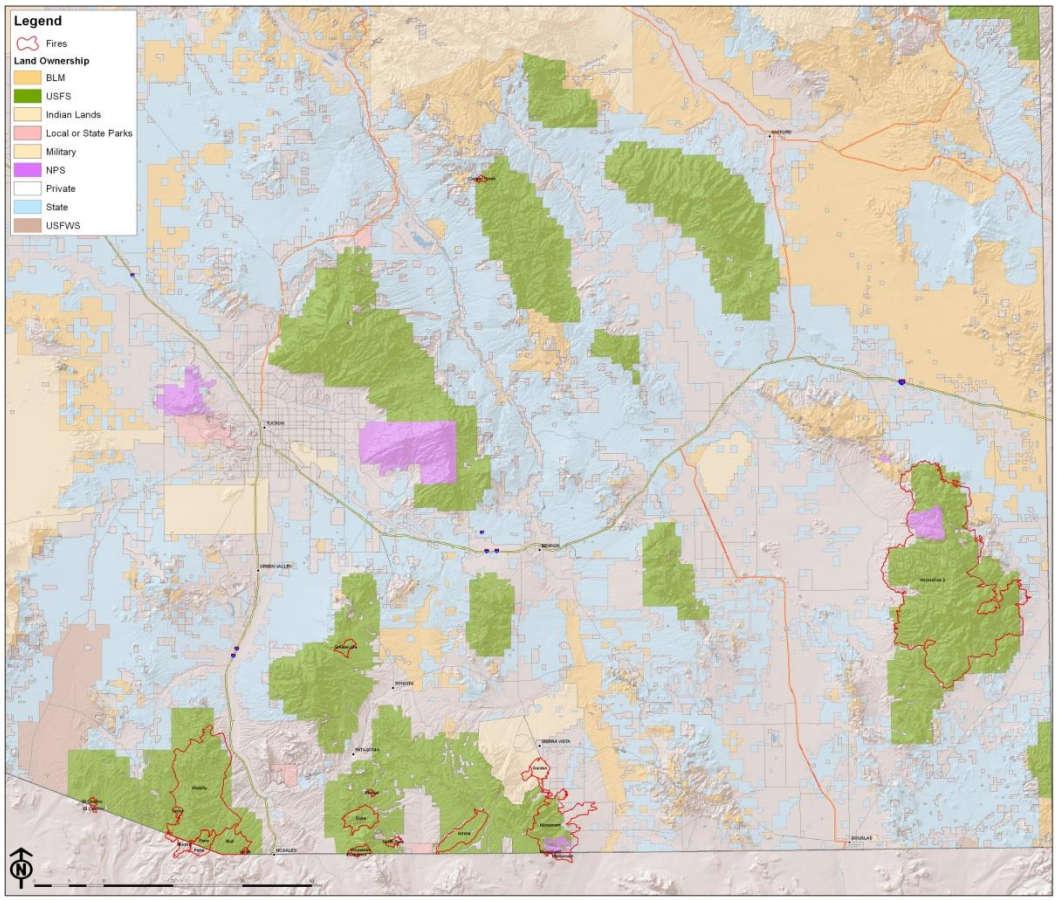
CORONADO NATIONAL FOREST

2012 FIRE MANAGEMENT PLAN

Name	Acres
Arlene	10,599
Bull	9,702
Copper Creek	618
Duke	7,649
Duquense	1,750
Duquense (MEX)	242
El Camino	609
El Camino (MEX)	269
Garden	3,766
Greaterville	2,279
Horseshoe 2	222,953
Monument (MEX)	1,659
Monument	30,393
Murphy	68,009
Murphy (MEX)	2,730
North Tank	1,143
Pena	3,523
Pena (MEX)	2,030
Verde	273
Wildcat	398
Yanks	856
Total (w/MEX acres)	371,450

Coronado NF Large Wildfires 2011



Reviewed and Updated by _/s/ Chris Stetson_____ Date __3/23/12_____

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 Coronado National Forest and compiles guidance from existing sources such as but not limited to, the Coronado National Forest Land and Resource Management Plan (LRMP), 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 Coronado 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.

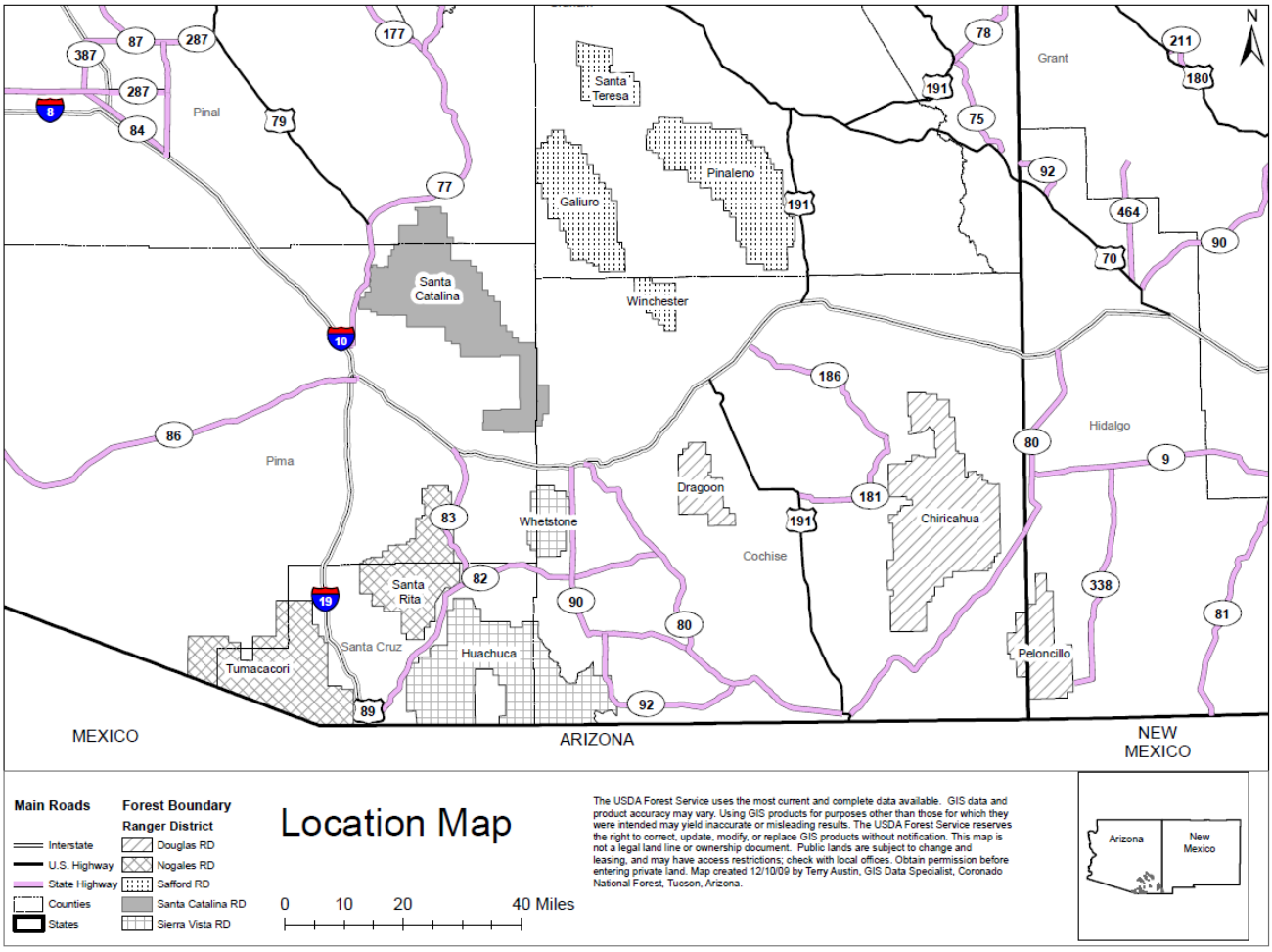
Chapter 3 articulates specific goals, objectives, standards, guidelines, and/or desired future condition(s), as established in the forest's LRMP, which apply to all the forest's FMUs and those that are unique to the forest's individual FMUs.

Chapter 1. INTRODUCTION

The Coronado 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 unit's LMP.

The Coronado National Forest covers 1,780,000 acres of southeastern Arizona and southwestern New Mexico. Elevations range from 3000 feet to 10,720 feet in twelve widely scattered mountain ranges or "sky islands" that rise dramatically from the desert floor, supporting plant communities as biologically diverse as those encountered on a trip from Mexico to Canada. (***Figure 1***)

Figure 1: Vicinity Map of the Coronado National Forest



The broad base for management of the Coronado National Forest is provided through a general Mission Statement:

"Manage the resources of the Coronado National Forest under multiple use and sustained yield principles to provide for balanced contributions to the national welfare and to the economic and social needs of the people of Southeast Arizona and Southwest New Mexico. Management programs are to be oriented to maintain cultural values and a viable rural economy". (LRMP, P.9)

Due to increasing human populations, wildland urban interface (WUI) is a growing concern on the Coronado. WUI areas include those of resident human populations at imminent risk from wildland fire. These areas may also include critical communications sites, municipal watersheds, high voltage transmission lines, observatories, church camps, scout camps, research facilities, and other structures that if destroyed by fire would result in hardship to communities. These areas encompass not only the sites themselves, but also the continuous slopes and fuels that lead directly to the sites, regardless of the distance involved. (R3 Supplement 5100-2010-2, Chapter 5140)

Illegal land use, specifically, un-documented aliens (UDIs) traffic and international drug running, pose a significant challenge when choosing the appropriate response to unplanned ignitions and providing for safety. These concerns are most notable on the Huachuca, Santa Rita, Peloncillo, Tumacacori, and the southern end of the Chiricahua Mountains. To address the fire fighters safety concerns, incidents that occur adjacent to the International Border will follow the Border Fire Initial Attack Protocol.

Chapter 2. POLICY, LAND MANAGEMENT PLANNING, AND PARTNERSHIPS

Fire management policy is complex, dynamic, and involves many layers of direction and strategy. The regulations and policy in the following documents guide the fire management 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)
  http://www.nwcg.gov/branches/ppm/fpc/archives/fire_policy/history/index.htm
- National Fire Plan
  http://www.forestsandrangelands.gov/
- Forest Service Manual 5100 (Fire Management)
  http://www.fs.fed.us/cgi-bin/Directives/get_dirs/fsm?5100!..
- Forest Service Manual 2320 (Wilderness Management)
  http://www.fs.fed.us/cgi-bin/Directives/get_dirs/fsm?2300!..
- The Wilderness Act of 1964
  http://www.wilderness.net/index.cfm?fuse=NWPS&sec=legisAct
- Guidance for Implementation of Federal Wildland Fire Management Policy (February2009)
  http://www.nifc.gov/policies/policies_documents/GIFWFMP.pdf

- A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment *10-Year Strategy Implementation Plan (2006)*
  http://www.westgov.org/wga/publicat/TYIP.pdf

2.2. Land and Resource Management Plan

- Coronado National Forest Land and Resource Management Plan (1986, as amended)
- Coronado National Forest Wildland Fire Implementation Guide
- Coronado National Forest Fire Prevention Plan
- Coronado Aviation Management Plan

2.3. Partnership

Collaborative processes were used to develop the underlying land management plan direction and the fire management plan. Coronado National Forest is a member of the Southeast Arizona Zone Charter Group in addition to National Park Service–Saguaro National Park (NPS), Bureau of Land Management – Safford District (BLM), United States Fish & Wildlife Service– Buenos Aires and San Bernardino national wildlife refuges (USFWS), Bureau of Indian Affairs – Tohono O'odham and San Carlos, State of Arizona – Tucson Office, and numerous local fire departments. Coronado NF works most closely with the National Park Service due to the common boundaries on the Santa Catalina, Sierra Vista, and Douglas Ranger Districts.

The Coronado is also a member of the Southeast Arizona Fire Planning Unit. The goal of this group is to provide planning and budget analysis that will be used by the participating agencies to develop and implement associated budgets within the context of the Fire Program Analysis (FPA) System.

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 to 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.

The response to wildland fire should be based on the ecological, social, and legal consequences of each fire. The circumstances under which a fire occurs—as well as the likely consequences to firefighter and public safety and welfare, natural and cultural resources, and values to be protected—dictate the appropriate response. Firefighter and public safety shall be the first priority in all fire management activities (Federal Wildland Fire Management Policy, 1995)

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

3.1.1. Land and Resource Management Plan Guidance

Goals: A goal is defined as "a concise statement of the state or condition that a land and resource management plan is designed to achieve. A goal is usually not quantifiable and may not have a specific date for completion."(36 CFR 219.3). The following is a list of forest goals as provided in the Coronado LRMP.

- Reduce the costs, resource damage, and threats to public and firefighter safety from future wildland fires. (Protection, p.11)
- Manage naturally occurring fires to restore and sustain ecological processes in fire-dependent ecosystems. (Protection, p.11)
- Create and maintain fuel conditions for low risk of extreme fire behavior and high-intensity wildland fires. (Protection, p.11)
- Cooperate with state and local law enforcement agencies in the protection of visitors, their property and National Forest lands and facilities. (Protection, p.11)
- Cooperate with other Federal, state and local regulatory agencies to protect air quality as required by the Clean Air Act. (Protection, p.11)
- Increase the public's awareness of their obligation to the resource and their responsibility in caring for it. (Recreation, p.9)
- Maintain or enhance the visual resource through sound landscape management principles. (Recreation, p.9)
- Protect significant cultural resources from damage by project activities or vandalism. (Recreation, p.9)
- Preserve and protect caves for their unique environmental, biological, geological, hydrological, archaeological, paleontological, cultural and recreational values. (Recreation, p.9)
- Manage existing wildernesses to preserve and protect the wilderness character in accordance with the various Wilderness Acts. (Wilderness, p.10)
- Until Congress makes a decision, the three WSAs will be managed under the direction prescribed for Management Area 9 to maintain the existing wilderness character and potential for inclusion in the National Wilderness System. (Wilderness, p.10)
- Provide habitat for wildlife populations consistent with the goals outlined in the Arizona and New Mexico Department of Game and Fish Comprehensive Plans and consistent with other resource values. (Wildlife and Fish, p.10)
- Provide for ecosystem diversity by at least maintaining viable populations of all native and desirable nonnative wildlife, fish and plant species through improved habitat management. (Wildlife and Fish, p.10)
- Improve the habitat of and the protection for local populations of Threatened and Endangered species to meet the goals of the Endangered Species Act of 1973. (Wildlife and Fish, p.10)
- To restore rangeland to at least a moderately high ecological condition (70% to 75% of potential production, fair range condition) with stable soil and a static or upward trend. (Range, p.10)

- Continue a program that enhances other resource values, and that effectively utilizes the wood fiber produced. Carry out silvicultural practices to improve stand health when such practices are consistent with other resource objectives. (Timber, p.10)
- Secure and provide an adequate supply of water for the protection and management of the National Forest. (Soil & Water, p.10)
- Provide a favorable water flow in quantity and quality for off-Forest users by improving or maintaining all watersheds to a satisfactory or higher level. (Soil & Water, p.10)

Standards and Guidelines:

- Firefighter and public safety shall be the first priority in all fire management activities. (Fire Mgmt., p.45)
- All human-caused fires shall be suppressed using appropriate suppression response strategies. (Fire Mgmt., p.45)
- Wildland fire suppression responses shall minimize costs of suppression, resource impacts, and risks to life and property. (Fire Mgmt., p.45)
- The appropriate response for each natural ignition will vary across the Forest but will include the full spectrum of options, from aggressive initial attack to management to achieve resource objectives. (Fire Mgmt., p.45)
- For all management areas, management of lightning-caused fires should be considered to restore fire's natural role in maintaining a healthy, diverse, and resilient ecosystem resistant to natural disturbances. (Fire Mgmt., p.45)
- Wildland fire use shall follow direction specific to the Forest's Fire Management Plan. Use the established protocols identified in the Fire Management Plan for minimizing resource impacts. (Fire Mgmt., p.45)
- All management practices will be planned so that air quality will meet local, State and Federal standards. (Air Quality, p.45)
- Safeguard water, people, animals, pets, and property in connection with use of pesticides and fire retardants. (Chemical Mgmt., p.46)
- Continue to maintain and protect the visual integrity of the landscape by meeting or exceeding the established visual quality objectives, which range from preservation to maximum modification. (Visual Res. Mgmt., p.28)
- Rehabilitate or enhance the existing visual quality in the process of accomplishing other resource management practices. (Visual Res. Mgmt., p.28)
- Evidence of management activities no longer desired will be removed and rehabilitated consistent with designated visual quality objectives. (Visual Res. Mgmt., p.28)
- Maintain or improve current vegetative diversity (numbers of plant associations and species occurrence) by mitigation of Forest activities. (Wildlife & Fish, p.31-1)
- Through management services, provide information to minimize disturbance and improve already disturbed areas. Best management practices will be used to minimize the time of recovery to a satisfactory erosion level, minimize soil productivity loss, improve water quality and minimize channel damage. (Watershed & Soil, p.38)
- Manage riparian areas to protect the productivity and diversity of riparian-dependent resources by requiring actions within or affecting riparian areas to protect and, where applicable, improve dependent resources (FSM 2526). Emphasize protection of soil,

water, vegetation, and wildlife and fish resources prior to implementing projects (FSM 2526). (Watershed & Soil, p.39)

Specific Management Area Standards and Guidelines: The LRMP divides the Forest into different "Management Areas" (MA's). The MA's have specific standards and guidelines in addition to the Forest-wide standards and guidelines as listed below.

MANAGEMENT AREA 2B (LRMP, P.54-7)

- Evaluate fuel-loading situation and prescribe action that reduces potential fire hazards related to talus snail protection.

MANAGEMENT AREA 9 – WILDERNESS (LRMP, P.80-82)

- Permit lightning caused fires to play, as nearly as possible, their natural ecological role within wilderness.
- Cooperate with Saguaro National Park to implement as nearly identical management of the Rincon Wilderness as possible.
- Vegetative manipulation is not used for range improvement, except as a result of prescribed fire.
- Utilize prescribed fire to reduce to an acceptable level, the risks and consequences of wildfire within the wilderness or escaping from wilderness.

MANAGEMENT AREA 15 - WILD CHILE BOTANICAL AREA (LRMP, P. 86-1)

- Fire suppression should be conducted to protect and promote botanical values.

3.1.2. Physical Characteristics that Apply to All Fire Management Units

The Coronado National Forest encompasses a number of “sky islands” scattered across southeastern Arizona and extreme southwestern New Mexico. Elevations range from 3000 feet to 10,720 feet. Because of the isolated nature of the mountain ranges, the Forest is split into twelve distinct Ecosystem Management Areas (EMA’s). (Figure 1)

Vegetative communities on the Forest range from Sonoran desert to spruce-fir forest, determined mainly by elevation, which controls rainfall, temperature, and other climatic factors. As elevation increases, vegetation types change from desert to woodland to forest communities (USDA Ecosystem Assessment 2001).

Wildlife found on the Forest is diverse and includes approximately 600 vertebrate species and 400 species of birds. Additionally, there are currently 30 species of animals and plants listed as threatened, endangered, or sensitive (TES).

The Forest has complex geology, consisting of several major thrust plates, large overturned folds, tectonically telescoped sedimentary and metamorphic facies, and igneous stocks of three ages. It is considered part of the basin and range geology, which extends from southeast Oregon through Nevada, through western and northern Arizona to Douglas, Arizona and gives rise to our current sky islands, which significantly contributes to urban development in the basins, isolation of TES species, and unique biotic communities. (Keyes 2002)

The climate in southeastern Arizona is semi-arid with a bi-modal distribution of precipitation. The summer rainy season occurs between July and September, while the winter rainy season occurs between December and March (Horn and Bryson 1960; Mitchell 1976). Generally, winter precipitation tends to be more spatially homogeneous, comprised of rains having longer duration relative to summer thunderstorms, which occur in short bursts over small or patchy areas of the region (Bahre 1991).

The annual climatic cycle that affects the fire regime begins in April with the melting of the winter snow pack. Winter storms are infrequent by this time and a drying trend sets in. Strong winds and low humidity occur in spring as weather systems track across the north of the region and warm high pressure builds from the south. By June, windiness is replaced by hot and dry conditions as high pressure strengthens across the area. This pre-summer drought intensifies through May and June, and frequently no precipitation occurs during this period. Lightning potential then increases as the high becomes centered near the four corners. Occasional isolated ‘dry’ thunderstorms may occur, generating lightning with little or no precipitation, resulting in fire activity.

In early July, a breakdown of high pressure over Arizona allows moist air from the Gulf of Mexico or the Gulf of California to flow over the state. Orographic and convective thunderstorms associated with the moist air mass are generated in increasing numbers during July and August, tapering off through September. A second drying trend establishes in October, and is broken by the arrival of large winter storms from the Pacific, often in late November (Baison 1990).

3.2. Fire Management Considerations for Specific Fire Management Units

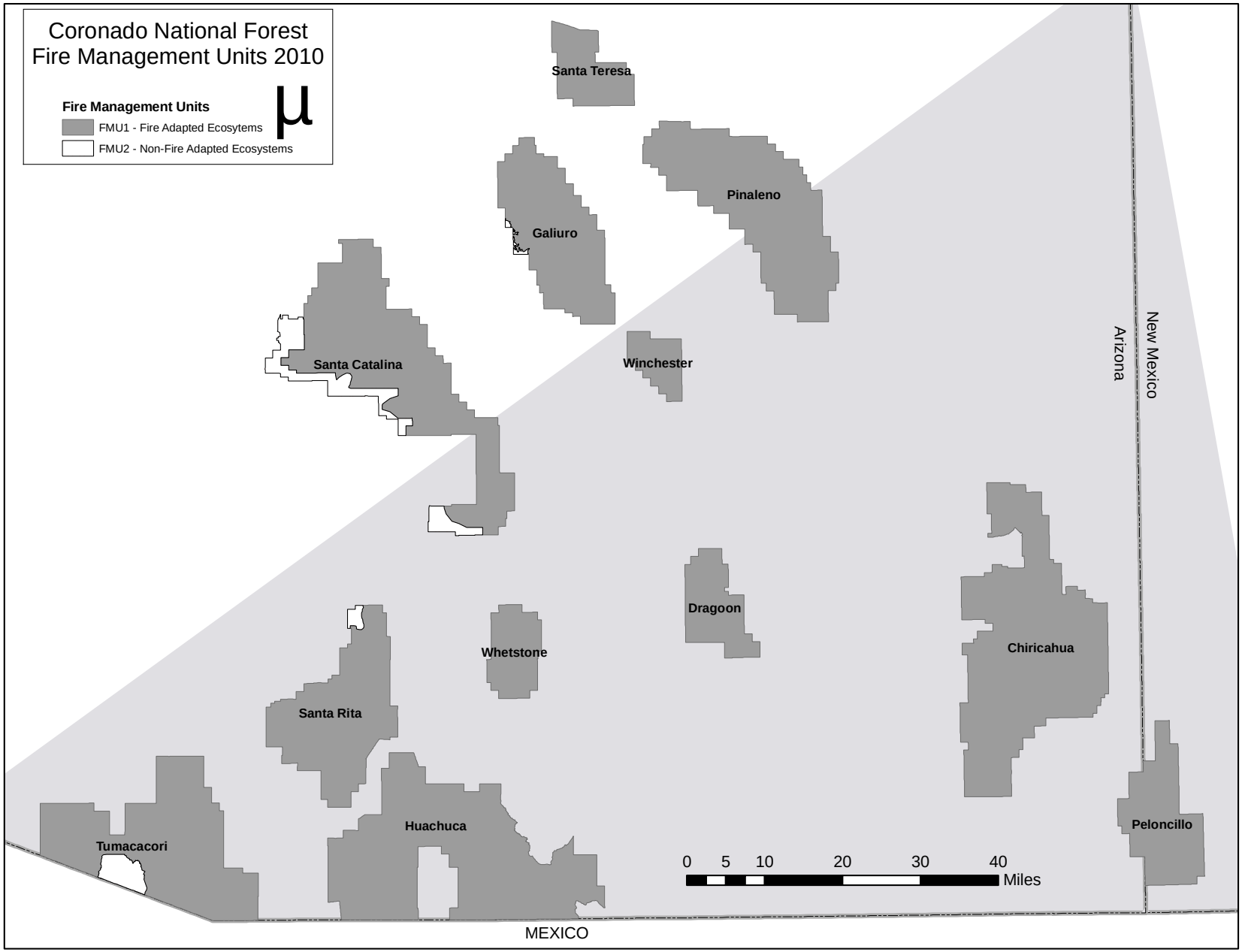
3.2.1. FMU Snap Shot

The Forest has identified two fire management units (FMU). These FMUs maintain consistency with the management objectives as outlined in the LRMP (Figure 2):

FMU 1 – Forest-wide, except within in the southwestern desert scrub (Upper Sonoran Desert) vegetation type. This FMU includes a full range of responses, from aggressive initial attack to managing natural ignitions to achieve desired Land and Resource Management Plan objectives when risk is within acceptable limits (CNF Wildland Fire Implementation Guide – 2005 Amendment to the LRMP, Amendment No. 11, June 2005).

FMU 2 – Generally, this FMU is located at elevations less than 4500 feet on the Santa Catalina, Santa Rita, Galiuro and Tumacacori EMAs. In this FMU, resource protection is the only objective, as it contains non-fire adapted vegetation. The vegetation type on the Coronado this applies to is the Southwestern Desert scrub, which contains the following species: saguaro (Cereus giganteus), palo verde (Cercidium spp.), creosote bush (Larrea tridentata), ocotillo (Fouquieria splendens), and brittlebush (Encelia spp.) (CNF Wildland Fire Implementation Guide – 2005 Amendment to the LRMP, Amendment No. 11, June 2005). **Due to the limitations of accurate mapping, , on-scene resources will need to identify the vegetation type at both the point of ignition and in the direction of likely spread, prior to making resource objective decisions.**

Figure 2. Coronado National Forest Fire Management Units



3.2.2. **FMU Guidance**

Guidance from the Forest LRMP is cited in section 3.1 above.

3.2.3. **FMU Characteristics** (The following characteristics apply to both FMU1 and FMU2 unless otherwise noted)

3.2.3.1. Safety

- Firefighter and public safety will be the first priority in all fire management activities.
- Each FMU is comprised of topographic features and influences that pose a safety hazard to fire management activities (steep slopes, rocky terrain, box canyons...).
- Poisonous plants and animals: Rattlesnakes, bees, wasps. Poison ivy (most likely in riparian areas).
- International Border activities: Ensure all firefighters, locals and guests, have in their possession, the Coronado NF *International Border Watchouts* pocket card and are familiar with the Border Response Protocols.
- Utility lines: Numerous utility lines (electric, gas) cross the Forest boundary. Locations can be obtained from the Forest GIS database and local utility companies.
- Aviation Hazards: An Aerial Hazard Map is compiled and updated annually or as needed. The Hazard Map will be available at Tucson Dispatch Center and each Forest aviation facility for review by flight crews.
- Travel routes: Many of the routes used to access the upper elevations of the “sky islands” consist of steep narrow roads with numerous blind corners and limited shoulder and pull-out opportunities. Expect high use of Forest system roads during the weekends and holidays. Be especially aware of heavy use OHV areas.
- Recreation areas: Developed and dispersed sites scattered throughout the Forest.
- Mines: Vertical mine shafts and horizontal adits are a safety concern on the Coronado. The highest occurrences of mine openings are found in the Huachuca, Tumacacori, and Santa Rita EMA’s. Mineshafts and adits may be hidden by vegetation and erosion of soil that covers up the openings. For information on the location of mining related safety hazards, contact the Forest Minerals Staff.

3.2.3.2. Physical

- ***Chiricahua EMA (FMU1),*** Douglas Ranger District: The Chiricahua Ecosystem Management Area (EMA) includes 291,496 acres of National Forest System land, encompassing nearly all of the Chiricahua Mountains. This rugged mountain range rises from the surrounding desert grasslands from an elevation of 4,800 feet to over 9,500, encompassing much of the high elevation of the Chiricahua Mountains. Steep canyons with densely timbered slopes dissect the range, radiating in all directions from 9,797-foot Chiricahua Peak. At the heart of the Chiricahua EMA lies 87,700-acre Chiricahua Wilderness (Class 1 airshed). In the northern portion of the EMA, Chiricahua National Monument is contiguous with the Forest on three sides.
- ***Dragoon EMA (FMU1),*** Douglas Ranger District: The Dragoon EMA is located approximately 1.5 hours east from Tucson. The rugged Dragoons contain 54,211 acres of the Dragoon Mountains and adjoining semi-desert grasslands and savannahs. Elevations range from 4,600 feet to the 7,519-foot Mt. Glenn.
- ***Galiuro EMA (FMU1/FMU2),*** Safford Ranger District: Located about 45 air miles northeast of Tucson, Arizona and 35 air miles northwest of Wilcox, Arizona. The rugged and precipitous Galiuro EMA encompasses 134,517 acres of primarily undeveloped lands; 714 acres are private inholdings. The majority of this EMA is so steep, rocky, and brushy that travel by horseback or on foot is limited to cleared and graded trails. Two major canyons, Rattlesnake and Redfield, and twin ridges running northeast to southwest, form the dominant geologic features of the area. From golden grasslands, 7,651-foot Bassett Peak rises up to form the EMA's highest point. Access is mainly via gravel and dirt roads, most lying on the east side of the mountain, with travel generally restricted to foot and horseback in the interior of the range. There are no developed recreation areas in Galiuro EMA, but dispersed areas throughout the mountains offer a wealth of opportunities for backcountry hiking, camping, and solitude. The 76,317-acre area, Galiuro Wilderness (Class 1 airshed) abuts Bureau of Land Management-administered Redfield Canyon Wilderness to the south.

  FMU2 is located on the western edge of this EMA between Cienega Wash, and Kielberg Canyon.

- ***Huachuca EMA (FMU1),*** Sierra Vista Ranger District: An expansive area containing 276,350 acres of land, the Huachuca Ecosystem Management Area includes the massive Huachuca Mountains, the smaller Patagonia Mountains and Canelo Hills, and the vast, rolling grasslands of San Rafael Valley. Fort Huachuca shares the EMAs northeastern border, and the entire south edge of the EMA lies on the international boundary with Mexico. The city of Sierra Vista is the largest community adjacent to this EMA. Much of this EMA is classified as wildland urban interface area due to the international border and the number of in-holding and subdivisions along the district boundaries other than around the Sierra Vista community. The Miller Peak Wilderness encompasses 20,190 acres of the EMAs upper elevations in the Huachuca Mountains.

- ***Peloncillo EMA (FMU1),*** Douglas Ranger District: Situated southeast of the Chiricahua Mountains and just north of the U.S.-Mexican border the Peloncillo Ecosystem Management Area is one of the most remote portions of the Coronado NF. It is located approximately one hour east of Douglas, AZ and an hour south of Lordsburg, NM. The mountains rise abruptly from a sea of desert grassland, contributing to the Coronado's "sky island" character. Elevations range from 4,593 feet (northeast corner of the EMA) to 6,624 feet at the summit of Owl Peak. The EMA's 87,985 acres straddle the Arizona-New Mexico border, with 81 percent arranged in New Mexico. The 15,690-acre Bunk Robinson Wilderness Study Area and the 12,840-acre Whitmire Canyon Wilderness Study Area flank the Geronimo trail to the south and north, respectively.

- ***Pinaleño EMA (FMU1),*** Safford Ranger District: Located approximately two hours northeast of Tucson, the Pinaleño EMA is located a short distance from US Highways 70 and 191, and is accessed by State Highways 266 and 366. The nearest communities are Safford and Thatcher the northeast. The Pinaleño Ecosystem Management Area encompasses a massive mountain range of 198,879 acres. Rising from surrounding semi-desert grassland to the Forest's only representative spruce-fir vegetation community, elevations range from 3,937 feet (southwest corner of the EMA) to 10,720 feet at the summit of Mt. Graham Peak. This EMA contains the Mt. Graham Wilderness Study area and Goudy RNA.

- ***Santa Catalina EMA (FMU1/FMU2),*** Santa Catalina Ranger District: The 265,142 acre Santa Catalina Ecosystem Management Area wraps around the northern and eastern sides of the Tucson basin, dominating the viewshed from most parts of the city of Tucson. The community of Oracle lies to the north. Elevations range from 2,200 feet at the valley edges to 9,200 feet on Mount Lemmon. The EMA is comprised of two mountain ranges, the Rincon Mountains and Santa Catalina Mountains. There are two designated Wilderness Areas in the EMA, the 56,933 acre Pusch Ridge Wilderness in the Santa Catalina Mountains, and the 38,590 acre Rincon Wilderness in the Rincon Mountains (Class 1 Airshed). The boundary of the Rincon Wilderness is shared with Saguaro National Park. The steep, south face of the mountain is almost a sub-range of mountains. The east-west leg of the EMA that outlines the Santa Catalina Mountains is termed the front-range, and includes Pusch Ridge, Finger Rock, Cathedral Peak, and other peaks lying along the eastward extension of Pusch Ridge. The front-range is dissected from the main part of the mountain mass by Sabino Basin and Romero Pass. The northwest and northeast borders of the EMA include Samaniego and Oracle Ridges, which form the apex of the triangular-shaped Santa Catalina Mountain range. Many of the steep, rocky canyons contain intermittent streams, which drain into the San Pedro and Santa Cruz Rivers.

  FMU2 extends from Catalina State Park on the northwest side of the EMA, along the front-range, to the northern edge of the Saguaro National Park boundary. A second portion of FMU2 is located south of the Park boundary near Posta Quemada Canyon on the southern portion of the EMA.

- ***Santa Rita EMA (FMU1/FMU2),*** Nogales Ranger District: Located about 30 miles south of Tucson and approximately 15 miles northeast of Nogales, Arizona. Elevation ranges from 3,200 feet to over 9,400 feet. The 148,421-acre Santa Rita EMA is visible from metropolitan Tucson. At the core of the Santa Rita Mountains is the 25,260-acre Mount Wrightson Wilderness, making up 17 percent of the EMA. Mt. Wrightson, which rises abruptly over 7,000 feet above the valley floor to an elevation of 9,462 feet, is the highest point in Pima and Santa Cruz Counties and is located surrounded on all sides by semi-arid hills of desert shrub and sloping plains grasslands. Its distinctive pyramid-shaped profile towers above the surrounding savannas and deserts, visible from much of southeastern Arizona, and creating a striking backdrop for people traveling along Interstate 10 and Highways 82 and 83.

  FMU2 is located in the northwest portion of the EMA. Sycamore Spring and Sycamore Canyon are topographic landmarks in this FMU.

- ***Santa Teresa EMA (FMU1),*** Safford ranger District: The 49,852-acre Santa Teresa Ecosystem Management Area makes up the Forest's most northerly land mass, located just beyond and between the Galiuro and Pinaleño mountains. Elevations rise from less than 4,000 feet in the canyon bottoms to nearly 7,500 feet at the summit of Cottonwood Peak. The EMA's Santa Teresa range is a network of rugged mountains with bald summits, deep canyons, and sprawling mesas. Extremely rugged Holdout Canyon typifies the Santa Teresa Mountains: abundant caves and alcoves hollow into eroded cliffs with picturesque formations. The 26,780 acre Santa Teresa Wilderness encompasses more than half of the EMA. Bordering the EMA to the north is the San Carlos Apache Reservation, also part of the Santa Teresa range.

- ***Tumacacori EMA (FMU1/FMU2),*** Nogales ranger District: The Tumacacori Ecosystem Management Area is the Forest's most southwesterly land mass, encompassing 203,800 acres. The Tumacacori EMA is located approximately 45 minutes south of Tucson. Bounded by the Santa Cruz River on the east and the Altar Valley on the west, Tumacacori EMA also shares its southern boundary with the U.S.-Mexico international border. At 6,422 feet, Atascosa Peak forms the summit of the EMA, presiding over the rugged and rocky Atascosa Mountains and Tumacacori Highlands. Vast rolling landscapes of grasslands and oak woodlands cascade in all directions from these dominating features. The 7,420-acre Pajarita Wilderness lies in the southern portion of the EMA.

  FMU2 is located in the south-central portion of the Tumacacori EMA adjacent to the International Border.

- ***Whetstone EMA (FMU1),*** Sierra Vista ranger District: Located approximately 45 minutes east of Tucson, the Whetstone Ecosystem Management Area is comprised of 44,987 acres of land in the Whetstone Mountain Range. Elevations range from 4,757 feet (east side of the EMA) to approximately 7,710 feet at the summit of Apache Peak.

- ***Winchester EMA (FMU1),*** Safford Ranger District: Located approximately 1-1/2 hours east of Tucson and southeast of the Galiuros, the Winchester EMA is comprised of 19,272 acres of National Forest System land in the Winchester Mountain Range. In addition, the State of Arizona owns significant acreage within the proclaimed boundary of the Forest, totaling 28,068 acres. This mountain range is the smallest managed by the Coronado National Forest. Elevations range from 4,593 feet (northeast corner of the EMA) to 7,631 feet at the summit of Reiley Peak. The Winchester EMA is relatively remote and lacking in public access.

3.2.3.3. Biological

- ***Chiricahua EMA (FMU1):*** Host to a wide variety of flora and fauna, Chiricahua EMA offers many opportunities for biological appreciation. The area surrounding Barfoot Park is world-renowned for uncommon bird and reptile species, including the largest known population of twin-spotted rattlesnakes (*Crotalus pricei*). Spectacular rock formations are visible from many vantage points throughout the EMA. Vegetation includes Sierra Madrean and Rocky Mountain species, including Arizona cypress, Arizona sycamore, Chihuahua pine, Apache pine, ponderosa pine, Douglas-fir, and Engelmann spruce. The Pole Bridge Canyon Research Natural Area (RNA) was established in 1931 to feature distinctive tree populations of the Mexican pine-oak ecosystem, particularly Apache pine, southwestern white pine, border piñon, and Arizona pine. Recommended for designation in the 1986 Forest Plan, the 762-acre Proposed South Fork of Cave Creek Zoological and Botanical Area (ZBA) shares two borders with the Chiricahua Wilderness within the northeastern portion of the EMA.
- ***Dragoon EMA (FMU1):*** Not unlike the other mountain ranges on the Coronado, the Dragoon EMA offers a rich variety and incredible diversity of vegetation, climatic and geologic zones. Vegetation communities range from desert grasslands in the lower elevations to coniferous woodland on the higher peaks. The diverse Sky Island vegetation communities of the Dragoons are home to fifteen species of threatened, endangered, and officially “special concern” animals and plants. These include animals such as the Peregrine falcon, Chiricahua leopard frog, and various endemic cacti. Jaguars have reportedly been seen in the Dragoon Mountains as recently as 1986.
- ***Galiuro EMA (FMU1/FMU2):*** The vegetation varies from semi-desert grassland to mixed conifer. Most of the north and east facing slopes grow dense stands of manzanita, live oak, and mahogany; on the south and west slopes are grasses and brush. The slopes at the higher elevation and ridge tops have moderate to dense stands of juniper, pinyon, and oak trees, while along the canyon bottoms and north slopes of the higher elevations are found Arizona cypress, ponderosa pine, Chihuahua pine, Mexican white pine, Douglas-fir, and occasional White fir. Deciduous trees such as sycamore, alder, maple, ash, and walnut grow in the riparian areas.

FMU2 contains dispersed occurrences of southwestern desert scrub, particularly Saguaro. This portion of FMU2 is nearing the outer limits (both geographic and elevational) of this vegetation type on the Coronado.

- ***Huachuca EMA (FMU1):*** The Huachuca EMA supports much of the same biological diversity found across the Sky Island region. Over 65% of the vegetation is comprised of the oak woodland type. Large expanses of grasslands occupy this area as well. The upper elevations consist of ponderosa pine and mixed conifer species. Perennial streams provide habitat for a variety of native fish species. The Huachuca EMA harbors nine listed Threatened or Endangered species including the colorful Sonoran tiger salamander, and Huachuca water umbel.

- ***Peloncillo EMA (FMU1):*** The relatively narrow range of elevation supports a surprising diversity of wildlife, most notable for reptile and amphibian species. Although mostly xeric, Cloverdale Cienega is one of the Peloncillo's rare aquatic features. The proposed Guadalupe Canyon Zoological Area was recommended for designation in the 1986 Forest Plan to protect 3,478 acres of habitat for unique wildlife associations. It would complement the Bureau of Land Management's Outstanding Natural Area in lower Guadalupe Canyon, recognized for its exceptional birding habitat. The Proposed Guadalupe Canyon Zoological Area forms part of the Peloncillo EMAs southern boundary and is entirely contained within the Bunk Robinson WSA.

- ***Pinaleño EMA (FMU1):*** Vegetation ranges from desert grassland at the lower elevations to spruce-fir and aspen forests. A portion of the EMA's mixed conifer forests within Goudy Canyon were designated a Research Natural Area in 1972 to provide opportunities to study Mexican white pine and Douglas fir in near optimal stand conditions. Pure stands of Mexican white pine are rare across the Forest, but well represented here.

- **Be extremely cautious about managing wildland fire in subalpine forests.** Subalpine forests (spruce/fir communities) occur at high elevations where mesic conditions are the norm, so naturally occurring fires may be composed of small areas of low intensity, but extensive stand-replacing events are also natural occurrences following naturally occurring events every 100-300 years; hence this is a fire-adapted biotic community that is very different from lower elevations of the Sky Islands. These high elevations have a large contingent of endemic flora and fauna that have evolved in this breadth of conditions, but short- and long-term effects should be carefully considered before determining the response to wildland fire. Thus, multiple management options are allowable—with this cautionary caveat being considered (CNF Implementation Guide for the Proposed Amendment of the LRMP Regarding Wildland Fire Use, Wildlife Specialist Report, June 2005; p. 8).

  On the eastern slope of the Pinaleño Mountains, 1,220 acres of the Wet Canyon talus snail's optimal habitat and the watershed that surrounds it, is protected with this special area, recognized in a 1998 Forest Plan amendment. As the name implies, this land snail is restricted to talus slopes

in canyon bottoms, and is barely more than a half an inch in diameter. It is endemic to the Pinaleño Mountains, and perhaps even to the Wet Canyon watershed. Five other talus snails are also endemic to the Pinaleño Mountains; they share common habitat requirements and are therefore mutually benefited by the existence of the Wet Canyon Talus snail Area.

Originally believed to be extinct in the 1950's, then rediscovered in the 1970's, the endangered Mount Graham red squirrel is a distinct subspecies of red squirrel found only in the Pinaleño Mountains. Most of the Refugium, which was established in a 1989 Forest plan amendment, was designated critical habitat by the U.S. Fish and Wildlife Service in 1990. It covers the very top of Mount Graham, protecting much of the red squirrel's spruce-fir habitat and some of its more recently recognized mixed conifer habitat.

- ***Santa Catalina EMA (FMU1/FMU2):*** Vegetation varies from southwestern desert scrub (FMU2) and desert grassland at the lower elevations to chaparral, then to coniferous woodland at higher elevations.

  Alder Canyon, on the east slope of the Santa Catalina Mountains, is notable for its large deposits of limestone and dolomite, which are uncommon within the range at these concentrations. An interrupted perennial stream flows from multiple springs and seasonal snowmelt making Alder Canyon particularly lush; it is probably second only to Sabino Canyon in terms of biological diversity. Lowland leopard frogs, canyon tree frogs, coatimundi, and riparian vegetation are abundant.

  One-thousand acres of land at the head of Alder Canyon on the eastern slope of the Santa Catalina Mountains were set aside in 1935 as Butterfly Peak RNA. The area was noted to contain one of the largest varieties of trees and shrubs in any one place in the Southwest, including at least seven coniferous species, eleven broadleaf species, and a wide range of shrubs and herbs.

  The Santa Catalina Research Natural Area was designated in 1927 as the nation's first RNA. Vegetation is dominated by widely dispersed ponderosa pines.

  FMU2 contains the typical southwestern desert scrub species described in section 3.2.1, with an increasing population of invasives such as buffelgrass.

- ***Santa Rita EMA (FMU1/FMU2),*** The mountains are surrounded on all sides by semi-arid hills of desert shrub and sloping plains grasslands. Mount Wrightson's stream-fed canyons are the source of an exceptional abundance of animals and plant life. Ponderosa pine and Douglas-fir dominate the higher elevation. Rough hillsides, deep canyons, and lofty ridges and peaks are characteristic of this Wilderness. It is an extremely well known area for birdwatchers, specifically in Madera Canyon, which lies at the foot of the Wilderness, and is internationally renowned as a unique habitat for a variety of both common and rare birds.

The Santa Rita Mountains are renowned for the occurrence of a number of Mexican bird species whose range in the U.S. is quite limited. Madera Canyon harbors springs and perennial pools, providing outstanding habitat for over 250 species of birds along with rare amphibians. Between 1,000 to 1,500 varieties of plants can be found in the Canyon contributing to the great diversity of habitats and animal life. Temporal Gulch in the southern Santa Rita Mountains supports a native fish. The Santa Rita EMA provided habitat for a variety of animals including mountain lions, bears, and coatimundi.

FMU2 contains the typical southwestern desert scrub species described in section 3.2.1, with an increasing population of invasives such as buffelgrass.

- ***Santa Teresa EMA (FMU1):*** The upper reaches and north facing slopes of the highest mountains in the area are composed of patches of vegetation associated with Madrean pine oak woodlands, dominated by Ponderosa pine. Transitioning down these slopes at the southern end of the range, the woodlands are composed of southwestern pine, Arizona white oak, Emory-oak, and other species associated with Madrean pine-oak woodland. South of Limestone and Laurel Canyons, interior chaparral species such as Mexican manzanita, and sugar and single leaf sumac are found. At the lowest elevations vegetation shifts to scrub and desert grasslands. Chaparral vegetation dominates the Wilderness, with stands of ponderosa pine and Douglas-fir along the north flank and crest of Cottonwood Peak.

  Common species such as black bear, coati, javelina and mountain lion live here alongside sensitive species such as peregrine falcon, greater western bonneted bat.

- ***Tumacacori EMA (FMU1/FMU2):*** The majority of the Gooding Research Natural Area lies within the Wilderness and contains Sycamore Canyon. Water is a comparatively abundant feature of this EMA. Aliso Spring, on the northwest slope of the Tumacacori Mountains, provides rare habitat for lowland leopard frogs and other aquatic-obligates. Further south, canyons of the Pajarito Mountains open into Mexico, harboring riparian vegetation and a fantastic diversity of birds, mammals, and reptiles. Sycamore Canyon, provides a lush riparian habitat and an important corridor for wildlife migration north and south. The rolling hills of primarily oak woodlands, southwestern desert scrub, and the riparian areas support a tremendous diversity of plants, with over 600 species of plants identified.

  The Wild Chile Botanical Area is located within the Rock Corral Canyon sub-watershed. It was designated in 1999 to provide additional notoriety, protection, and research opportunities for the wild chile (Capsicum annuum var. aviculare) and other plants of economic importance or conservation concern.

  FMU2 contains the typical southwestern desert scrub species described in section 3.2.1, with an increasing population of invasives such as buffelgrass.

- ***Whetstone EMA (FMU1):*** Vegetation in the Whetstone Mountains climbs from semi desert grassland-mixed scrub and Chihuahuan desert scrub to Madrean encinal, Madrean pine-oak woodland, and tops out at a small patch of ponderosa pine at the highest elevations around Apache Peak and French Joe Peak.

  French Joe Canyon is host to an intermittent stream lined with oak, ash, cottonwood and Arizona walnut. Located on the east side of the mountain range, it is the most significant riparian habitat in the management area. The canyon supports a great diversity of birds. The riparian habitats of the range support common species such as mountain lion and black bears, along with sensitive species such as Arizona ridge-nosed Rattlesnake and Mexican Spotted Owls. Limestone outcroppings support rare plants and animals that specialize in that habitat. Large populations of whitetail deer can be found near the south end of the range.

- ***Winchester EMA (FMU1):*** Madrean oak-pine woodland dominates the mid elevations of the Winchester Ecosystem Management Area covering nearly 60% of the land. Higher elevations along the northern slopes of Reiley Peak, Muskhog Mountain and Javelina Peak are covered with Madrean montane coniferous forest characterized by a mix of Apache, Arizona, white and ponderosa pines. The lower reaches of the area along Mud Springs Canyon and Bald Ridge consist of semidesert grasslands and mixed scrub. Reiley Canyon, running through the heart of the area, is lined with patches of common riparian species such as sycamores, cottonwood, and willows. Much of the low elevations in the Winchester range are covered with semi-desert grasslands. The southern tip of the Ecosystem Management Area is primarily semi-desert grassland that is dominated by native species and has a very low density of shrub encroachment. Lands along the western boundary of the Management Area are mostly covered with grasslands dominated by native species with a moderate amount of shrub encroachment.

3.2.3.4. Resources

- ***Chiricahua EMA (FMU1),*** Several rugged four-wheel drive roads cross Chiricahua EMA at the northern and southern extents. A single two-wheel drive accessible road crosses the range from east to west over Onion Saddle. Numerous developed sites have camping and picnicking facilities and are all accessible with a two-wheel drive vehicle. Dispersed areas are also available throughout the Chiricahua EMA for recreation use. In particular, the ridges and drainages surrounding Cochise Head - the single largest rock outcrop on the Coronado National Forest - remain rugged and remote with access limited primarily to on- and off-trail travel.

  The Chiricahua Mountains, along with all the lands in the southeastern corner of Arizona, were once part of the Chiricahua Apache Reservation, and the mountains continue to be a special place for the descendants of the Chiricahua Apaches. Ancestors of members of the White Mountain and San Carlos Apache Tribes frequented the mountain ranges of the Douglas Ranger District and Apache Scout camps were located in the Chiricahua Mountains in the nineteenth century.

- ***Dragoon EMA (FMU1),*** The rugged and rocky Dragoon Mountains rise from the surrounding desert grasslands to elevations over 7,500 ft. and offer a diversity of recreation opportunities. Developed recreation areas in Cochise Stronghold provide camping and picnicking facilities. There are also many dispersed recreation areas and opportunities for backcountry hiking throughout the Dragoons.

  The granite domes and rock formations invite modern-day rock climbers, photographers, wildlife-viewers, and hikers from around the country to recreate in the scenic landscape. East Stronghold Canyon offers developed recreation opportunities while West Stronghold Canyon features a more dispersed recreational experience. Access throughout much of the EMA is via unpaved roads.

  The Dragoon Mountains have long been recognized as a special place for the descendants of the Chiricahua Apaches (including Mescalero, San Carlos, and Chiricahua-Warm Springs-Fort Sill Apache Tribes).

- ***Galiuro EMA (FMU1/FMU2):*** Access is mainly via gravel and dirt roads, most lying on the east side of the mountain, with travel generally restricted to foot and horseback in the interior of the range. There are no developed recreation areas in Galiuro EMA, but dispersed areas throughout the mountains offer a wealth of opportunities for backcountry hiking, camping, and solitude.

  This EMA was historically within the territory of the Western Apaches. The Hopi Tribe and Zuni Pueblo have ancestral sites in the San Pedro Valley, to the west, and likely used the Galiuro Mountains in centuries past. At Power's Cabin, deep within the mountain range, one of the most famous of old west shoot-outs took place in 1918.

- ***Huachuca EMA (FMU1):*** Ancestors of the Chiricahua Apache, the Western Apache, and the O'odham once used the entire EMA and continue to visit areas near Fort Huachuca for acorn collection.
  Numerous access roads penetrate Huachuca EMA, connecting to a network of unpaved roads within. Montezuma Pass to Sonoita, via Parker Canyon Lake, is a favorite scenic drive navigable to two-wheel drive vehicles despite being dirt in most sections. Visitors concentrate along Carr Canyon, within campgrounds and picnic areas surrounding Parker Canyon Lake, and at eastside access points near the thriving community of Sierra Vista. Highway 82 closely borders the west side of the EMA, providing additional access for visitors to the Patagonia Mountains.

- ***Peloncillo EMA (FMU1):*** Access is limited to primitive roads, primarily Geronimo Trail (NFSR 63), and there are no developed recreation sites. Large unroaded areas are valued for their solitude and unconfined recreation opportunities. The EMA's 87,985 acres straddle the Arizona-New Mexico border, with 81 percent arranged in New Mexico.

- ***Pinaleño EMA (FMU1):*** Residents of the Gila Valley consider Mount Graham a special place - part of a tradition of retreating to the mountain for relief from summer heat. The entire range, has been formally recognized as a Traditional Cultural Property important to the Western Apache groups, including White Mountain, San Carlos, and Yavapai Apache, and as a place of outstanding significance in Western Apache religion, culture, and history. The mountain continues to play a vital role in Western Apache life ways and tribal well-being. *The Pinaleños* serve as a source of natural resources and traditional medicine for ceremonial uses, and is used as a place of prayer and a source of power to Western Apache people. The Hopi Tribe, the Pueblo of Zuni, and the Four Southern Tribes of Arizona also have sacred sites and shrines within the Pinaleño Mountains. The entire EMA has been determined eligible for listing on the National Register of Historic Places.
  Primary access into the mountains is via State Highways 366 and 266 (over Stockton Pass). Non-motorized trails penetrate the range for travel by foot and horseback.
  Visitor facilities include developed campgrounds and picnic areas, and a visitor center staffed by volunteers. There are also many popular locations for dispersed recreation. Large unroaded areas, including the Mount Graham Wilderness Study Area, offer opportunities for backcountry hiking and solitude. University of Arizona's Mount Graham International Observatory (MGIO), has become an important astrophysical research facility and contributes to the rich multiple-use history of the range.

  The WUI consists of Turkey Flat cabins, Columbine, private ranch parcels, municipal watersheds, transportation and utilities corridors and communication and fire lookout facilities located on Heliograph, Webb Peak, West Peak, and Lady Bug Saddle. Current residential development includes approximately 88 constructed cabins, several of which are accompanied by detached accessory buildings (sheds, etc.). In addition, Columbine Work Center includes nine administrative structures, the Columbine Bible Camp contains five structures.

Heliograph Peak consists of communication towers and other structures under special use permit through the CNF. This site is a major communication site for Southeast Arizona and the Southwestern United States. The loss of this site would disrupt communications across the Southwest.

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- ***Santa Catalina EMA (FMU1/FMU2):*** This EMA receives more visitors than any other part of the Coronado National Forest. Mount Lemmon's Ski Valley is the southernmost ski area in the continental U.S. Trails wander the many canyons, ridges, valleys, and forests of the Santa Catalina EMA, many stemming from the Arizona Trail as it traverses both mountain ranges. The primary access route into the Santa Catalina Mountains is the Catalina Highway. Dispersed and developed recreation sites are abundant. Large archaeological sites in the foothills and small shrines atop peaks are important to the Zuni and the Hopi.

  The WUI consist of Summerhaven, Oracle, Catalina,Tucson, Willow Canyon, Organization Ridge (church and scout camps), and University of Arizona Steward Observatories. Mount Lemmon and Mount Bigelow are occupied by communication towers that are essential to communication throughout the Southwest.

- ***Santa Rita EMA (FMU1/FMU2):*** This EMA is extremely well known area for birdwatchers, specifically in Madera Canyon, which lies at the foot of the Wilderness, and is internationally renowned as a unique habitat for a variety of both common and rare birds.

  Madera Canyon also offers developed recreation and is considered a WUI area due to the infrastructure within the canyon. The east side of the EMA offers opportunities for off-highway vehicle use and dispersed recreation, not limited to camping, hunting, and foot-trail-based pursuits. An unmistakable feature known as Elephant Head, at the EMAs northwest extent, attracts backcountry rock climbers. The Arizona Trail traverses the range from south to north.

  A partnership between the Forest Service and the University of Arizona resulted in construction of the Florida Station, which serves as headquarters for the Santa Rita Experimental Range, just beyond the northern boundary of the EMA. Another joint venture, between the University of Arizona and the Smithsonian Institution, has placed a telescope and observatory at the top of the EMA's second highest peak, Mount Hopkins.

- ***Santa Teresa EMA (FMU1):*** Bordering the EMA to the north is the San Carlos Apache Reservation, also part of the Santa Teresa range. These mountains also lie within the aboriginal territories of the Western Apaches and the Four Southern Tribes, and may have been part of the migration routes used by ancestral pueblo groups. As one of the least developed EMAs within the Coronado NF, access into Santa Teresa EMA is via gravel and dirt roads, or by hiking trails. There are no developed recreation areas, although opportunities for backcountry hiking, camping, and picnicking are abundant.

- ***Tumacacori EMA (FMU1/FMU2):*** The Tumacacori EMA generally remains wild in character, with developed recreation centered around Pena Blanca and Arivaca Lakes, and dispersed recreation abundant throughout its interior. An historical lookout sits atop Atascosa Peak. Unpaved roads provide access throughout the EMA. Native American cultural sites are abundant across the Tumacacori Highlands.

- ***Whetstone EMA (FMU1):*** Apache Peak is the range's focal point – appropriately named for the Western Apaches that considered these mountains part of their territory. Historically, the Whetstone Mountains were also within the territory of the Chiricahua Apache, and archaeological sites indicate long use by Hohokam, ancestral O'odham. Today, access is via primitive roads and trails, as this is one of the least developed EMAs on the Forest. Trails originating in Karchner Caverns State Park at the northern border of the EMA are popular. Developed recreation sites are absent, but opportunities for dispersed recreation abound.

- ***Winchester EMA (FMU1):*** Part of the Apache territory when Euroamericans entered the region, this range was evidently visited by Native American groups for thousands of years. Winchester EMA offers opportunities for primitive-end recreation and solitude. Access is via primitive roads, with much of the EMA accessible only by hiking cross-country. There are no developed recreation areas in the EMA, and there are good opportunities for backcountry hiking, camping, and solitude.

3.2.4. FMU Fire Environment

3.2.4.1. Fire Behavior

- **Fuels conditions likely to influence fire behavior (FMU1):** Past management practices have destabilized many fire-adapted ecosystems, including much of the land managed by the Coronado National Forest, though in some areas less than others because of past practice using confinement as a strategy, which reduced fuel accumulations. A lack of natural fire influence over the past century has changed the character of vegetative communities within the Forest, causing an unnatural accumulation of fuel and leaving many areas at risk of catastrophic fire. As a result, wildland fires are now larger and more severe than historical fires.

  The loss of a natural fire interval has contributed to a decline of structural and vegetative diversity in forested areas. The absence of periodic fires has contributed to an increase of woody species and a decrease in native grasses.

- **Fuels conditions likely to influence fire behavior (FMU2):** Historically, patchy fuels and sparse vegetation have limited fires to small areas in the Sonoran Desert vegetation. In the last decade, buffelgrass has rapidly spread across southern Arizona and threatens the Sonoran Desert ecosystem, and its plants and wildlife. Buffelgrass is the greatest non-native species threat the Forest has ever faced because it competes with native plants for resources, creates dense stands which inhibits native plant growth, and promotes fire in a community dominated by plants and animals (like saguaros and desert tortoises) that are not adapted to fire. Buffelgrass increases the fuel load and provides a continuous fuel source thereby increasing the frequency and intensity of fire. Some of the other troublesome weeds in terms of increasing fire hazard include red brome, and fountain grass.

Fire regime alterations: Many years of intensive fire control has resulted in significant changes in vegetative composition of the Coronado. In some cases, this shift has been towards a less desirable plant community with attendant increase in fire hazard, decrease in forage production, and declining wildlife habitat (LRMP, p.5). These changes are evident in the amount of fuels that have built up over time, the change in the frequency of natural fires (fire regimes), and the intensity of wildland fires. Exotic grass invasions in desert regions (FMU2) can change the fire regime by providing fuel for fire where fire was once rare.

*Fire Regime Condition Classes (FRCC) are a way of categorizing the degree to which key ecosystem components such as species composition, structural stage, and stocking level have changed in an area due to changing fire regimes. There are three condition classes:

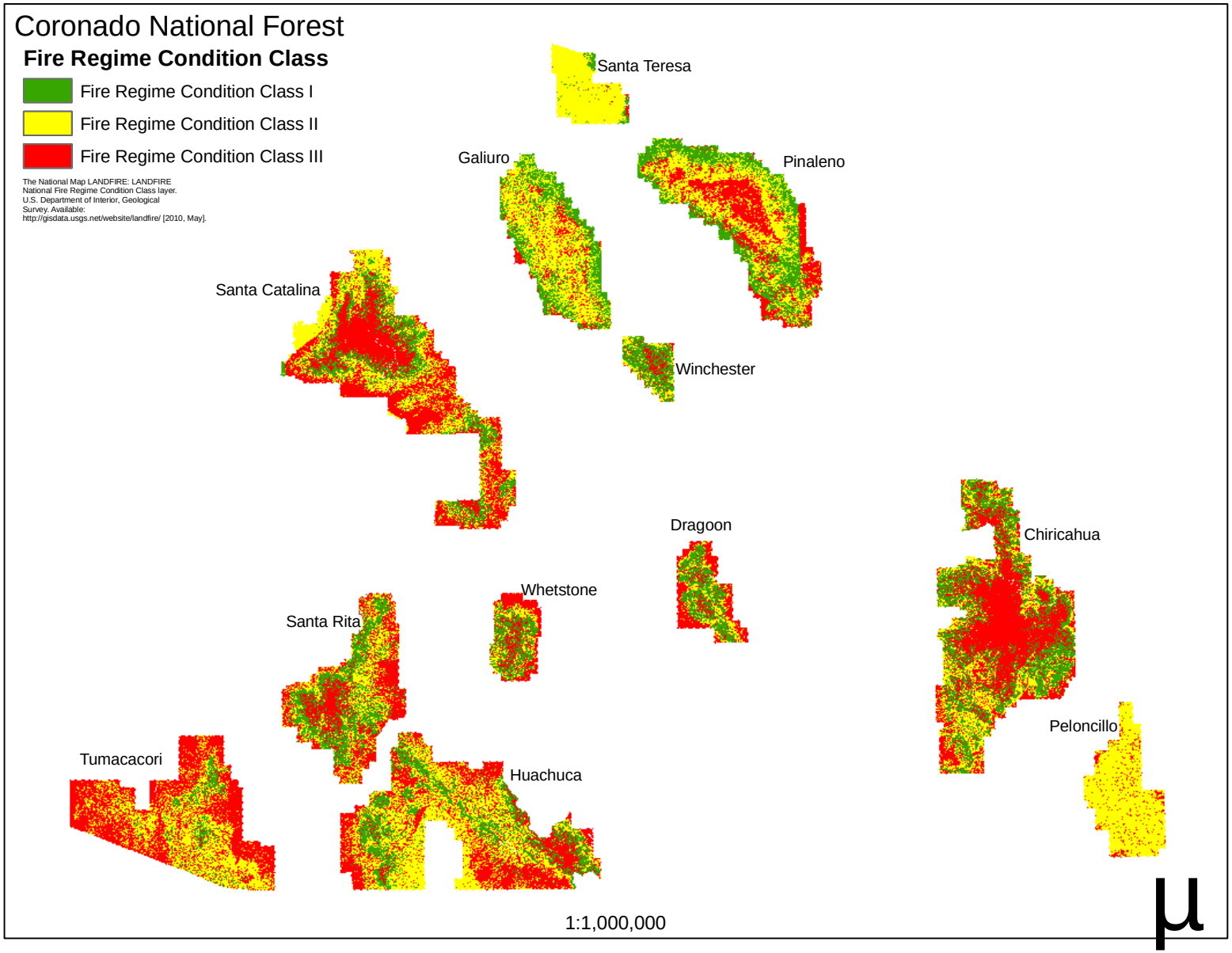
Condition Class 1: Fire regimes are within an historical range and the risk of losing key ecosystem components is low. Vegetation attributes (species composition and structure) are intact and functioning within their historical range.

Condition Class 2: Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from historical frequencies by one or more return intervals (either increased or decreased), resulting 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 historic range.

Condition Class 3: 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 leads to dramatic changes to one or more of the following: fire size, intensity, severity, and landscape patterns. Vegetation attributes have been significantly altered from their historical range. *** FRCC concepts and definitions are published in Hardy and others (2001), Hann and Bunnell (2001), and Schmidt et al. (2002).**

Figure 3. displays the condition classes for each EMA. Assessing FRCC may help in gaining a landscape perspective of fuels conditions, evaluate risk to ecosystem sustainability, and develop strategies to improve condition class (i.e. managing natural unplanned ignitions). This information may also aid in completing a Relative Risk assessment in WFDSS. **An effort is being made to update the FRCC layer to reflect treatments and recent disturbances.**

Figure 3. Coronado Fire Regime Condition Class (LANDFIRE National Data)



- **Control problems and dominant topographic features:** Topographic features were discussed in the descriptions for each EMA. Other potential control problems/concerns include:
    - Areas of heavy accumulations of fuel and vegetation
    - Steep slopes
    - Weather anomalies, e.g., micro bursts
    - Drought conditions
    - Wildland Urban Interface
    - Threatened, Endangered, or Proposed Species and Critical Habitat
    - Forest Service Sensitive Species
    - Coronado NF Management Indicator Species
    - Other Wildlife, Fish, and Rare Plant Species
    - Electronic Sites
    - Kartchner Caverns (Whetstones)
    - Interagency Coordination
    - Observatories
    - Ski Valley
    - Developed Recreation Sites
    - Riggs Lake
    - Parker Canyon Lake
    - Rose Canyon Lake
    - Peña Blanca lake
    - Cima Cabin in Chiricahua Wilderness
    - Radar Base
    - Lookouts
    - Fire Sensitive Heritage Resources
    - Sabino Canyon
    - Madera Canyon
    - Cave Creek
    - Stronghold
    - Scenic Byway
    - Illegal Land Use
    - Cultural Resources
    - Visual Quality
    - Illegal Border Crossing, UDA and Drug Smuggling

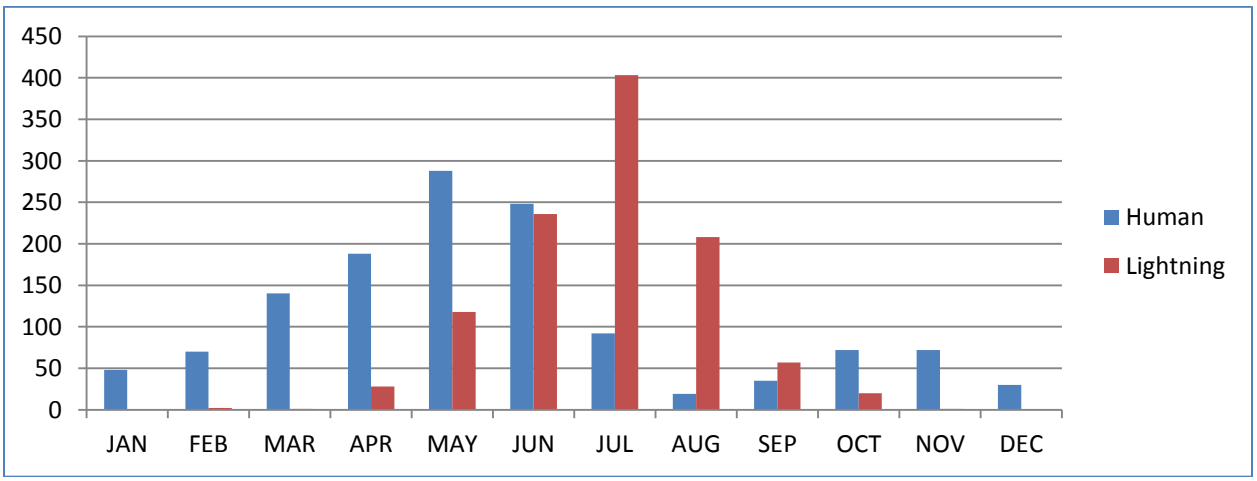
Historic fire occurrence: Fire occurrence for the Forest over the past 20 years resulted in 2,376 fires reported on National Forest lands and lands protected by the Forest totaling 862,227 acres burned. During this time, there were 1,302 human-caused fires for 615,902 acres and 1,074 lightning-caused fires for 246,325 acres burned. Forty- five percent of all fires were lightning-caused whereas 55 percent of all fires were human-caused and burned 369,577 more acres than lightning caused. (The 2011 fire season contributed approximately 340,000 acres to the totals mentioned).

Fire Occurrence, Cause and Percentage by EMA (1991-2011)

EMA	Cause	Count	%
Chiricahua	Human	35	14
	Lightning	209	86
Dragoon	Human	14	44
	Lightning	18	56
Galiuro	Human	6	21
	Lightning	23	79
Huachuca	Human	500	80
	Lightning	127	20
Peloncillo	Human	11	42
	Lightning	15	58
Pinaleño	Human	77	24
	Lightning	245	76

EMA	Cause	Count	%
Santa Rita	Human	101	71
	Lightning	42	29
Santa Teresa	Human	0	0
	Lightning	12	100
Tumacacori	Human	152	82
	Lightning	33	18
Whetstone	Human	4	19
	Lightning	17	81
Winchester	Human	1	9
	Lightning	10	91
Santa Catalina	Human	401	55
	Lightning	323	45

Fire Occurrence by Month 1991-2011



3.2.4.2. Weather

- **Weather Patterns Influencing Fire Behavior Forest-wide:**

  - Strong west/southwest winds and low humidity are prevalent from late March to early July, resulting mainly in wind-driven fire behavior. affect
  - Hot, dry, and unstable conditions usually occur from late May to early July, leading to the potential for plume dominated fire behavior.
  - Dry lightning is most prevalent from June to early July.
  - The monsoon, accompanied by higher humidity and rainfall potential, less wind and subdued fire behavior, begins during the 1st or 2nd week in July and ends in the 2nd or 3rd week in September.
  - Dry and mild conditions occur again in the first half of October, leading to a period of increased fire behavior potential before the onset of winter conditions.
  - Drought and long term drought increases the potential for extreme fire behavior by causing abnormally low moisture levels in both dead and live fuels. Live fuels and larger dead fuels can play an unusually significant role in the fire behavior environment, and heavy fuels can contribute significantly to fire intensity and dramatically limit suppression options.
  - "Hard freeze" during the winter months causing frost damage, may result in increased fire behavior (March, 2011). Live fuel moistures in the affected vegetation are dramatically decreased as a result of the frost damage.

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