

US EPA ARCHIVE DOCUMENT

**APPENDIX N:  
FORT HUACHUCA INTEGRATED WILDLAND FIRE  
MANAGEMENT PLAN**



# Fort Huachuca Integrated Wildland Fire Management Plan

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## Integrated Wildland Fire Management Plan

### U.S. Army Intelligence Center and Fort Huachuca, Arizona

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## CHAPTER 1: INTRODUCTION

Fort Huachuca encompasses 73,142 acres west of the San Pedro River and City of Sierra Vista in Cochise County, Arizona (Figure 1-1). The reservation is about 75 miles southeast of Tucson and eight miles north of the international border with Mexico. Elevations on Fort Huachuca range from 3,940 ft above sea level near the San Pedro River to 8,625 ft at its western boundary in the Huachuca Mountains, and terrain varies from relatively flat bajada bottoms to steep mountains and canyons. It is well documented that fire is a natural disturbance in the Fort's grassland, shrubland, woodland, and forest plant communities (Abbott 1998, Danzer 1998, Kaib et al. 1996, Swetnam and Baisan 1996). This plan addresses management of fire in these vegetation types using strategies of suppression, prescribed fire, non-fire treatments (such as thinning), and wildland fire use. Wildland fire use is the current term for allowing natural ignitions to burn that meet predetermined prescriptions and that are predicted to accomplish resource management and fuels reduction goals.

This Integrated Wildland Fire Management Plan (IWFMP) is a third-generation effort for Fort Huachuca. Dan Robinett from the Natural Resources Conservation Service wrote a draft plan in 1993. The 1997 IWFMP began with the 1993 draft and added fuels management and ecological material from Rena Ann Abolt (The Nature Conservancy) and procedural direction from Rick Anderson (Saguaro National Park). The current (2005) plan builds on these previous efforts and introduces two new major themes: (1) discussion of fire activities relevant to the 2002 Biological Opinion that guides management of federally listed species on the installation and (2) coordination with the Huachuca Area Fire Partners (HAFP). The 2002 Army Wildland Fire Policy Guidance (Appendix A) has also guided the organization and contents of this plan. This plan provides Fort Huachuca natural resource specialists, the Fire Department, Range Control, and outside cooperators a comprehensive guide to help make decisions about management of fires to safeguard life and property, support training, and protect Fort Huachuca's natural resources.

This plan should be updated annually to keep resource lists up to date, incorporate advances in research and technology, and apply new policies. Together with the IWFMP of the Huachuca Area Fire Partners, it is designed to serve as guide for wildland fire operations and justification for fire program elements. It is a reference for Fort Huachuca's fire management personnel, including individuals from the fire department, range control, natural resources, U.S. Forest Service, and other cooperators.

### HISTORY

#### Installation Fire Program History

Fort Huachuca began yearly burns in the 1950s, burning according to a random schedule on the lower elevations of the installation. Fire personnel in the early days who conducted prescribed burns noticed that grasses tended to thin out with too much burning. Other fires were started by machine gun fire. In those early days, the surrounding community was small (population around 10,000). The public did complain, mostly about possible effects of fire on small mammals and birds.

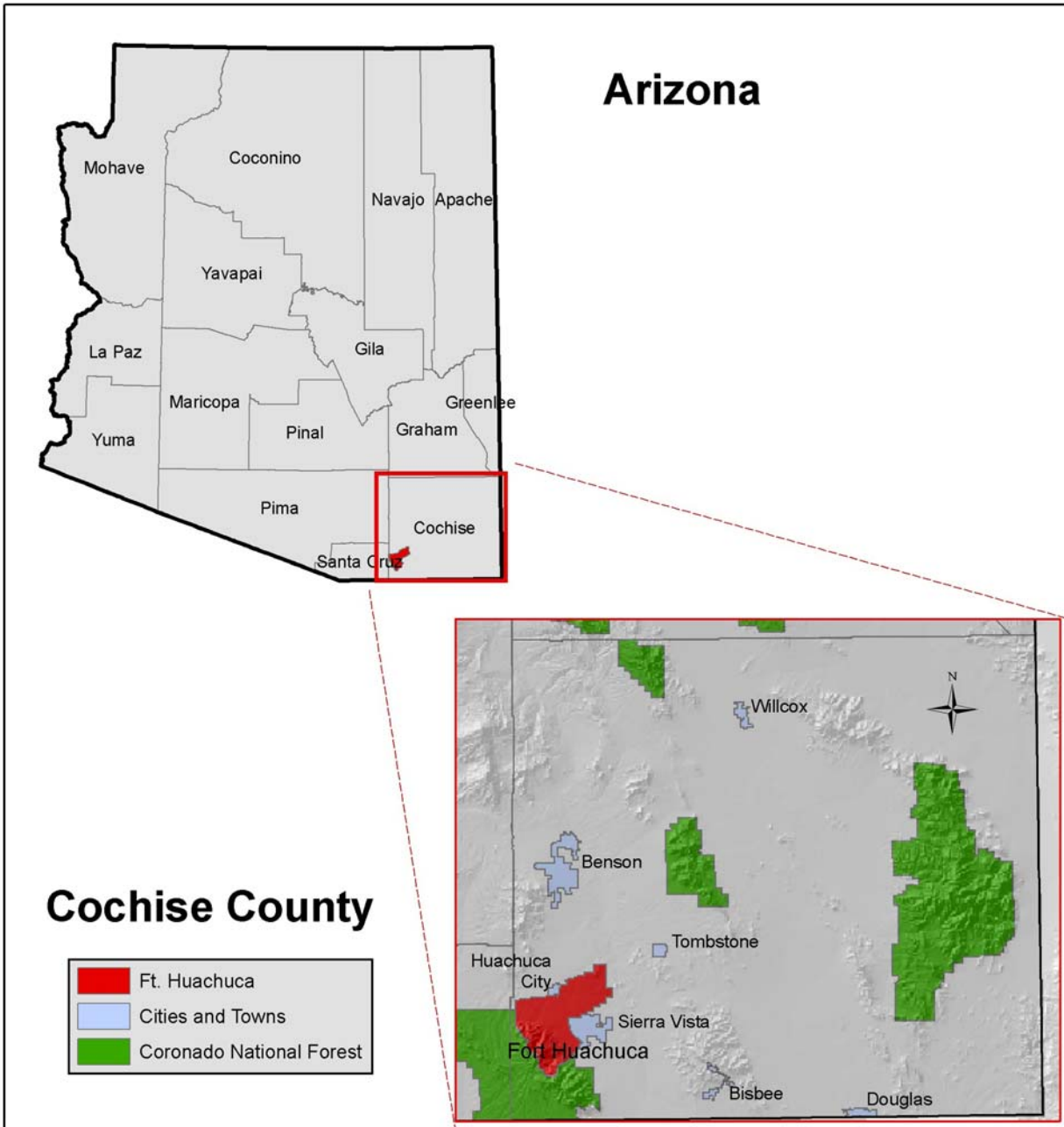


Figure 1-1. Location of Fort Huachuca

Fire occurrence information has been kept on Fort Huachuca since 1973 with a gap from 1975 to 1977. Areas burned were mapped each year with notes recording the date and burn intensity. The ITAM office under Range Control (see Chapter 3 for a description of Fort Huachuca's fire organization) is the keeper of fire-related GIS material. Figure 1-2 shows the timing and locations of fires on the installation since 1973. The 1988 listing (as federally endangered) of the lesser long-nosed bat increased the need for detailed planning and mapping of fire program activities.

### **Interagency cooperation and mutual aid agreements**

Fort Huachuca has maintained an interagency agreement with the USDA Forest Service (Appendix B) that covers all fire management activities. Mutual aid agreements with local fire departments provide sharing of resources for fire suppression activities (Appendix C).

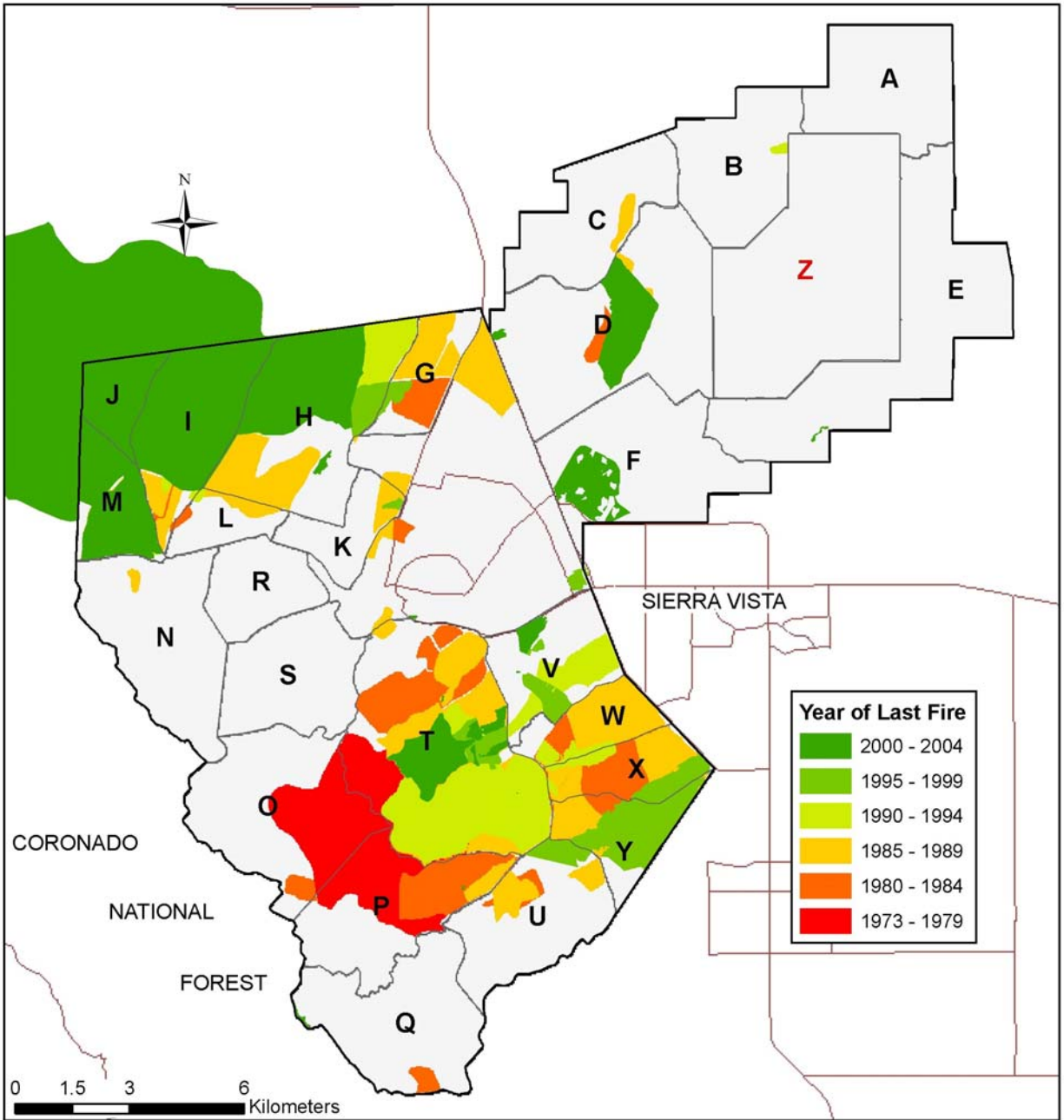
### **Huachuca Area Fire Partners (HAFP)**

This 2005 IWFMP contains direction specific to the installation but also adopts the regional fire plan of the Huachuca Area Fire Partners. The HAFP was formed to manage fire on a large scale according to natural (or defensible) rather than jurisdictional boundaries. The group first came together in 1996 then restarted work on the IWFMP in 2002. The installation's historical cooperators are all members of the HAFP. This regional plan provides background and operational details that are common to the public and private land managers who developed it. Chapter 3 explains relationships and roles in more detail.

### **COMPLIANCE WITH POLICY**

This IWFMP addresses and responds to the following laws, plans, policies, and standards adopted by the Army:

- Federal Wildland Fire Management Policy, 1 January 1995
- National Wildfire Coordinating Group (NWCG) Wildland and Prescribed Fire Qualification System Guide (PMS 310- 1/NFES 1414), January 2000
- National Fire Protection Association (NFPA) Standards:
  - Standard 295 *Standard for wildfire control*
  - Standard 299 *Protection of life and property from wildfire*
  - Standard 1051 *Wildland firefighter professional qualification standard*
- Department of Defense (DOD) Instruction 6055.6, 10 October 2000, DoD Fire and Emergency Services Program
- National Environmental Policy Act of 1969 (NEPA), as amended
- Fort Huachuca Programmatic Biological Opinion, Arizona Ecological Services Field Office, U.S. Fish and Wildlife Service, 23 August 2002
- U.S. Army Intelligence Center and Fort Huachuca, Integrated Natural Resources Management Plan and Environmental Assessment 2001-2005, Environmental and Natural Resources Division, Directorate of Installation Support, November 2001
- Clean Air Act (1990)
- Integrated Cultural Resources Management Plan for Fort Huachuca Military Reservation, Arizona, June 2003
- National Historic Preservation Act of 1966 (NHPA), as amended



Created By Joshua Swanson  
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Figure 1-2. Year of last fire for mapped fires at Fort Huachuca

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- Endangered Species Act of 1973
- 2002 Army Wildland Fire Policy Guidance (full text in Appendix A)

### **National Fire Management Policy**

The Review and Update of the 1995 Federal Wildland Fire Management Policy (USDA and USDI 2001) “finds and recommends that federal fire management activities and programs are to provide for firefighter and public safety, protect and enhance land management objectives and human welfare, integrate programs and disciplines, require interagency collaboration, emphasize the natural ecological role of fire, and contribute to ecosystem sustainability.”

### **Fort Huachuca/ DOD Mission**

This IWFMP is an addendum to the Integrated Natural Resources Management Plan (2001). The plan provides a system for documenting environmental impacts and developing methods to mitigate or eliminate adverse human impacts on natural resources. The primary goal of the resources management program for Fort Huachuca is to protect naturally evolved biotic communities and landscapes in order to support military training that takes place upon the land. The Sikes Act requires the Secretary of the Army to manage natural resources of each military reservation for sustained, multiple use. However, resource management must first accommodate the Fort’s military training and testing missions, including the use of live ammunition and tracers that start fires.

### **FORT HUACHUCA FIRE MANAGEMENT GOALS AND OBJECTIVES**

Protect life as the highest priority.

- Provide for the safety of army personnel, dependents, employees, visitors, and fire staff.
- Maintain a qualified and properly trained fire staff.
- Reduce fuels that threaten high-use areas.

Protect installation and personal property.

- Reduce fuels that threaten high-value areas.
- Coordinate structural and wildland fire operations.

Manage fire to support military training.

- Conduct fire operations to reduce potential for catastrophic fire that disrupt training regimes.
- Conduct suppression activities to minimize adverse effects on training areas.
- Conduct prescribed fire activities to minimize restrictions on live fire ranges.

Manage fire to benefit natural resources.

- Allow fire to be a dynamic ecosystem process.
- Use fire to improve and sustain habitat of federally listed and other sensitive species.
- Minimize adverse effects of fire and suppression activities on natural resources.

Manage fire to benefit historic properties.

- Minimize adverse effects of fire and suppression activities on archaeological sites, historic structures, ethnographic resources, and cultural landscapes.

- Use prescribed fire to reduce fuels around sensitive resources and maintain landscapes.
- Take advantage of surveying opportunities during and after fire operations.

Coordinate fire operations with other installation divisions and neighboring land owners.

- Bring together structural and wildland fire planning operations.
- Maintain communication and educate the neighbors about the fire program.
- Maintain formal agreements and conduct joint fire management activities with cooperators.
- Continue to actively participate in the HAFP.

## CHAPTER 2: ECOLOGICAL BACKGROUND

The goals and objectives for this plan direct Fort Huachuca to manage fire to benefit natural resources by (1) allowing fire to be a dynamic ecosystem process, (2) using fire to improve habitat of federally listed and other sensitive species, and (3) minimizing adverse effects of fire and suppression activities on natural resources. This chapter presents background information on vegetation types, fire ecology, fuels, soils, water, and wildlife that guides the design of the Fort Huachuca fire program. Most of the discussion of fire effects on soils, water, and wildlife was taken from the 1997 IWFMP.

### VEGETATION

Most types of vegetation present on Fort Huachuca and across the HAFP planning area are considered adapted to fire and require fire at varying intervals to retain the species composition and structure present before humans made significant changes. This plan promotes fire as a dynamic ecosystem process, but the condition of the landscape does not allow many natural fires to burn. In this section, ecological units and their current and desired conditions are described with reference to what is known about their fire history.

Classification of vegetation and determination of desired conditions are derived from the work of the HAFP. Laing et al. (in press) developed ecological mapping units in a GIS for the entire planning area (Figure 2-1 and Table 2-1). The units utilize USDA Forest Service General Ecosystem Survey and Natural Resources Conservation Service STATSGO (State Soil Geographic Database) mapping. They were refined using digital elevation model derived data, geology maps, existing vegetation mapping, and expert knowledge. These ecological units provide a context for designating fire regimes and condition classes, and their associated vegetative and hydrologic implications, in response to fire management.

In short, they are areas where distinctive fire behavior and effects are expected. Fort Huachuca has adopted these ecological mapping units for use in this plan; eight of the 13 units occur on the installation (Table 2-1). The HAFP IWFMP contains the comprehensive ecological unit descriptions.

Discussion of vegetation also includes an assessment of Fire Regime Condition Class (FRCC) that compares the state of landscape units with a likely historical range of conditions (Schmidt et al. 2002):

Condition Class I- Fire regimes are within a historical range, and the risk of losing key ecosystem components is low. Vegetation attributes (species composition and structure) are intact and functioning within a historical range. Fires burning in class I lands pose little risk to the ecosystem and positively affect biodiversity, soil productivity, and hydrologic processes. Typical management replicates the historical fire regime through periodic application of prescribed fire or through wildland fire use.

Condition Class II- Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from



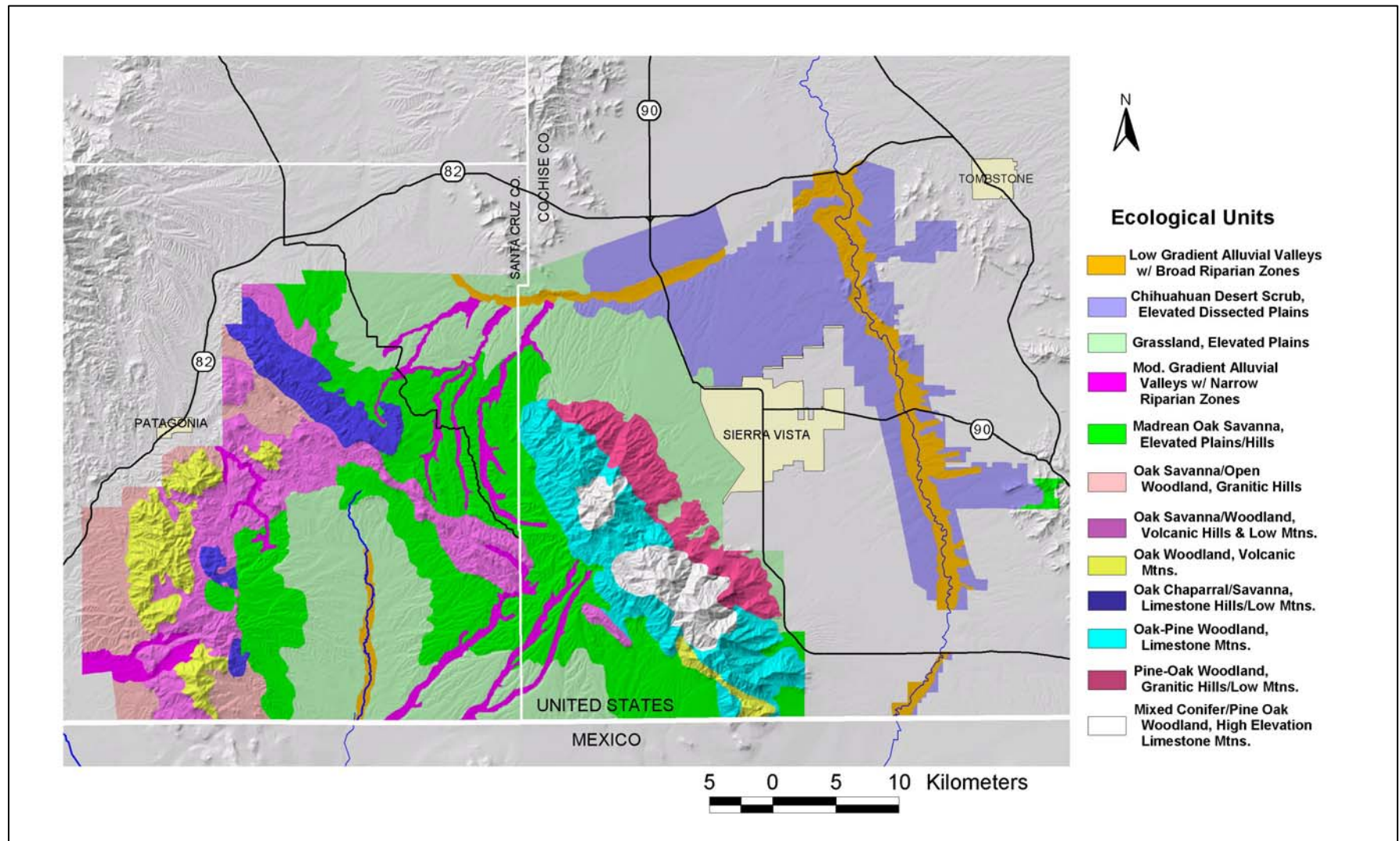


Figure 2-1. Ecological Mapping Units

**Table 2-1. HAFP Ecological Mapping Unit System**

#	Mapping Unit Description	Present at Fort H	Fuel Models	Summary of HAFP Desired Conditions
1	Low-gradient alluvial valleys with broad riparian zones	✓ NW (Babocomari) and E (San Pedro) boundaries		Vegetation dominated by herbaceous wetland species (cienegas) interspersed with reaches supporting gallery cottonwood-willow forest
2	Chihuahuan desert scrub and grassland mosaic on elevated/dissected plains	✓ East Range	2, 6	Desert scrub and grassland mosaic with increased grass/herbaceous cover, decreased exotic grass cover
3	Grassland on elevated plains	✓ NW to SE Huachuca bajada/foothills	1 or 3	Grasslands dominated by native species with shrub canopy cover < 5%
4	Moderate-gradient alluvial valleys with narrow riparian zones	✓ Lower Garden Cyn	6 and 8	Restore and maintain historic vegetation to improve watershed condition and function
5	Madrean oak savanna on elevated plains and hills	Not mapped on FH		Madrean oak savanna with a canopy cover of 5-12%, composed mostly of oaks, interspersed with areas of higher tree canopy cover in draws
6	Madrean oak savanna and open woodland on granitic hills	Not mapped on FH		Madrean oak savanna with a canopy cover of 5-12%, composed mostly of oaks, interspersed with areas of higher tree canopy cover in draws.
7	Madrean oak open woodland and savanna on volcanic hills and low mountains	Not mapped on FH		Madrean oak savanna with a canopy cover of 5-12%, composed mostly of oaks, interspersed with areas of higher tree canopy cover in draws.
8	Madrean oak open woodland on volcanic mountains	Not mapped on FH		Madrean oak open woodland dominated by oak species (12-30% canopy cover).
9	Madrean chaparral and oak savanna on limestone hills and low mountains	Not mapped on FH		Mosaic of chaparral patches with varying canopy cover, reflecting different post-fire successional stages. Some oak savanna (5-12% canopy cover).
10	Madrean oak-pine woodland on granitic hills and low mountains	✓ East slope Huachucas	1 and 6	Madrean pine-oak woodland (canopy cover 12-40%) with grass/herbaceous understory; overstory composed primarily of fire tolerant species including resprouting species
11	Madrean pine-oak woodland on limestone mountains	✓ East slope Huachucas	8 -10	Madrean oak-pine woodland (canopy cover 12-40%) with grass/herbaceous understory; overstory composed primarily of fire tolerant species including resprouting species
12	Mixed conifer and Madrean pine-oak woodland on high elevation limestone mountains	✓ Highest elevations	10 and 11	Mixed conifer and Madrean pine- oak woodlands (canopy cover 12-40%) with grass/herbaceous understory; overstory composed primarily of fire tolerant species including resprouting species
CR	Canyon riparian: mixed broadleaf riparian forests in steep, narrow canyons	✓ Garden and Huachuca Canyons	8-10	Maintain overstory trees, thin understory with low-intensity (backing) fire or non-fire treatments; minimize fire effects (especially erosion and sedimentation)

historical frequencies by one or more return intervals (either increased or decreased). This results in moderate changes to one or more of the following: fire size, intensity, severity, and landscape patterns. Vegetation attributes have been moderately altered from their historical range. Wildland fires burning in class II lands can have moderately negative impacts to species composition, soil conditions, and hydrological processes. Typical management requires moderate levels of restoration treatment, such as a combination of prescribed fire with mechanical treatment.

Condition Class III- 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 results in 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. Wildland fires burning in class III lands may eliminate desired ecosystem components, exacerbate the spread of unwanted non-indigenous species, and result in dramatically different ecological effects compared to reference conditions. Typical management requires high levels of restoration treatment, such as mechanical treatments, before fire can be used to restore desired ecosystem function. Intensive efforts, which may include seeding, herbicide application, biomass removal, and other types of rehabilitation, are required for class III lands.

Table 2-2 lists key species in the ecological units that are defined in Table 2-1. A brief discussion of fire ecology/history and wildlife follows for each type. For complete descriptions of the mapping units and a more detailed review of fire ecology, see the HAFP plan. Fort Huachuca also has a vegetation map (Figure 2-2) that uses the classifications used by the Coronado National Forest (CNF). The headings below reconcile the labels applied by the different classification systems.

### **Map Unit 1: Low-gradient alluvial valleys with broad riparian zones**

(CNF Dry Desert Riparian, Figure 2-2)

On Fort Huachuca, dry riparian zones cross the East Range Chihuahuan desert scrub/grassland, draining from west to east toward the San Pedro River. Streambeds are typically ephemeral, have low relief and in some areas may be indistinguishable from the surrounding area. Portions of these streambeds may be extremely excised as a result of localized grazing and erosion, and have eroded down to bedrock in many places.

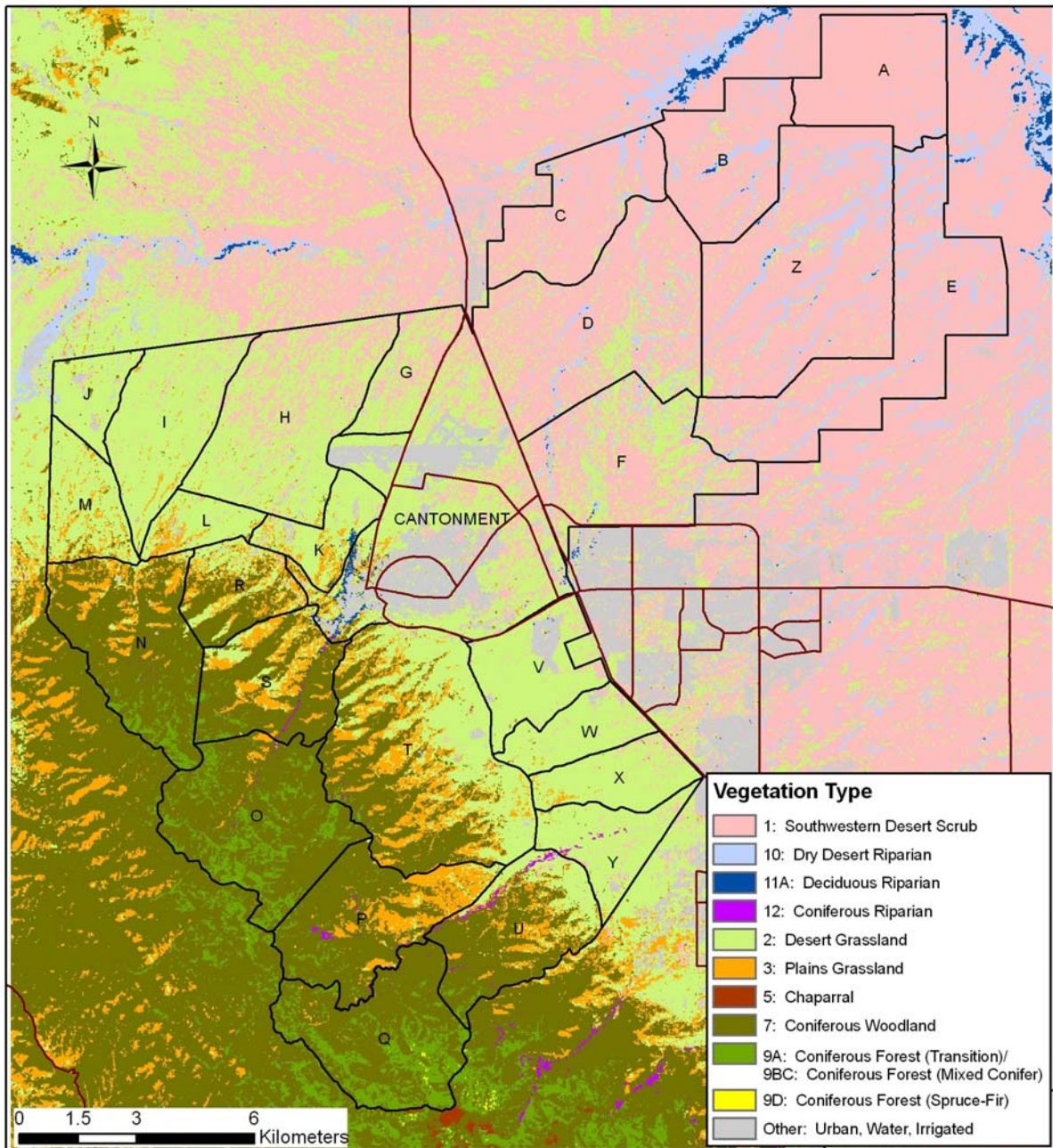
History of fire in these zones is not clear, but fires may have spread into dry riparian corridors from the adjacent uplands (Stromberg and Ortiz-Zuazaga 1998). In some areas, these low elevation riparian zones may not require specialized treatment with fire; it may be best to treat them along with the surrounding vegetation. Some species tolerate fire by resprouting from the root crown (for example, mesquite, desert willow, hackberry, sacaton) (Tratz and Vogl 1977, Armstrong 1980). Use of fire to knock back invading mesquite is only moderately effective depending on tree size and available fuel (Cable 1965). Burning may stimulate leaf production of sacaton, although recovery after fire depends on the extent of root crown removal by fire (Cox 1988).

Desert riparian zones may be represented by the same fuel models as the surrounding grassland or shrubland. No studies of fuel loads in these zones are known. FRCC would be a Class I depending on reach or Class II depending on presence of invasive species and soil/channel

**Table 2-2. Key Plant Species in HAFP Ecological Mapping Units Found on Fort Huachuca**

#	Mapping Unit	Key Plant Species (from HAFP ecological mapping unit descriptions)
1	Low-gradient alluvial valleys with broad riparian zones	Fremont cottonwood, Goodding’s willow, and sacaton—low terraces and floodplains; spike rush, sedges, cattails, bulrush—streambanks and aquatic habitats; blue grama, vine-mesquite, sideoats grama, plains lovegrass, three-awns—upper terraces and valley side slopes
2	Chihuahuan desert scrub and grassland mosaic on elevated/dissected plains	Historically grassier; blue grama and other native perennials; non-native Lehmann lovegrass present now; encroachment by whitethorn acacia, velvet mesquite, creosote, tarbush, littleleaf sumac, and yuccas
3	Grassland on elevated plains	Blue grama-dominated grasslands with sideoats grama, cane beardgrass, hairy grama, plains lovegrass, and little bluestem at higher elevations; also scattered Emory oak and juniper at higher elevations and moister sites.
4	Moderate-gradient alluvial valleys with narrow riparian zones	Fremont cottonwood, Arizona sycamore, Arizona walnut, Arizona Ash, and Goodding’s willow; upper terraces and side slopes—Emory oak and grasses
10	Madrean oak-pine woodland on granitic hills and low mountains	Mostly evergreen oaks (Emory, Arizona, net-leaf), Chihuahua pine, Mexican pinyon pine, alligator juniper. Some Arizona and Apache pine and Douglas-fir at higher elevations.
11	Madrean pine-oak woodland on limestone mountains	Mostly evergreen oaks (Emory, Arizona, net-leaf, silverleaf), Mexican pinyon pine, alligator juniper, Arizona and Apache pine. Some Douglas-fir at higher elevations.
12	Mixed conifer and Madrean pine-oak woodland on high elevation limestone mountains	Mostly mixed conifers: Arizona and Apache pine, Douglas-fir and white fir; Gambel and silverleaf oak present but densities potentially reduced by fire.
CR	Canyon riparian: mixed broadleaf riparian forests in steep, narrow canyons	Bigtooth maple at upper elevations; Arizona sycamore, Arizona walnut and encroaching upland species from adjacent pine-oak woodlands (from Stromberg and Ortiz-Zuazaga 1998)

APPENDIX N



Source: CNF Vegetation Codes extrapolated from 2003 Miller Vegetation Classification

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September 2005



Figure 2-2. Fort Huachuca Vegetation Map.

degradation. One goal in this vegetation type would be to restore and maintain historical vegetation, which should improve watershed condition and function.

### **Map Unit 2: Chihuahuan desert scrub and grassland mosaic on elevated/dissected plains**

Chihuahuan desert scrub generally occurs between about 3500 and 5000 ft (Wallmo 1955, Miller et al. 2003), with semidesert grasslands above and alluvial valleys with broad riparian zones below. At Fort Huachuca, this type is mainly restricted to the East Range (Figure 2-2), with a mean elevation of about 4000 ft. Shrubs dominate this unit, with grasslands interspersed; see Table 2-2 for species. Although wildfires were never frequent in desert scrub communities, they may have been more common in the 19<sup>th</sup> century due to greater grassland continuity (Bahre 1985). Historical land uses, fire suppression, and climate change have promoted spread of shrubs, loss of inter-shrub soil, and subsequent decreases in herbaceous cover. Fire likely inhibited woody plant establishment (Cooper 1961, Humphrey 1962, Daubenmire 1968, Wright and Bailey 1982), with historical fire frequency estimated at four to ten years, largely based on historical frequency of grassland fires. These fires are most likely to occur during the late spring (June), prior to the monsoon season, when there is a high frequency of lightning strikes (Humphrey 1958).

Estimates of desert scrub fuel loads range from 0.2 to 8.4 tons/ac; herbaceous fuel loads range from .04 to 1.2 tons/ac (Miller et al. 2003). Models for this vegetation type using the fire behavior prediction system (FBPS) (Anderson 1982, Hubbard 2001) are fuel models 2 and 6 although many areas have very little, if any, surface fuels. FRCC in this vegetation zone is estimated to be a Class III, although fire hazard may be low. Potential natural vegetation (PNV) is predicted to be grassland dominated by native grasses, with some non-indigenous grasses in some areas. The desired future condition would be a desert scrub and grassland mosaic with more extensive grassland patches and shrub canopy cover at <5%. The goal would be to reduce or maintain non-indigenous grasses at current levels. Extensive soil loss and high shrub cover may preclude restoration of desired grassland vegetation in some areas.

Relevant research conducted in Chihuahuan desert scrub has usually been designed to measure post-fire responses and investigate techniques to minimize shrub encroachment and increase herbaceous cover (Wright et al. 1976, Ahlstrand 1982, Cornelius 1988, Drewa et al. 2001). Most of the shrub species found in Chihuahuan desert shrub communities respond to fire by resprouting (Ahlstrand 1982, Christensen, 1985). No studies have been undertaken in this vegetation type in the HAFP area.

### **Map Unit 3: Grassland on elevated plains**

(CNF Plains Grassland, Figure 2-2, also called semi-desert grassland)  
4400-5600 ft (mean 4900)

Slope of this unit is generally less than 5 %. The upper elevation transitions into oak savanna and the lower elevation transitions into the Chihuahuan desert scrub/grassland. Wright (1980) and others suggested that “semidesert grasslands might be better designated as semidesert grass-shrublands because they are potentially perennial grass-shrub-dominated landscapes located between the desert scrub below and the oak woodlands above.” On Fort Huachuca, these grasslands are located mainly on slopes at the base of the mountain and just below (Figure 2-2).

The semidesert grassland is floristically diverse, with species composition changing across the geographic area (Abbott 1997). Vegetation structure also varies as result of land-use history and management (Westoby et al. 1989, Burgess 1995). The herbaceous component consists of perennial bunch and sod-forming grasses, annual grasses, and annual and perennial forbs and other graminoids. Woody mesquites grade into oaks at higher elevations. See Table 2-2 for species composition, and for a more complete list for this vegetation type, see Abbott (1997). Historical fire frequencies in southeastern Arizona semi-desert grasslands have been estimated at between four and ten years (Wright 1980, McPherson 1995, Kaib et al. 1996). These fires most likely occurred during the late spring (June) prior to the monsoon season, when there is a high frequency of lightning strikes (Humphrey 1958).

Prior to 1880, shrubs were inconspicuous in desert grasslands, suggesting that fires were frequent enough to prevent widespread shrub invasion (McPherson 1995). By the late 1880s the occurrence of large grassland fires had declined, and a “brush invasion” began (Bahre 1985). Although there is controversy concerning the extent to which fire maintains grasslands (i.e. minimizes shrub invasion), it is clear that fire is a key component of the natural disturbance regime in grasslands and that the natural fire regime has been drastically altered (Archer 1994, Bahre 1991, Griffiths 1910, Humphrey 1958, Leopold 1924, McPherson and Weltzin 1997, Abbott 1997).

Grasslands continue to be altered by livestock grazing, fire suppression, introduction of non-native grasses (e.g., Lehmann lovegrass (*Eragrostis lehmanniana*) (ERLE) and Boer lovegrass (*E. curvula*)), fragmentation due to housing developments and road dissection, and shrub invasions (Bahre 1991, Bock and Bock 1992).

Lehmann lovegrass contributes to increased fire frequency, intensity, and spread. Its prolific seed production, positive response to fire, and wide range of environmental tolerances allow it to outcompete native grasses (Ruyle et al. 1988). Because ERLE produces more fine fuel than native grasses, fires burn with greater intensity that may have detrimental effects on native grasses and other plant species that rely on spatial refugia to escape fire (Bock et al. 1986, Abbott 1997). Native grasses recover after fire but recovery is dependent on drought conditions at the time of the fire and in successive growing seasons. ERLE is opportunistic and can take advantage of drought conditions and expand into other areas at the expense of native grasses (Robinette 1992, Cable 1965).

Herbaceous production is variable based on land use history and presence of ERLE. Herbaceous biomass ranges from 0.3 to 6.7 tons/ac, with ERLE production greater than 100% higher than native grass production (Wright 1980, Cox et al. 1990, Miller et al. 2003). The FRCC in this unit is Class II or III depending on extent of invasive species and shrub/tree encroachment. Fire in grasslands can be modeled using the FBPS fuel model 1 or 3 depending on grass species composition and grass height. Potential natural vegetation is predicted to be grasslands-dominated by native grasses; however presence of ERLE may preclude returning grass-dominated areas to a 20<sup>th</sup> century status and may actually push native grasslands to an irreversible threshold that would make it difficult to transition to a more desirable state without major human intervention (Anable et al. 1992, Aronson et al. 1993).

A five-year (1999-2004) study by the University of Arizona investigated the effects of fire on Fort Huachuca grassland systems, with emphasis on how exotic ERLE affected biotic communities. Researchers found that ERLE biomass declined and this effect persisted following burns for more than two years. Response depended on annual precipitation and the season of the fire, with summer burns possibly depressing ERLE more effectively than spring burns (but effects disappeared with time). Plant species richness did not change with fire treatment but remained lower on plots dominated by ERLE and higher on native-dominated plots.

**Map Unit 4: Moderate-gradient alluvial valleys with narrow riparian zones**  
CNF Deciduous riparian, Figure 2-2

Deciduous riparian zones are composed mainly of winter-deciduous, broadleaf trees with dominant tree species and composition varying based on elevation; see Table 2-2. At Fort Huachuca, lower Garden Canyon best typifies this zone. Deciduous riparian zones are typically adjacent to grassland-tree/shrub communities. Herbaceous cover is strongly influenced by vegetation found on adjacent lands and is highly variable. Riparian vegetation has been affected by humans more than any other vegetation type, mainly due to its proximity to water.

Although riparian plants are not dependent on fire for renewal, fire may be important for the maintenance of these habitats in combination with other disturbances (Bendix 1994, Reeves et al. 1995). For instance, cottonwood-willow forests are not considered fire-adapted, but mortality in these communities may depend on fire intensity, time of burn and type of fire (ground fire vs. canopy fire) (Stromberg and Ortiz-Zuazaga 1998).

Deciduous riparian zones probably will not be represented by the same fuel models as the surrounding vegetation, because these are usually grassland or shrubland. Riparian zones are not necessarily represented by any fuel models; although fuel models 6 or 8 may be considered in certain areas. The riparian corridor may act as a barrier to fire because this zone may be cooler and have higher fuel moisture than the surrounding vegetation, effectively slowing a fire down. However, there are no studies of fuel loads in these zones, and there is potential for fuel loads to be greater than the surrounding area. Riparian areas are treated separately from the surrounding landscape, which means they are usually not treated, and this may result in a build-up of hazardous fuels. FRCC in deciduous riparian zones would be a Class I depending on reach or Class II depending on presence of invasive species and soil/channel degradation. Specific goals in this vegetation type would be to restore or maintain historical vegetation, which should improve watershed condition and function.

Data on fuel loads and distribution, fuel chemistry and flammability, and fuel moisture is needed from riparian areas to understand and predict fire behavior (Dwire and Kauffman 2003). Because deciduous riparian areas are sensitive (i.e., contain many riparian obligate plant and animal species), a severe wildfire at the wrong time of the year (summer) could have a devastating effect on these areas, and should be managed to reduce those risks.



### Map Unit 10: Madrean oak-pine woodland on limestone mountains

CNF coniferous woodland on Figure 2-2, also oak/pinyon/juniper  
5100 – 8300 ft (mean 6500)

Oak/pinyon/juniper (OPJ) communities are more complex than savannas; see Table 2-2 for species list. OPJ exhibits a mosaic of stand densities which are influenced by topographic position. Canopy cover can range from 10% through 100% due to a higher shrub component, and OPJ communities contain less surface fuel than oak savannas (McPherson 1992, Abbott 1997, Miller et al. 2003). At a higher elevations, OPJ transitions into pine/oak woodland and ponderosa pine communities. Trees are generally  $\leq 15$  ft in height.

Despite the fact that oak woodlands occupy millions of acres of arid and semi-arid lands in southwestern U.S. and northern Mexico, there has been little focus on fire regimes in oak communities (McPherson 1992, Ffolliott et al. 1992). Existing historical accounts of fire in OPJ tend to be anecdotal (e.g., Leopold 1924, Wallmo 1955, Niering and Lowe 1984, Bahre 1985, 1991), however natural return intervals may be around thirty years (Wilkinson 1997). For many decades the policy regarding wildfires in oak woodlands was one of total suppression. Within the last few decades however, it was recognized that fire plays an essential role in the structure and function of woodland ecosystems (Marshall 1963, Whittaker and Niering 1965, Caprio and Zwolinski 1995) and more recently land managers began to reintroduce fire into the landscape.

Oak woodlands are comprised of many evergreen tree species most of which are well adapted to burning. A mosaic is created only when a fire burns through it, particularly in areas with high stand density which are likely to sustain stand-replacing fires. All of the evergreen oak species sprout vigorously after fire. Shrubby components like silktassel, skunkbush, and mountain mahogany also sprout after fire. Other species, such as manzanita, have fire-scarified seeds which germinate readily following a fire. Native manzanita can change the fire regime in an area. It can spread into oak communities under any disturbance regime (fire or cutting). Once it has been cut/burned it needs to be burned regularly to keep it out. Alligator juniper and madrone both sprout after fire. The notable exception to these evergreens is Mexican pinyon which, under a certain size, is usually killed by fire. Mexican pinyon regenerates by seed but once burned may require 20 to 30 years to achieve pre-burn densities. Older, larger pinyon trees however, are more resistant to fire (Moir 1982). Presence of mature Mexican pinyon suggests a relatively long fire-free interval.

Tree density in OPJ can range from 10 to 640 stems/ac (Miller et al. 2003). Areas with higher tree densities of mature OPJ can become virtually “fireproof” because in areas where Mexican pinyon is the principal tree, fuels are typically light and discontinuous. A combination of Mexican pinyon and alligator juniper with low surface fuels may be extremely resistant to all but extreme fire conditions. Shrub, litter and herbaceous fuels are highly variable depending on stand composition, aspect and substrate. Although there are no fuel models representing OPJ, FBPS fuel models 1 and 6 are typically combined to model fire behavior. FRCC is mostly Class III due to high tree and shrub densities and increasing prevalence of fire-intolerant species. In areas that have recently burned the FRCC is a Class I. Desired conditions in the OPJ are to

create more of a mosaic and mitigate fire hazard by treating areas in the wildland urban interface, which is becoming increasingly complex in certain areas.

### **Map Unit 11: Madrean pine-oak woodland on granitic hills and low mountains**

Also CNF Coniferous woodland on Figure 2-2

4900-7300 ft (mean 5600 ft)

The pine-oak woodland is a narrow, dense zone with a mixture of tree and shrub species; see Table 2-2. The upper end of this zone transitions into pine or mixed conifer forests. The pine-oak woodland is ecotonal between OPJ and ponderosa pine or mixed conifer stands, depending on aspect. Stand composition changes from with increasing elevation from oak-dominated to a more pine-dominated combination. Based on a fire history constructed in pine/oak woodlands of canyons in southeastern Arizona (including the Huachuca Mountains), southwestern New Mexico and northern Mexico, Kaib (1998) estimated a fire frequency of from 1 to 15 years, with an average interval of 8 years. Individual canyons may have had longer or shorter fire intervals, e.g., Rhyolite Canyon in the Chiricahua National Monument had a fire frequency of 9 – 22 years (mean 14.6 years) (Swetnam et al. 1989); the Organ Mountains (New Mexico) had a fire frequency of 1 to 3 years (minimum) to 11 to 22 years (maximum) (Morino 1996); and McClure Canyon in the Huachuca Mountains had a fire frequency of 2 to 21 years (mean 7 years).

High tree densities in pine/oak woodlands are indicative of the diminished role of fire in these communities. Moderate fire intensity favors pine while killing less fire resistant oaks. Oaks are prolific resprouters after disturbance and are favored by low intensity fire or long fire intervals (Barton 1999). Fuel loads are similar to those measured in ponderosa pine communities (see below). Pine/oak woodlands may be represented by FBPS fuel models 8 through 10. The FRCC is typically a Class III due to high tree and shrub densities, increasing prevalence of fire intolerant species, and replacement of understory vegetation by litter and woody debris. Desired conditions may be reduced stem density, litter, and woody debris in favor of an increased grass/herbaceous component.

### **Map Unit 12: Mixed conifer and Madrean pine-oak woodland on high elevation limestone mountains**

CNF Coniferous Forest (transition)/Coniferous Forest (mixed conifer) in Figure 2-2

5900-8625 ft (mean 7100)

The ponderosa pine community type dominates elevations from about 5500 ft to 8625 ft, while mixed conifers dominate the more mesic north-facing slopes at the uppermost elevations. Conifers can be present at lower elevations in north-facing, more mesic canyons, while adjacent xeric south-facing slopes may have chaparral species, which can reach 7500 ft in elevation. Lower elevations of the ponderosa pine/mixed conifer community transition into pine/oak woodlands; however in steep-sided canyons, upper slopes could be dominated by oak-pinyon-juniper.

The current fire regime in ponderosa pine forests and associated woodlands of the southwest is radically different from that of pre-settlement times (Cooper 1960, Covington and Moore 1994, Swetnam and Baisan 1996). Changes in the fire regime were attributed to decreased frequency of

widespread surface fires, human land-use, and climatic variation (Bahre 1991). Frequent surface fires consumed accumulated needles and grass, maintaining open stand conditions. These fires also prevented establishment of less fire-tolerant tree species. Currently, ponderosa pine dominates the older age classes, but because of lack of fire, less fire-resistant tree species, including southwestern white pine and Douglas fir compete in the younger age classes (Danzer 1998). Much of the ponderosa pine area was logged extensively around 1900. In addition, heavy grazing was deliberately practiced to remove fine fuels in pine woodlands (Leopold 1924). Fire was reintroduced in the 1970s, but active suppression of most wildfires continues.

Fire history studies have shown that the historical mean interval between fires for the Huachuca Mountains ranged from 4 to 10 years, which is similar to that reported for other sky island mountain ranges (Swetnam and Baisan 1996, Danzer 1998, and Kaib 1998). The last widespread fire in the Huachuca Mountains occurred in 1899. In contrast to the low-intensity, pre-settlement fires, large crown fires occurred in 1977, 1983 and 2002 in the Huachuca Mountains. The potential for fires in this mountain range is high due to lightning and anthropogenic sources. The Huachuca Mountains are a major conduit for illegal human traffic due to their proximity to the Mexican border. Several recent fires were attributed to this traffic. Another factor contributing to potential fire is insect infestation. For the past several years Arizona has been experiencing an increasing amount of pinyon and ponderosa pine mortality due to native insect outbreaks (<http://www.fs.fed.us/r3/resources/health/beetle>). Combinations of low tree vigor caused by several years of drought and excessively dense stands of trees have allowed beetle populations to reach outbreak levels. Beetle-killed trees greatly increase the risk for catastrophic fire in these forests.

Little is known about fires in high elevation mixed conifers in the Huachuca Mountains, although mesic conditions may reduce fire occurrence compared with other types (Bahre 1991). In the White Mountains of Arizona, Dieterich (1983) estimated the fire-return interval to be 22 years. Fires in mixed conifer communities can be light or erratic in wet years or intense stand-replacing fires during drought years.

Mixed conifer plant associations can be represented by FBPS fuel models 10 and 11. In the Huachuca Mountains, tree density ranges from 10 to >160 trees/ac; downed woody material in the 0 – 3” category ranges from 0.2 to 7 T/ac; shrub biomass from zero to 6 T/ac (Miller et al. 2003). FRCCs are typically a Class III due to greater tree and shrub densities, increasing prevalence of fire intolerant species and replacement of understory vegetation by litter and woody debris. Desired conditions would be to decrease the number of fire intolerant species and increase the herbaceous component. Because large portions of the mixed conifer are Mexican spotted owl habitat, there may be limits placed on how many stems, snags, and large logs can be removed.

**Canyon Riparian Unit: Mixed broadleaf riparian forests in steep, narrow canyons**  
CNF coniferous (montane) riparian in Figure 2-2

On Fort Huachuca, the canyon riparian type is found primarily in Garden, Huachuca, McClure, and Sawmill Canyons. Table 2-2 lists canyon riparian species; encroaching upland trees from adjacent pine-oak woodlands might include oaks, pines, alligator juniper, and Douglas-fir. Across the HAFP the region, overstory and understory species will vary as precipitation varies

with elevation and aspect (Shreve 1915, Wallmo 1955, Whittaker and Niering 1965). Conifers can be present at much lower elevations on north-northwest facing canyons than those with a southern exposure.

Fire histories derived from tree-ring data indicate that fires occurred regularly in montane riparian zones (Swetnam et al. 1989). Kaib (1998) used fire-scarred pine samples collected from several mountain ranges in southeastern Arizona and Northern Mexico to reconstruct fire histories in riparian canyon pine-oak forests bounded by semi-desert grasslands. A fire frequency ranging from four to eight years was inferred from a 230-year analysis period (1650 – 1880). Kaib concluded that canyon forests sustained more frequent fires than previously thought based on patterns of synchronous fires between mountain ranges and between lower elevation (pine/oak) and upper elevation (mixed conifer) sites. In addition, Swetnam et al. (1992) conclude that the oak-pine riparian gallery may be a conduit to fire spread across elevational gradients. This pattern was evident in Rhyolite Canyon in the Chiricahua Mountains but may also apply to the Huachucas because of similar topography and vegetation patterns.

Riparian corridors can have vegetation similar to the adjacent slopes, or completely different, depending on steepness of the canyon, and elevation. In the Huachuca Mountains, vegetation in higher elevation reaches tend to be more similar to adjacent areas than vegetation in lower reaches of the canyon (Shelley Danzer, personal observation). Upper reaches typically contain mixed conifers in and surrounding the drainage. Lower reaches, which may be in steeper-sided canyons, may be surrounded by Madrean oak woodland species.

The mean fire interval (MFI) for the Huachuca Mountains is 4 to 10 years (Danzer 1998, Kaib 1998). Frequent, low intensity fires in these canyons ended in the early 1900s. More recent fires have been stand-replacing. Fire occurrence historically was associated with the arid spring and foresummer; however because the Huachuca Mountains are currently a major conduit for illegal border traffic, and because of regional drought, fires can and do occur at any time of the year. The montane riparian zones are most vulnerable because these areas are highly traveled and they contain sensitive plant and animal species and critical habitat associated with them.

Coniferous riparian zones are represented by FBPS fuel models 8 through 10, depending on location along canyon, adjacent vegetation, stand composition, presence of water (or riparian habitats), and live and dead fuel loads. The FRCC classification can be a Class III due to greater tree and shrub densities, increasing prevalence of fire intolerant species and high litter and woody debris. See the mixed conifer category for fuel loads. The goal in this vegetation type would be to restore a natural fire regime that would decrease tree and shrub density, fuel loads, and fire intolerant species.

Although there is little research in riparian areas, they are ecologically important, and provide critically valuable habitat for terrestrial and aquatic species in arid regions (Naiman et al. 1993, Kauffman et al. 1997). Current research in riparian areas focuses on topics such as stream hydrology and geomorphology, individual plant and animal species that depend on these systems, and effects of grazing, to mention a few. Little information is available on fire prediction variables or effects of fire on riparian systems and their recovery.

## SOIL, WATER, AND FIRE

Fire effects on soil and water vary with fuel loads, soil types, intensity of burning, and post-fire precipitation. Effects on soil and water properties are described by general vegetation types.

Fires in the semi-desert grasslands and oak-grass savanna (unit 3) on Fort Huachuca have some short-term negative effects upon soils and water. Grass cover and litter protect the soil surface by dissipating the energy of falling raindrops and by slowing the flow of water running across the surface. Litter retards the evaporation of soil moisture and grass plants break up surface wind velocities reducing evaporation (Branson et al. 1981). Fire consumes much of the standing grass materials as well as litter on the surface, exposing the bare soil to raindrop impact. Surface water flow is unimpeded by litter on the soil and nothing is left to retard evaporation. This negative impact is short lived as grass species quickly regrow after fire and cover and litter recover to pre-burn conditions within one to three years after the fire. The negative effect is less severe on soils with surface covers of gravels and cobbles. An unnaturally frequent fire regime (every two years) will cause considerable negative effects including accelerated erosion, increased water runoff; reduced water quality, and sedimentation downstream.

Periodic fire in semi-desert grasslands stimulate grass plants to keep them vigorous and productive. This acts to increase soil organic matter by increasing root production. Increased organic matter improves soil structure, increases water infiltration, and increases cation exchange capacities in the soil. The benefits of periodic (five to ten years) fire in these grasslands greatly outweighs the short term negative impact of fire on soils and water.

Fires in dense oak woodlands on Fort Huachuca can have serious effects on soils and water. When these woodlands burn, usually all above ground cover is removed. Steep (>20%) slopes, left unprotected by vegetation, experience very high water runoff and severe erosion when large rainfall events follow the fire. High organic matter content in these soils (USDA-NRCS 1992) and thick layers of litter or duff under the tree canopy can create water repellent soil layers after burning. Depending on the duration of a fire burning the surface litter, organic substances can distill downward into the soil and form a non-wettable layer. Thicker non-wettable layers form in dry and coarse textured soils. Even though water repellent areas do not occur extensively on large burn areas of these woodlands, they can contribute greatly to the increased runoff and erosion from them (Wright and Bailey 1982).

When large areas of this woodland burn, accelerated erosion and runoff can trigger debris flow events which scour out stream channels, removing soil and vegetation, and deposit large amounts of coarse sediment downstream (Wohl and Pearthree 1991). Studies in the Arizona interior chaparral, watersheds similar to southern oak woodlands, show that after large fires, severe erosion removed sediment from hillslopes and deposited it in channels. Subsequently, as hillside and streamside vegetation recovered, erosion stopped on the slopes and began in the stream channels. Tributary channels may still be eroding twenty-five years after the fire and sediment from these will be accumulating in the mid to lower reaches of the main stream (Heede, Harvey and Laird 1988). These are natural slope erosion and valley fill processes, but may be somewhat manageable by limiting the amount of a watershed which is allowed to burn. Also, geomorphic investigations in other canyons in the Huachuca Mountains, indicate a fairly long time between severe erosion events and also suggest a link between forest fires and debris flows (Wohl and Pearthree 1991).

As these woodlands recover from fire, tree canopies regain their cover in twenty years. Ground cover and litter layers form and new soil is weathered from the parent materials. At some midpoint between natural fires in these woodlands, there is a period of maximum water production from the watershed. This probably occurs near the time when post-burn canopies recover to forty or fifty percent and before tree sprouts become mature and tap the regolith with a complete root system fully exploiting water stored in the soil and in bedrock fractures.

Fire in the pine and pine-fir forests on Fort Huachuca will vary in their effects on soil and water. Several areas in this vegetation type have burned in the recent past. These areas have reduced fuel loads, open tree canopies and understories of grasses, shrubs, and forbs which quickly recover after fire. In these areas, fires will have minimal short term negative effects on soil erosion and water runoff and longer term positive impacts by increasing soil organic matter, stimulating herbaceous cover, and keeping tree stands open, allowing more water to enter bedrock fractures and eventually end up as spring and stream flow.

In other areas in the pine-fir type on Fort Huachuca, stands are dense, have not burned in fifty plus years, and fires may have similar effects on soil and water as the mixed oak woodlands do. Once these areas burn a single time, the similarities end. In a crown fire, many of the trees will be lost. They blow down in a few years. These pine species are not sprouters and must come back into the community from seed. This slow response to a fire will allow grasses and forbs to develop in the understory and surface fuels, including pine needles, can accumulate for another fire in a relatively short period of time (six to eight years). When these areas burn a second time, at a more natural interval, surface covers will quickly be able to recover and prevent erosion and runoff.

Other general impacts of fire on soils on Fort Huachuca include short term increase in soil pH due to ash, a short term increase in soil nitrogen available for new plain growth due to decaying plant roots, a short term decrease in soil organisms, and a short term decrease in cation exchange capacity due to reduction in organic matter.

Other general impacts of fire on water at Fort Huachuca include short term increases in stream sediment loads and water turbidity after fire. Also pH can increase slightly and water hardness (calcium and magnesium) can increase after fire, especially in watershed areas with limestone parent materials (Wright and Bailey 1982).

#### WILDLIFE

Animals living in habitats naturally shaped by periodic fires are assumed fire-adapted. The short-term potential negative impacts on wildlife are primarily related to impacts on habitat, particularly in terms of cover, forage, nesting sites, or perches. Some individual mortality may occur during fire events. The severity of these impacts depends on the mobility or range of individual species, the size and patchiness of the fire, and the availability of sufficient alternative habitat in areas not affected by the fire. Potential positive short-term impacts include improved forage quality, prey vulnerability, and the creation of new open spaces. The probability that fire affects aboveground habitat resources is high. The severity of this impact is highly species-specific, depending on habitat requirements and post-fire climatic conditions.

The long-term potential impacts of burning are primarily related to maintaining a patchy mosaic of habitats. The probability of this beneficial outcome is related to the interaction between fire frequency and the size of individual fires. Small-scale fires that occur with frequencies between 5 to 10 years have the potential to maximize species diversity on a landscape level. A long-term negative potential impact on wildlife diversity occurs on sites dominated by non-native lovegrasses.

The long-term potential negative impacts of not burning are primarily related to the loss of patchy mosaics of diverse habitats, leading to an overall reduction in wildlife diversity. Animals that depend on herbaceous vegetation for cover, forage and nest sites will be negatively affected as the herbaceous component decreases. The probability of this outcome is moderate to high.

Lack of fire also increases the risk of high-severity fires in areas where fuels have built up to hazardous levels.

General effects of fire on wildlife are discussed below for each ecological mapping unit; special-status species are addressed in Chapter 8. A helpful review of fire effects on wildlife is contained in the USDA Forest Service Rocky Mountain Research Station publication *Wildland Fire in Ecosystems: Effects of Fire on Fauna* (Smith 2000).

In the desert grassland (map unit 2) on Fort Huachuca, fires will reduce shrub (mesquite, desert broom, whitethorn acacia, creosote, burroweed) cover and increase grass-forb cover. Fires can create open patches for foraging, while unburned areas provide cover. Most species gain habitat with fire that reclaims the once-open grassland areas artificially dominated by shrubs. Mourning and white wing dove can lose immediate nesting habitat in a semi-desert grassland fire, but almost always gain in food supply from an increase in large-seeded early successional plants after the burn.

Animal species like mule deer, javelina, Gambel's quail, and packrats will not use the burned areas for a short period as fire removes the woody plants that they depend on for the structural habitat. Species like rabbits, antelope, scaled quail, and insectivorous birds will increase as areas open up and more herbaceous forage is produced. Likewise, shrub-nesting bird species like cardinals, cactus wrens, mockingbirds, and flycatchers may lose nests in the immediate area of the burn, while other species like horned lark, lark sparrow, Say's phoebe, and black-throated sparrow, which select more open habitats, benefit from desert grassland fires (Aid 1990, Wright and Bailey 1982). Fires in this grassland can be destructive to ground-nesting birds like Montezuma (Mearn's) quail, vesper sparrow, and meadowlark, but these species have multiple nesting periods and recover rapidly.

In the elevated grassland/oak savanna (map unit 3), fire may occasionally kill mature oak trees creating snags which become habitat for cavity nesters like woodpeckers and kestrels. Fire can also damage mature mastproducing trees, reducing food production for species like whitetail deer, rock squirrels, and coati. Fire can prune oak trees and open up areas to make them more attractive to pronghorn antelope. Due to fire exclusion, the oak woodland has thickened and moved downhill into the grasslands. Fire can be used to abate the artificial increase in oak savanna and define the ecotone between semi-desert grassland and oak woodland.

In the mixed oak woodland on Fort Huachuca (map unit 10), the structure of the habitat is dramatically changed for relatively long periods after stand-replacing fire. Fire creates openings in the artificially dense and late successional forest for most of the animal species using this habitat. As these communities grow back after fire, certain animal species reach their peak numbers within the burned area at some point in the process (twenty to thirty years) of full recovery. Forest and shrub habitats in the middle successional stages generally have the maximum diversity and numbers of bird species (Wright and Bailey 1982).

Large mammals like black bear and mountain lion use the dense, unburned oak woodlands as primary habitat, although forage supplies for both (whitetail deer for lion and insects, rodents, and grass for bear) increase as wildland fires create openings in these old growth stands. Fires in these woodlands create openings, providing more edge habitat and forage for species like

Montezuma quail and turkey. Burnt snags are used by cavity nesting species. Old growth stands that developed due to fire exclusion are favored most by special interest species like band-tailed pigeon and elegant trogon. Coues whitetail deer concentrate on burned areas within this woodland because browse species like silktassel, mountain mahogany, and oak are within reach as seedlings and topkilled plants resprout.

In the pine and fir forests (map unit 11) on Fort Huachuca, the structure of some present day habitats can be altered by wildland fire. Mid-successional (still some open canopy) pine habitats, with shrubs, grasses, and hardwoods in the understory, provide for maximum bird diversity (Szaro and Balda 1979a,b). Some special status species, like the federally listed threatened Mexican spotted owl, are known to use old growth pine-fir in canyon habitats, but are also attracted to areas opened up by crown fire. On Fort Huachuca, Danzer (in press) has documented three times as many spotted owl nesting and roosting sites in steep canyons dominated by oak encinal compared with mixed conifer areas. Other special interest species, such as Gould's turkey, favor pine stands in similar canyon habitat with mature trees in open, park-like settings with grass-forb understories providing insects and green shoots for forage in the early summer (Wright and Bailey 1982). Restoring the historic fire regime may produce habitat structure and mosaics that benefit buff-breasted flycatchers, a sensitive species whose geographic distribution in the U.S. has decreased significantly since about 1920 (Conway 2004).

Crown fires in the mixed conifer forest create habitat for a great variety of cavity-nesting birds, storage trees for acorn woodpeckers, and forage areas for insect-feeding species. Blowdown trees killed in crown fires provide foraging habitat for coati, black bear, and Arizona shrew. Severe crown fires will be detrimental to tree squirrels, but surface fires in ponderosa pine have no effect on squirrels and in fact, medium-age ponderosa pine (fifty to one hundred years) stands are most productive for Abert squirrels in northern Arizona (Wright and Bailey 1982).



## CHAPTER 3: FIRE ORGANIZATION AND BUDGET

At Fort Huachuca, most of the responsibility for wildland fire management fire planning and operations lies within the Fire Department and the DPW, Environmental and Natural Resource Division (ENRD). The Integrated Training Area Management (ITAM) program also assists fire management by bringing together personnel from ENRD, Range Control, and the fire department with military trainers and testers to support the military mission.

The primary mission of the Fire Department is to protect life and property on Fort Huachuca by providing emergency medical services and structural fire protection. Its secondary mission, based at Fire Station #2, is wildland fire management ranging from the lower elevations on the West, East, and South Ranges to Charlie Break in the Huachuca Mountains. The department maintains three fire stations and is also responsible for fire safety, training, prescribed burning operations, determining fire danger, and fire-related communications on and off the installation.

The ENRD oversees all resource management areas for Fort Huachuca: air and water quality; watershed management; collection and disposal of waste and hazardous materials; compliance with NEPA and ESA; archaeology and historical properties management; wildlife management; nature-based recreation, including hunting and fishing; and planning and support for wildland fire.

This chapter summarizes:

- responsibilities of key people
- training needs
- fire program resources
- budget process
- fire agreements/cooperators

that support the wildland fire program.

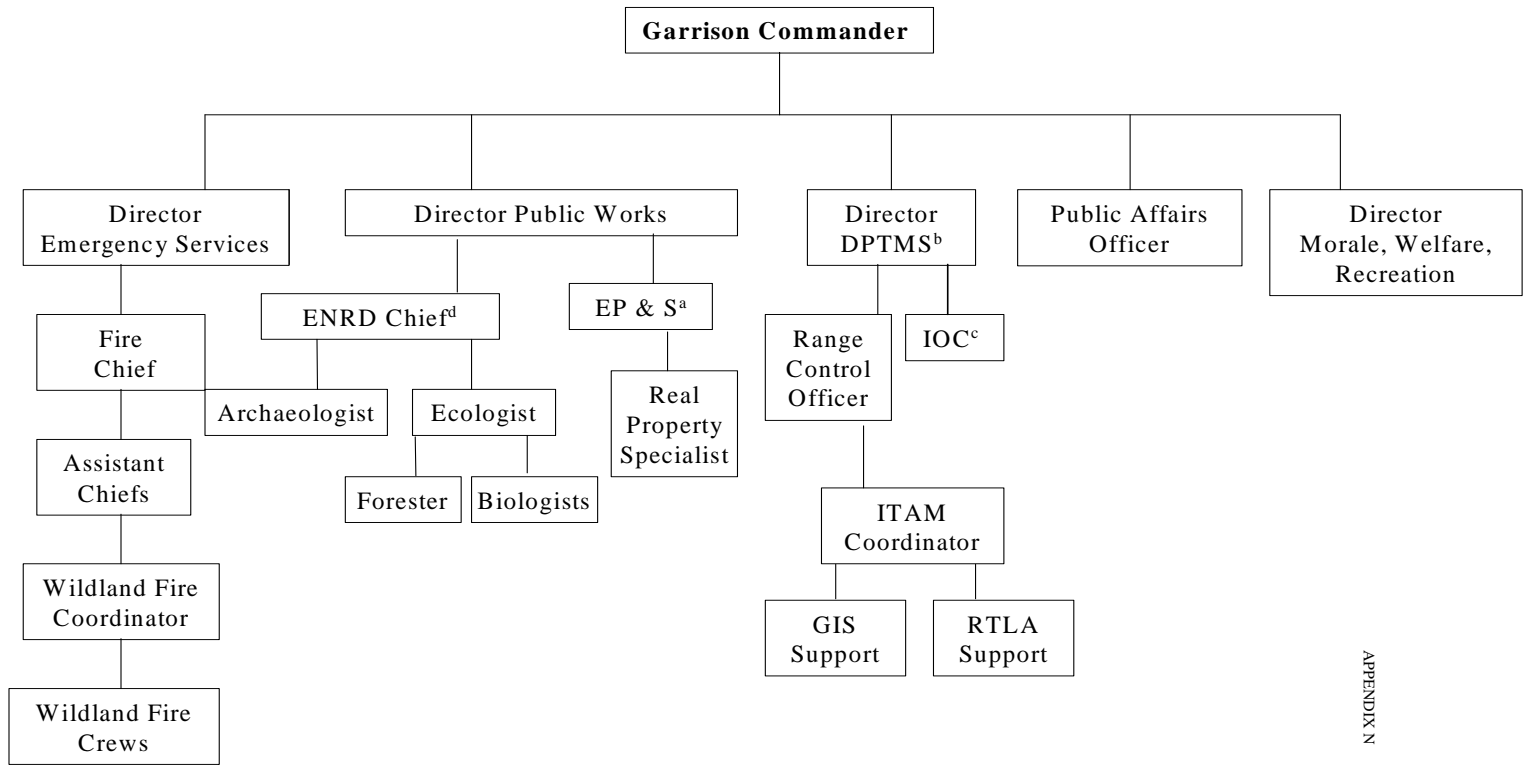
### INTERNAL ORGANIZATIONAL STRUCTURE AND RESPONSIBILITIES

Figure 3-1 is an organization chart identifying key fire organization positions and their relationships to one another. Responsibilities of these positions relating to fire management include:

#### **Fire Department**

Fire Chief – Has responsibility for wildland fire program. Coordinates with ENRD personnel, particularly the Forester on planning and compliance activities and with the Fire Department's Station 2 and/or Wildland Fire Coordinator on operational requirements. The chief will approve all burn plans and any wildland fire use.

Assistant Fire Chief(s) –Oversee personnel, budget, and training matters and are in charge when the Fire Chief is absent.



APPENDIX N

<sup>a</sup>Engineering Plans and Services Division  
<sup>b</sup>Director, Plans, Training, Mobilization, Security  
<sup>c</sup>Installation Operations Center  
<sup>d</sup>Environmental Natural Resource Division

Figure 3-1. Fort Huachuca Fire Organization Chart

Wildland Fire Coordinator – Organize wildland fire operations. Works closely with the ENRD and Forester as well as ITAM and Range Control on fuels management project planning. Keeps project files that include burn plans, compliance documents, accomplishment forms, cost data for personnel and equipment, and maps. Tracks wildland fire qualifications needs. (Vacant as of spring 2005.)

### **ENRD**

Division Chief – Approves all burn plans and wildland fire use. Responsible for overseeing preparation of fire management plan and supporting environmental compliance.

Ecologist – Oversees management of watershed/water condition and vegetation on Fort Huachuca. Responsible for Endangered Species Act compliance. Contributes to burn plan development. Serves as Resource Advisor on an as needed basis.

Forester – Is responsible for fuels management in the grasslands, woodlands, and forests on Fort Huachuca. Updates the IWFMP and external agreements; monitors compliance with external agreements. Notifies IOC of pending fire operations. Coordinates weather data collection. Assists with prescribed burn plans, including coordination with ENRD personnel, fire department Wildland Fire Coordinator, Meteorologist, neighboring agency fire managers, and others. Records fire history information including mapping fire boundaries, and forwards to ITAM Coordinator for entering into the GIS. Coordinates with Arizona Department of Environmental Quality on fire-related air quality issues. Oversees documentation of fire effects and directs rehab efforts. Makes recommendations relating to the maintenance, retirement, or construction of firebreaks. Serves as a resource advisor during fire operations.

Fuels Specialist – As of fall 2005, the Fort Huachuca ENRD and the Coronado National Forest Sierra Vista Ranger District are planning to share a fuels specialist position. The fuels specialist will reside in the local Forest Service office. The person in this position will write the prescriptions and burn plans for the projects described in this IWFMP and execute the projects using interagency (Army, Forest Service, BLM) crews.

Biologists – Coordinate fire management Endangered Species Act compliance activities. Assist with documentation of fire effects on soils, vegetation, and wildlife on Fort Huachuca. Help develop prescribed burn plans, and particularly guide project goals related to natural resources. Serve as a resource advisor during fire operations.

Archaeologist - Provides information related to effects of fire and fire management activities on cultural and historical resources on Fort Huachuca. Supervises pre-project surveys and provides archaeological clearance for construction of features needed for fire management (e.g., firebreaks). Participates in burned area rehabilitation activities.

### **DPTMS**

IOC – Responsible for internal coordination for prescribed burns; the Environmental Division's Forester initiates requests, and the IOC disseminates information to all necessary personnel. Obtains clearance for time and place of burns and issues approval.

Range Control Officer - Range control personnel on Fort Huachuca have an active role in fire management. Reports fires started by military training activities. Fire reports are filled out on

every burn and forwarded to the Forester. Coordinates with the fire chief on prohibiting the use of pyrotechnics or tracers in high fire danger periods.

ITAM Coordinator - Provides input on fire management needed to assist military training activities, including recommending burns to accomplish mission-related goals. Oversees the GIS as a data management and visual tool to coordinate fire management, natural resource and military training activities. Supervises GIS and RTLA positions. Contributes natural resource information to fire management activities on the Fort.

GIS Specialist – Provides fire program mapping needs by plotting (GPS) burn perimeters and maintaining fire history map and database. Prepares an annual burn decision map for the Fort for use by Range Control, the Fire Department, and the U.S. Forest Service.

RTLA Coordinator – Responsible for land condition and trend analysis. Oversees pre- and post-fire (and training activity) monitoring.

#### **Public Affairs Officer**

PAO – Responsible for notification of fire-related activities to military and civilian personnel on and off the installation.

#### **Morale, Welfare, and Recreation**

Director, MWR – Serves as the contact and coordination point, through the IOC, for ensuring compatibility between fire and MWR planning and operations.

#### **TRAINING AND CERTIFICATION**

The fire department for the Fort is responsible for both wildland and structural fire management. The Fort Huachuca Fire Department follows the Federal Emergency Management Agency (FEMA) standards for structural fire suppression. The Fort is also adopting the National Wildfire Coordinating Group (NWCG) and Department of Homeland Security National Incident Management System (NIMS) standards for wildland and prescribed fire management positions to provide qualified and certified personnel for wildland fire and prescribed burning (see Standard Operating Guidelines [SOG's] in Appendix D). Table 3-1 summarizes the current fire personnel and qualifications on the Fort, and Appendix E lists qualifications for individual Fire Department personnel. To receive a Red Card (wildland fire certifications) all personnel are required to:

- Pass the physical fitness test at the arduous level
- Be job qualified at the minimum of Firefighter 1

This level of certification requires completion of four basic wildland fire courses (S-130, S-190, I-100, and L-180) and an annual refresher. These courses are readily available every year in the southeast Arizona. The Southeast Zone of the Wildland Fire Training - Southwest Area

**Table 3-1. Fort Huachuca Fire Department 2005 Personnel and Qualifications**

	Assistant Chiefs		Captains		Engineers & Firefighters		Total	
	Actual	Desired	Actual	Desired	Actual	Desired	Actual	Desired
<b>Number of Personnel</b>	<b>1</b>		<b>6</b>		<b>26</b>		<b>33</b>	
<b>Red Card Qualifications</b>								
Firefighter 1	1		6		26		<b>33</b>	
Firefighter 2	1		6		19		<b>26</b>	
Squad Boss	1		0		0		<b>1</b>	
Squad Leader	0		5		6		<b>11</b>	
Engine Boss	0		2	6	3	12	<b>5</b>	<b>18</b>
Crew Supervisor	0		2	6	1		<b>3</b>	<b>6</b>
Strike Team Leader Div. Supervisor	0		2		1		<b>3</b>	
Division Supervisor	0		2		1		<b>3</b>	
Type 3 Incident Commander	0		2		1		<b>3</b>	
Type 4 Incident Commander	0	6	1	6	2		<b>3</b>	<b>12</b>
EMT-B	0		5		20		<b>25</b>	
EMT-P	0		0		2		<b>2</b>	
Engine & Tender Operator- All types	0		4		23		<b>27</b>	

maintains a website that lists a schedule of wildland fire training opportunities in the zone:  
<http://www.nationalfiretraining.net/sw/zones/sez.htm>

The Southeast Zone covers all of Cochise, Pima, and Santa Cruz counties plus southern parts of Graham, Pinal, and Maricopa counties, and eastern Yuma county. As of 2004, Pete Gordon in the Coronado National Forest Supervisor's Office is the Southeast Zone training coordinator: 520-670-4832; pagordon@fs.fed.us.

Currently, adequate skills are available on the Fort to carry out prescribed burning in the lower elevation vegetation types. Critical positions in wildland fire management such as Type 2 Incident Management Team members, Prescribed Fire Manager, Fire Planning Specialist, and Fire Behavior Analyst require many years of prescribed fire training and experience. Neighboring land managers employ people with these qualifications, and prescribed fire management "overhead" teams can be called on (from the Southeast Zone) to manage human-ignited prescribed fires or unplanned ignitions.

### **Fire Equipment**

Equipment needs for fire management activities include personal items, tools, and heavy equipment. Table 3-2 reviews the basic tool and equipment inventory as of 2005, and the SOG minimum personal gear lists for initial attack and two-week packs. With the exception of the heavy equipment, most items in Table 3-2 are ordered annually. (Full-text SOG's appear in Appendix D.) Table 3-3 compiles the personnel and heavy equipment resources over the planning area of the HAFP.

A fire department "wish list" at the time of this plan's preparation included drip torch for mounting on ATV's and a Wildland Ultra XT Attack Engine with the following features:

- 250 GPM pump
- 2400-gal capacity
- 6-wheel drive, all-terrain capability
- 4-person cab

### **BUDGET PROCESS**

Wildland fire management project funds are covered in the Environmental Program Requirements budget. Budget requests extend 10 years into the future and are made two to three years in advance of receipt of funds. The ENRD Chief and Ecologist consult with environmental staff to develop the budget requests for fire management activities related to federally listed species. The ITAM program also procures funding for projects that directly support training activities. Fire Department funds cover personnel and some equipment costs for the wildland fire program. The vehicle and other equipment needs to sustain fire management program proposed in this plan must be assessed on a regular basis and considered when developing long-term funding requests.

**Table 3-2. Fort Huachuca Wildland Fire Management Equipment and Personal Gear (2004)**

Heavy Equipment		Hand Tools		PPE		Personal Gear	
#	Item	#	Tool	#	Item	#	Item
1	Type 3 Tender (1000 gallons)	50	Pulaski	60	Nomex Shirt		Battery (D)
2	Type 6 Hummer Engine ( 250 gallons)	66	Shovel	60	Nomex Pants	2 cases	Battery (AA)
1	Type 6 Engine (200 gallons)	110	McCloud	28	Helmets		Battery (AAA)
2	All-terrain vehicles (ATV)	77	Swatters	20	Gloves	4 boxes	MRE
1	ATV trailer	22	Combo Tools	30	Headlamps		Chem Lights
1	ATV Drip Torch	4	Swedish Sand Vic	30	First Aid Kits	6	Belt Weather Kit
3	Portable Pumps	10	Back Pack Pumps	28	Bandit Scarfs		Radio Harness
1	3,000 gallon portable pumpkin			30	Face Shroud		Flagging
1	1,000 gallon portable pumpkin			20	Goggles	28	IA Packs
1	500-gallon portable pumpkin			50	Fire Shelter	28	Two Week Bag
1	Mini-striker portable pump					6	Brief Case
							Flashlights
						8	Sleeping Bag
						6	Tents
							Hatchets
						2	Chain Saw Chaps
						1 case	Bar Oil
						1 case	2 Cycle oil
						6	Radios
						6	Radio Battery
						4	Utility Bags

Heavy Equipment		Hand Tools		PPE		Personal Gear	
						1 spool	Nylon cords
							Bottle Water
						10	Gatorade
						12	1.5" gated Y
						6	1" gated Y
						10	Spanners
							Fitting Holders
							Tool Holders
						10	Hose Clamps
						10	Nozzles
							1.5" Caps
							1" Caps
							Reducers 2.5" to 1.5"
							Reducers 1.5" to 1"
							Reducers 1" to 3/4"
							3" Hose
							1.5" Hose
							1" Hose
							3/4" Hose
							Class A Foam
							AFFF Foam

\* See SOG in Appendix D for optional gear.



Table 3-3. Resource Inventory for Huachuca Area Fire Partners Planning Area

Agency			Federal			Fire Districts					DOI		NGOs		AZ	Priv	MX	
Vehicle	Type	Min Cap	Cor	Hua	Brdr	Fry	Pat	Pal	Ws	Hua	Son	NPS	BLM	Aud	TNC	Park	Priv	MX
Aircraft	any	any	x	x	x	x	x	x	x	x		x	x	x	x	x	x	
Helicopter	any	any											3					
Tender	1	5000+								1								
Tender	2	2500+				1	1	2										
Tender	3	1000+		1		1	1	2	1	1								
Tender	4	1000+																
Engine (Heavy)	1	400+				3		1										
Engine (Heavy)	2	400+																
Engine (Heavy)	3	500+	1			1		1		2								
Engine (Brush)	4	750+											1					
Engine (Brush)	5	500+																
Engine (Brush)	6	200+	4	3		3	3	5	2	1		1	2			1		
Engine (Brush)	7	125+																
Pick-up (Brush)	n/a	n/a						1							2	1		
ATV	n/a	n/a		2										2	3			
<b>Total</b>			<b>5</b>	<b>6</b>	<b>0</b>	<b>9</b>	<b>5</b>	<b>12</b>	<b>3</b>	<b>5</b>	<b>0</b>	<b>1</b>	<b>6</b>	<b>2</b>	<b>5</b>	<b>2</b>	<b>0</b>	<b>0</b>

Table 3-3, continued. Resource Inventory for Huachuca Area Fire Partners Planning Area

Miscellaneous	Type	Gallons																	
Tank (Fixed)		any																	2
Tank (Portable)		300																	2
Pumpkin		5000																	
Pumpkin/Portatank		3000	1																
Pumpkin		1500																	
Pumpkin		1200																	1
Pumpkin		1000																	
Portable Pump	Waterous	140																	
Portable Pump	slip-on	300																	1
Portable Pump	slip-on	125																	1
Portable Pump	Mark 3	n/a	1																2
Portable Pump	Mini-mark	n/a																	1
Portable Pump	Honda	n/a																	1
Portable Pump	Generic	n/a	3																1

- Air Tanker
- Helicopter
- Tender
- Dozer
- Tractor
- Engine

APPENDIX N

Table 3-3, continued. Resource Inventory for Huachuca Area Fire Partners Planning Area

Agency		USDA-DOD-HL		Fire Districts						BOI		NGOs		AZ	Priv	MX
		Cor	Hua	Brdr	Fry	Pat	Pal	Ws	Hua	Son	NPS	BLM	Aud	TNC	Park	Priv
Personnel	Type	x	x	x	x	x	x	x	x		x	x	x	x	x	x
Not red-carded (Support)	Non-fire				0	13					1		2			
Red-carded	Non-fire	35	3		39	15					6	40		9		
Not red-carded	Fire						26		18						3	
Red-carded (Arduous)	Fire		35					16				40				
<b>Total Personnel</b>		<b>135</b>	<b>38</b>	<b>0</b>	<b>39</b>	<b>28</b>	<b>26</b>	<b>16</b>	<b>18</b>	<b>0</b>	<b>7</b>	<b>80</b>	<b>2</b>	<b>9</b>	<b>3</b>	<b>0</b>
Miscellaneous	Type															
EMT					39	9										
Wildland training			38				26	6	18							
Paramedics					14											
Wilderness Medics					6											
Burn Boss 1		1														
Burn Boss 2		1														
IC1						0						1				
IC2						0										
IC3						1						4				
IC4													3			
TRT (Tact Resp Team)					8											
S-190					39											

## **FIRE AGREEMENTS AND COOPERATORS**

### **Huachuca Area Fire Partners (HAFP)**

The Fort's historical cooperators in fire management are all members of the HAFP. The HAFP was formed to manage fire on a large scale according to natural (or defensible) rather than jurisdictional boundaries. Figure 3-2 shows the planning area boundary as of 2005. The group has mapped ecological units across the 500,000-acre area and determined desired conditions from ecological and fuels management perspectives (see fire ecology discussion in Chapter 2). At the time of preparation of this plan, the group is working on dividing the planning area into treatment units for large-scale prescribed burns.

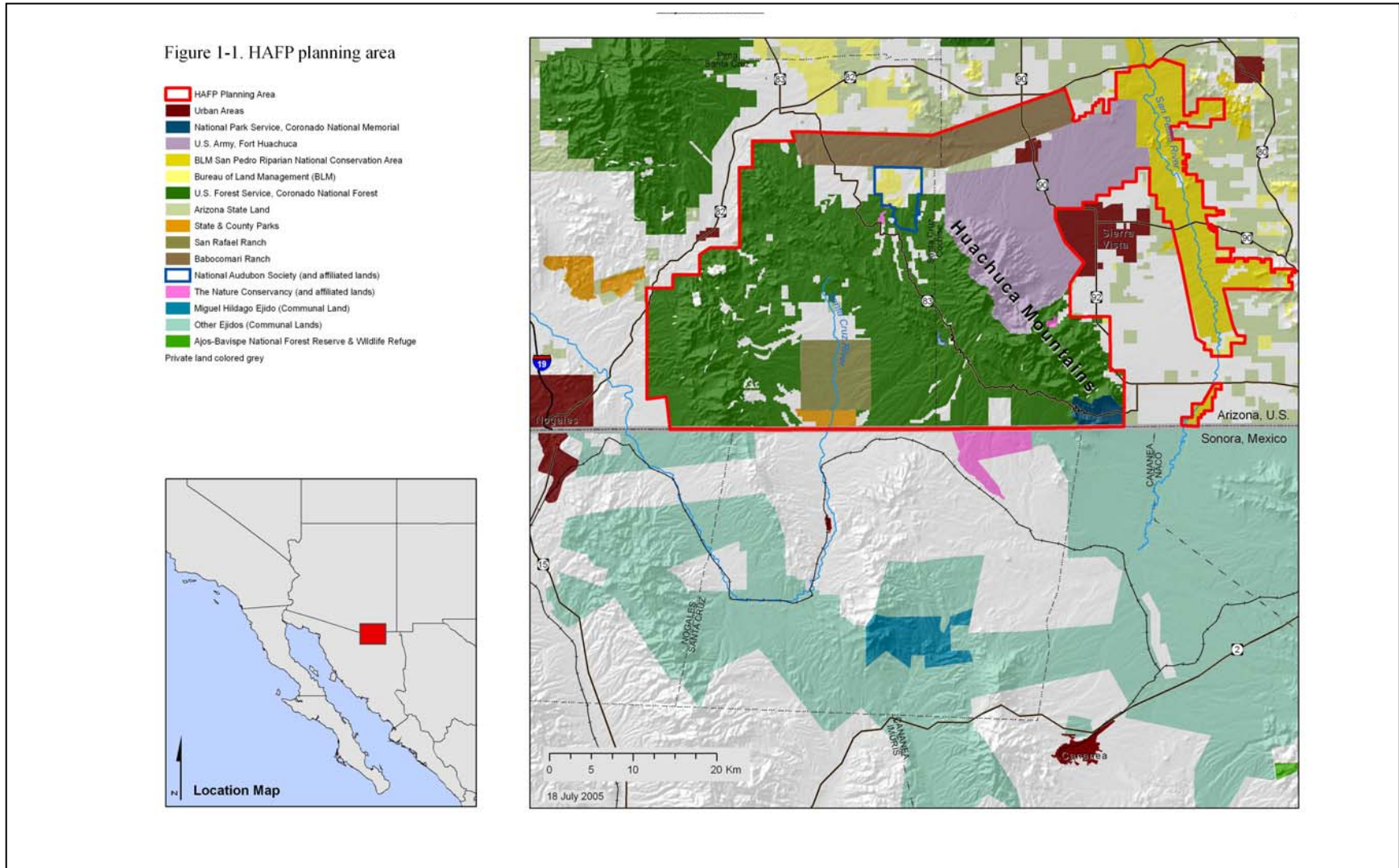
Within the HAFP, the Fort's major neighbors are the Coronado National Forest and Bureau of Land Management (BLM). Fort Huachuca has nearly 20 miles of common boundary with the Forest's Sierra Vista Ranger District. Woodlands and forests with similar fuel loads span this boundary. The area from Gate 7 to Brown Canyon is contiguous with the Miller Peak Wilderness Area. The East Range has about seven miles of common boundary with the San Pedro National Riparian Conservation Area managed by the BLM. This large area is being managed as one of the few publicly owned perennial stream systems in southern Arizona. Desertscrub and semi-desert grassland with similar fuel loads lie on both sides of the administrative boundary. Grassy bottoms, like Graveyard Wash and the large drainage north of it, have continuous fine fuel loads which could carry fire into the National Conservation Area to the San Pedro River.

### **Agreement with USDA Forest Service**

The Sierra Vista Ranger District of the Coronado National Forest has historically been given responsibility for fire management in the woodlands and forests above Charlie Break (see Figure 5-1 for location of Charlie Break). Under the interagency agreement, the Forest Service maintains a tanker at Libby Field to assist Fort Huachuca and surrounding areas with wildland fire management. The current interagency agreements between Fort Huachuca and the Forest Service are included in Appendix B.

### **Other Agreements**

The installation cooperates with four local fire districts on fire management activities. Table 3-4 contains contact information for these cooperators and also for other nearby fire departments. Appendix C is the 2005 draft agreement between Fort Huachuca and four of the local districts covering mutual assistance for both structural and wildland fire.



**Figure 3-2. Huachuca Area Fire Partners Planning Area**

**Table 3-4: Cooperating Fire Districts**

Name & Address of Cooperating District	Contact & Phone
Fry Fire District 4817 Apache Avenue Sierra Vista, AZ 85650	Bill Miller 378-3276
Huachuca City 500 N. Gonzales Blvd. Huachuca City, AZ 85616	Bob Fenimore 456-1354
Palominas 9695 East Highway 92 Palominas, AZ 85615	James Liendecker 366-5400
City of Sierra Vista 1327 E. Fry Blvd Sierra Vista, AZ 85635	Bruce Thompson 458-3319 Cell (520) 236-6378
<b>Other area fire departments</b>	
Patagonia P.O. Box 497 Patagonia, AZ 85624	John Ashcroft 394-2337
SEESI (Sonoita/ Elgin) 3173 Highway 83 Sonoita, AZ 85637	Joseph DeWolf 455-5854
Whetstone Fire 2424 Calle Segundo Huachuca City, AZ 85616	Dave Bizek 456-1717

## CHAPTER 4: FIRE MANAGEMENT UNITS

### FIRE MANAGEMENT STRATEGIES

Four strategies play important roles in wildland fire management at Fort Huachuca.

- Wildland suppression is applied via appropriate management response around high-use developed and training areas and certain sensitive resources needing protection.
- Prescribed fire is used to reduce fuels in high-risk areas and accomplish ecological goals.
- Wildland fire use allows natural ignitions to burn when they meet predetermined prescriptions related to safety and ecological goals.
- Non-fire applications—most notably thinning and herbicides—are treatments that are used instead of prescribed burning in areas where fire is inherently unsafe or undesirable given current fuels conditions.

Fire Management Units (FMUs) are areas that apply certain sets of the above fire management strategies. This chapter delineates FMUs for Fort Huachuca and describes them in detail. The units defined for Fort Huachuca integrate into the FMUs specified for the HAFP.

Figure 4-1 shows three FMU's for the installation:

- FMU 1: areas where wildland fire would be suppressed, but all other strategies available
- FMU 2: areas allowing suppression and non-fire treatments only (around perimeter)
- FMU 3: areas permitting all strategies

FMU 1 consists of areas where the risks to people, developments, and sensitive resources from prescribed fire are deemed manageable, while in FMU 2 risks are deemed too great, and only suppression and non-fire treatments are allowed. FMU 3 permits wildland fire use under predetermined conditions as well as the other strategies.

#### **Managing Fire in the Wildland-Urban Interface (WUI)**

Fort Huachuca contains urban, wildland-urban interface, and wildland components. The wildland/urban interface is the zone where human developments meet or intermingle with undeveloped wildlands. Fires have been destroying homes and killing people in this interface since the 1800s; in past decades, dealing with fire in the WUI has been a national priority but not one easily addressed. Fort Huachuca is a classic WUI situation, with structures and utilities intermixed with fire-prone, naturally vegetated areas. Protection within the WUI requires both wildland and structural firefighting skills. The decision about which natural resource or piece of property to protect and which to walk away from is a difficult one to make, especially during a wildfire. Thus the protection priority for fire management on Fort Huachuca is stated as life first and everything else second based upon the relative values to be protected. Despite inherent risks of escape and possible property damage and loss of life, prescribed fire has a role in the wildland-urban interface.

Fort Huachuca has nearly sixteen miles of common boundary with urban and developed lands. Many of these areas are rural subdivisions with grass and shrubby fuels up to and around scattered housing. These areas are at risk from fires starting nearby on Fort Huachuca.

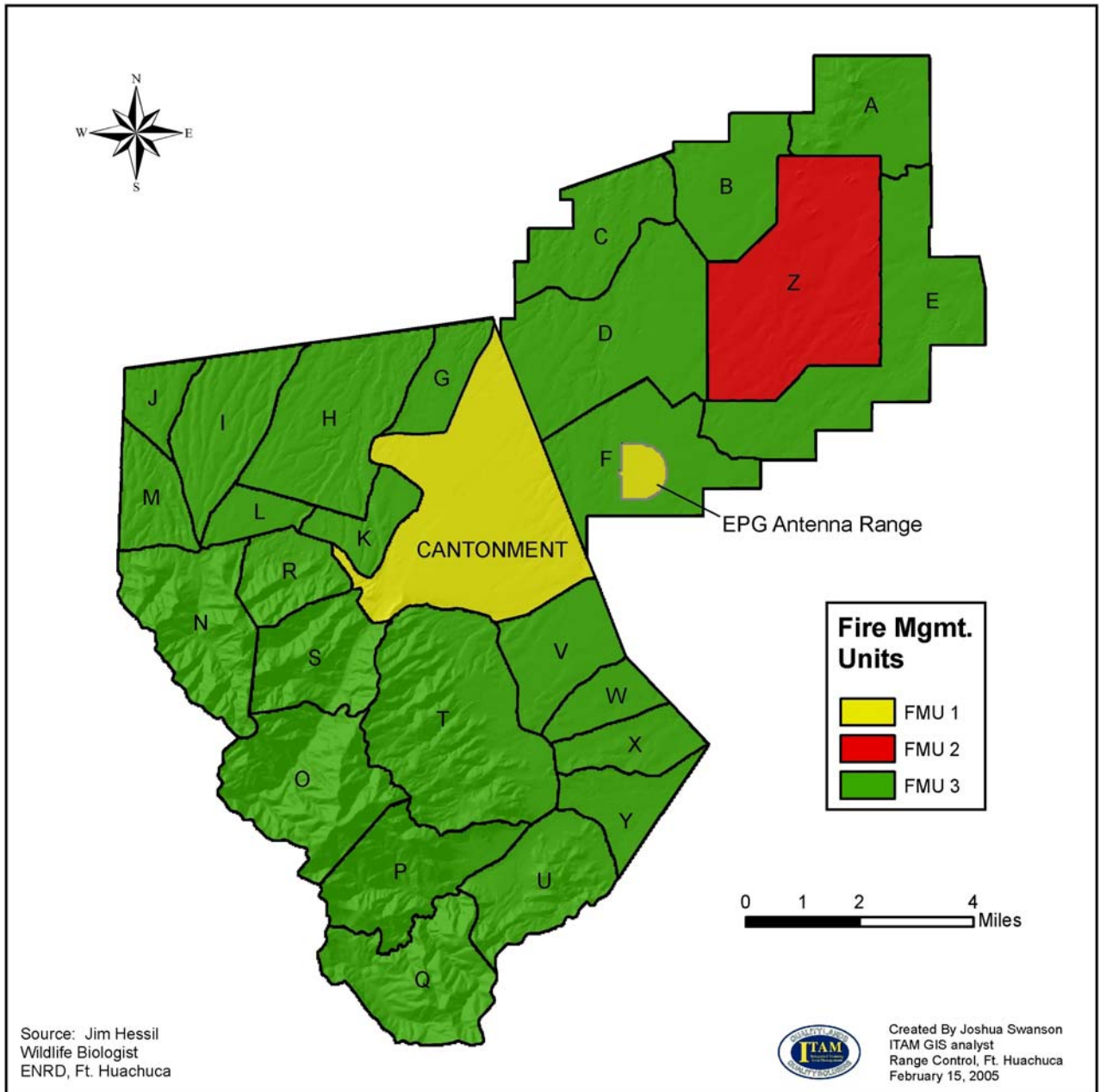


Figure 4-1. Fort Huachuca Fire Management Units.



**FIRE MANAGEMENT UNIT 1: WILDLAND FIRE SUPPRESSION**

(Wildland fire suppressed, but all other strategies available)

*Boundaries, Access and Important Features*—Cantonment Area, Airfield, section of Area F  
These areas contain ample access through existing roads. The entire FMU is relatively flat.

*Fuel Models*

Anderson (1982) models 1 and 3 for grasslands.

*Developments at Risk***Cantonment:**

Residential areas  
Schools, hospital  
Wren Arena  
Fuel storage areas  
Wastewater treatment plant  
Powerlines  
Water storage facilities  
Apache Flats RV Park  
Ammo Supply Point  
Cemetery (historic)

**Airfield:**

Hangars  
Fueling points

*Sensitive Natural Resources*

None

*Sensitive Historic properties*

Cantonment: National Historic District

*Operational Considerations*

Area F training exercises  
Traffic management in Cantonment area  
Smoke around the airfield  
Open house events  
Concerts  
Funerals  
Other scheduled public events  
Passage of undocumented immigrants trying to avoid detection

**FIRE MANAGEMENT UNIT 2: NO FIRE**

(Areas allowing suppression via confinement and non-fire treatments around the perimeter)

*Boundaries, Access and Important Features—Impact Area Z*

Any travel through Area Z must be confined to existing roads due to the presence of unexploded ordnance. A 15-ft (road width) firebreak surrounds the area.

*Fuel Models*

Anderson (1982) fuel models 2 and 6 for shrublands.

*Wildland Fuel Factors*

The fuels in the area are sparse and patchy. However, no burning is planned for this area.

*Developments at Risk*

None

*Sensitive Natural Resources*

None

*Sensitive Historic properties*

None

*Operational Considerations*

Potential live ordnance—fire management activities are restricted to the edges of Area Z and confinement is recommended strategy for wildland fire management.

Passage of undocumented immigrants trying to avoid detection

**FIRE MANAGEMENT UNIT 3: FULL TOOLBOX**

(Areas permitting all strategies)

*Boundaries, Access and Important Features*—everywhere else, including above Charlie Break. Terrain in FMU 3 varies from relatively flat shrublands and grasslands to steep, rugged forests in the high country. Lower elevation areas are served by numerous roads, but limited access exists for the high elevation areas because of fewer roads and poor condition of some roads.

*Fuel Models*

Anderson (1982) models 1, 2, 3, 6, 8 for grasslands, shrublands, woodlands/forest

*Wildland Fuel Factors*

Fuels in lower elevation areas are reduced through prescribed burns and other treatments. Fuel factors specific to high elevation training areas are discussed in Chapter 5. Fuel loads in the forested areas are heavy and terrain makes fire operations difficult.

*Developments at Risk*

3 Garden Canyon picnic areas (training areas P, U)  
 Huachuca Canyon picnic areas (S)  
 Garden Canyon Cabin (Q)  
 VA cemetery property (V)  
 Remote weather stations (several locations)  
 USGS stream gauges (Garden Canyon, Huachuca creeks)  
 Golf course (V)  
 Asbestos landfill (V)  
 Antenna test area (F)  
 Recharge basin instrumentation (F)  
 UAV facility (J)  
 Wind turbine (M)  
 West gate (M)  
 Powerlines  
 Buffalo Corral (K)  
 Blacktail Canyon electromagnetic test facility (R)  
 Split Rock Cabin (S)  
 Small arms ranges and targets (T)  
 Aerostat support buildings (Y)  
 Field training sites (U, P)  
 Maverick Training Site (L)  
 Leadership Reaction Course (Y)  
 Sportsman Center (V)  
 Precipitation station (Y)

*Sensitive Natural Resources*

Mexican spotted owl PACs  
 Upper Garden Canyon pond Sonora tiger salamander habitat  
 Huachuca water umbel populations in Garden, McClure, and Sawmill canyons and critical habitat in Garden Canyon Creek  
 Leopard frog, barking frog, and Arizona treefrog habitat  
 Lesser long-nosed bat roosts (caves and mines) and foraging areas  
 Spring and riparian habitat for sensitive species, including mature riparian trees

*Sensitive Historic properties*

Pictographs and wooden bridges  
 Archaeological sites with burnable materials

*Operational Considerations*

Range 5—high explosive hand grenades  
 Passage of undocumented immigrants trying to avoid detection  
 Special outdoor events (e.g. birding tours)  
 Hunting season  
 Research and long-term monitoring plots

## CHAPTER 5: SAFETY

The safety of firefighters and the public is the highest priority in every wildland fire management activity. Guaranteeing safety requires managing known risks wisely as well as following appropriate procedures during fire operations. These topics are also addressed in discussions of fire operations. Appendices F and G contain two safety tools used by the Coronado National Forest: Incident Extended Attack Complexity Analysis Worksheet and Incident Organizer. Fort Huachuca may choose to adopt similar tools as part of standard risk assessment procedures.

### RISK ASSESSMENT/DECISION ANALYSIS PROCESSES

Sound operational risk management will be the foundation for all fire management planning and activities. Key risk management processes relate to weather, condition of fuels, and neighbors. A logical, continuous, five-step process guides prescribed fire risk management:

- Assess hazards to determine risks.
- Implement controls that eliminate or reduce hazards.
- Decide how to proceed and communicate decision clearly.
- Evaluate effectiveness of mitigations and controls.
- Communicate and document risk decisions.

### Fire Weather and Season

The southern Arizona fire season runs from April into October. The weather conditions which influence fire ignition, behavior, and suppression are known as fire weather. The weeks before the July 1 ( $\pm$ ) start of the summer monsoon season define the period of highest fire danger. Hot, dry surface winds create thermals and carry moisture that is beginning to flow aloft from the Gulf of Mexico to form weak storm cells over the mountains. Virga, high surface winds, and lightning are common occurrences, along with occasional ignitions from ground strikes. Windy weather is typical on Fort Huachuca during spring and summer, especially in conjunction with monsoon storms.

Pre-monsoon fires are the most intense and typically have the highest spread rates. In addition to high temperatures, low humidities, high winds, and dry lightning storms, vegetation factors contribute to the intensity of the initial fire season. The perennial, mainly warm-season grasses remain dry and a readily available, significant fuel until July. In addition, the oaks generally drop (and replace) their leaves during the spring dry period that occurs from late April through early July.

The second fire season begins with the “true monsoon” onset. Storms are usually well developed by the third week in July and occur almost daily throughout the Huachuca Mountains. Green-up typically begins during the first two weeks of the season. Although fuel moisture and burning indices are usually lower than in the first fire season, more fires occur in the second season because there are many more storms and, consequently, more lightning. By August, when thunderstorm activity is often very high, soils and woody fuels at upper elevations are typically saturated with moisture and fire activity declines. When drier conditions return toward the end of September, few thunderstorms are occurring and fire activity remains low.

In addition, studies of long term fire-climate interaction through tree ring research have shown a connection between regional drought and fire season severity. The El Nino-Southern Oscillation (ENSO) seems to bring unusually wet weather to Arizona in the fall-spring period and greatly reduce the incidence of fire in the woody fuels in the mountain areas. These events are usually followed by drought years in which high fuel loads coincide with extremely low fuel moisture making the fire danger extreme and the risks in prescribed burning very high (Swetnam 1988, Swetnam and Betancourt 1990). The ENSO fire connection suggests that during some years it may be possible to forecast fire season severity well in advance. Drought beginning in the late 1990s has contributed to extremely hazardous fuel conditions in the woodlands and forests of the Southwest.

#### Fire Weather Variables Affecting Risk of Extreme Fire Behavior

- Air temperature
- Relative humidity
- Wind speed
- Wind direction
- Percent shading
- 1, 10, 100, 1000-hr time lag fuel moisture
- Live fuel moisture
- Drought index by fuel model

#### Fuel Breaks

A network of fuel/fire breaks and roads that have some use for fire management covers the installation. These potential fire control and access features extend from the crest of the Huachucas down to the lowest elevations on the East Range. Although the roads and breaks are helpful for fighting wildland fires and confining prescribed burns, they are of limited use in areas where slopes are steep and fuel loads are high. A number of these features traverse the ridgetops in an east-west direction along the eastern slope of the mountain.

The fuel/fire breaks were cut decades ago as safety features to reduce the threat of fire spread across the mountainous parts of the installation. The network was being maintained as of the early 1980s, but thereafter only sporadically. Most of the maintenance in recent years has been focused on the perimeter road around Impact Area Z, breaks in area T (location of live fire ranges), and the roads along the installation boundary (stop fire from spreading on and off the installation).

Future maintenance should continue to focus on the current priorities as well as provide for periodic maintenance of the remaining fuel/fire breaks and roads. This work will ensure the breaks and roads are in good enough condition to provide access for fire management and other activities. Maintenance tasks include grading and installing water bars, culverts, and other structures for erosion control. Removal of vegetation along the edges of breaks and roads will also increase their value for fire control. However, the east-west ridgetop breaks will receive minimum attention because of their limited utility and poor condition. The tribes that are consulted when the installation undertakes major land management actions have also objected to these ridgetop features.

### Fuels Considerations

Figure 5-1 shows features (fire breaks and helipads) that are important for fuels discussion and for overall fire safety. Areas with very heavy fuel loads and highly volatile fuels pose the highest risks on the ground to personnel managing wildland fires. On Fort Huachuca, these high risk areas include wooded tracts above Charlie Break, in narrow canyons and on steep slopes. Many parts of FMU 3 require reduction of fuels before wildland fire use is feasible. Fire management activities in highest risk areas are frequently limited to aerial efforts.

Important fuels-related and topographic features of military training areas (N, O, P, Q, R, S, U) are described below (see Figure 5-1):

#### Training Area N

- Heavily wooded along upper boundary with U.S. Forest Service and south and eastern ridgetops; manage with aerial forces.
- Southern edge rocky ridge could be defended with water drops; southeast ridgeline would accommodate helicopters with water buckets.
- Southeast part very densely wooded with highly volatile fuels; no ground crews—manage fires from the air only.
- Road on the Crest Trail above Deer Springs and above Blacktail Springs very rough and not accessible to pumper units; access to heavily wooded area from Helipads # 1 and 2
- Rugged ridgetop along its western boundary best managed from air (but fuels reduced from recent fires); use Helipad #1 and 2.
- Water source Parker Canyon Lake seven air miles from N.

#### Training; Area O

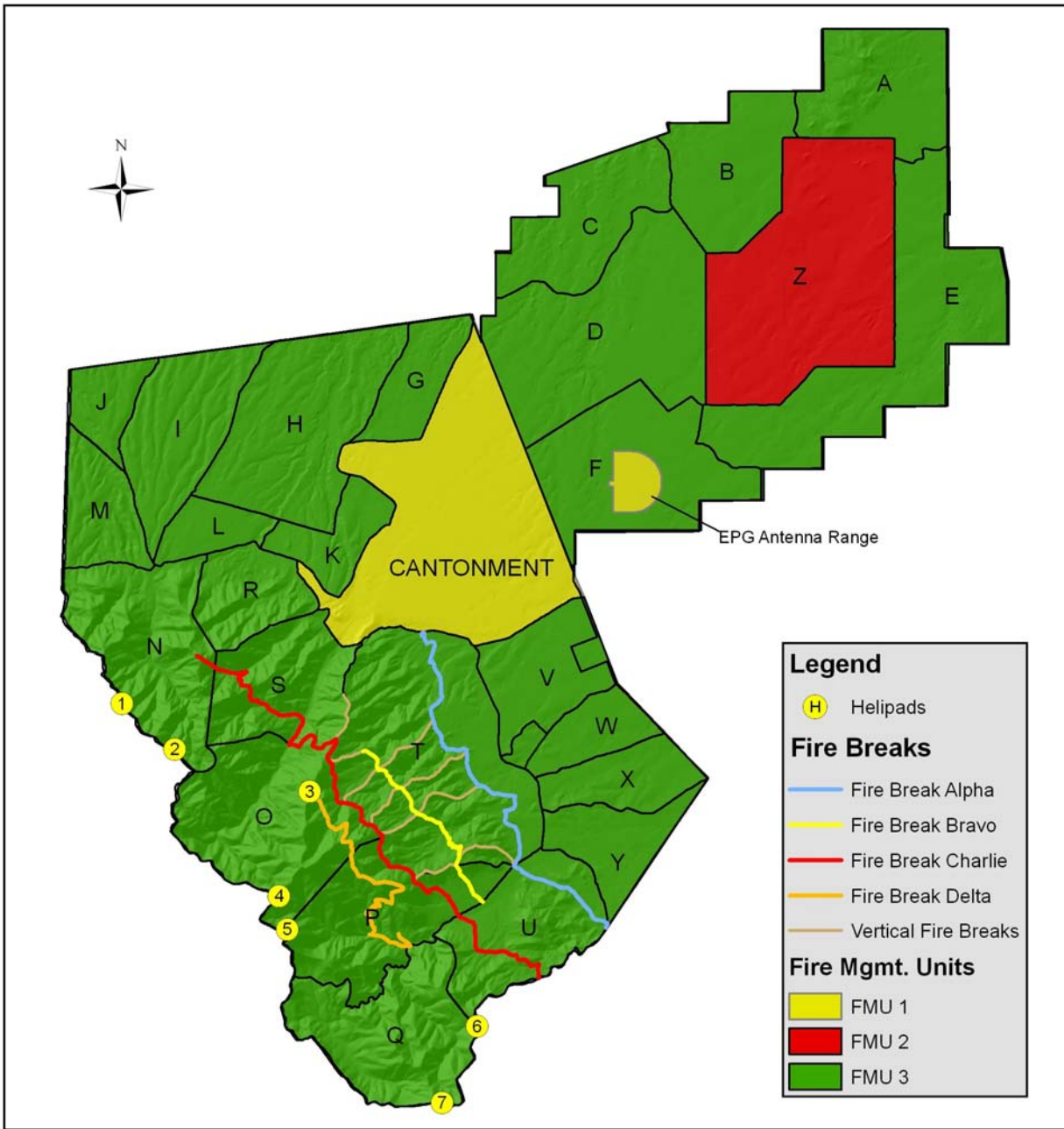
- East side of Huachuca Canyon very heavily wooded on very steep slopes with moderately deep and deep soils.
- Northwest-west side lacks breaks along its northern edge; defend by aerial forces.
- Parker Canyon Lake water source five air miles from O.

#### Training Area P

- No firebreak or control features from Lyle Peak down to the bulldozer line above Gate 7 along southwest boundary; should only be managed by aerial forces.

#### Training Area Q

- Very heavy and volatile woody fuel loads in rugged Scheelite Canyon; has not burned in a long time.



FMU Source: Jim Hessel  
Wildlife Biologist  
ENRD, Ft. Huachuca

Created By Joshua Swanson  
ITAM GIS analyst  
Range Control, Ft. Huachuca  
June 2005



Figure 5-1. Locations of Fire Breaks and Helipads.

- Very volatile woody fuels on the ridge between Scheelite and Sawmill; unsafe for ground forces on this ridge below the 7,800 foot elevation line.
- Ridge on the east side of Garden Canyon only defensible from the air.
- The area on the north side of Garden Canyon is defensible on top of Scheelite Peak as the ridge is flat and open.
- Area north and west of Scheelite Peak defensible only from the air down to the south exposure of the ridge hitting Garden Canyon; south exposure open enough for ground crews to work safely.
- Very large area of highly volatile woody fuels with low live fuel moistures in Sawmill Canyon and the headwaters of Garden Canyon
- Moderate fuels for one-fourth mile up from the Boy Scout Cabin along road up Sawmill Canyon
- Water source Parker Canyon Lake four air miles from Q.

#### **Training Area R**

- Southwest corner rocky, somewhat open ridge top; defend by aerial forces such as air tankers or helicopters with water buckets.

#### **Training Area S**

- Very steep section of ridge below Firebreak #5 has no road; needs helicopters with water buckets.
- Above Charlie Break to the crest of the ridge between Huachuca, Split Rock, and Blacktail Canyons very heavily wooded with no firebreaks; area of highly volatile woody fuels along the ridge into Blacktail Canyon to be managed from the air only.

#### **Training Area U**

- Generally heavy woody fuels of low volatility.
- Roads above Charlie Break could be used in the future as firebreaks by hand crews backfiring.
- Hand crews could manage fire burning up slope towards Scheelite Peak by defending the area on top of the peak accessible by Helipad #6.
- Rugged area of volatile fuels west of Scheelite Peak (runs into Q), down to Garden Canyon best managed using air tankers or helicopters with water buckets.

### **Neighbors**

Fort Huachuca has nearly sixteen miles of common boundary with urban and developed lands. Many of these areas are rural subdivisions with grass and shrubby fuels up to and around scattered housing. These areas are at risk from fires starting nearby on Fort Huachuca.



Prescribed fire has a role in the urban/wildland interface, however there are inherent risks of escape and possible property damage and loss of life if the fire is not managed by trained fire practitioners. Protection within the wildland/urban interface is very complex with both wildland and structural firefighting skills needed.

### SAFETY AND EMERGENCY OPERATIONS

Firefighter and public safety is the highest priority in every wildland fire management activity. Wildland fire Standard Operating Guidelines (SOGs) specifically address safety considerations. Fort Huachuca has established SOGs to establish standard:

- Minimum list of gear carried by all fire department personnel in initial attack packs
- Procedures for operations and training required for issue of the Red Card to fire department personnel
- Procedures for administration and oversight of fires not only in the wildland areas of Fort Huachuca, but fires that threaten to encroach on the installations (SOG covers dispatch through initial attack through control or escape)
- Procedures for wildland fire (caused by humans or lightning) suppression operations
- Procedures to ensure, when possible, the protection of environmentally sensitive areas during suppression activities
- Procedures for inspection and maintenance of wildland fire equipment and hand tools

Within these SOGs are key policies relating to safety (summarized briefly here—refer to full-text documents at the fire department):

- Limits on use of equipment are determined by the design specifications and experience of users
- Crew chiefs will ensure personnel are properly dressed and equipped
- Attention will be paid to the driving (especially transit to fires), parking, and securing of vehicles
- Assignments to wildland fire duty will follow Red Card qualifications
- Ten Standard Firefighting orders will be adhered to
- NWCG, NIMS, NFPA standards and guidelines will be followed
- Fire suppression will NEVER take place in impact areas, and caution will ALWAYS be necessary relative to ordnance installation-wide

The chief of the crew that arrives first or that person's designee will initially serve as IC. In the event of fire escape, this Initial Attack IC will notify the shift supervisor, setting off the following possible chain of events:

- Shift supervisor requests Type 3 IC through proper channels
- If Type 3 IC is unavailable from the installation fire department, one will be brought in from an outside agency
- Upon the transfer to the Type 3 IC, the shift supervisor will assign a member of the fire department to be liaison between IC and fire department and to be stationed at the Incident Command Post
- No change of IC will take place without a face-to-face meeting between incoming and outgoing IC's.

### **Unexploded Ordnance (UXO)**

Presence of UXO is a hazard that comes with operating an installation training facility. Fire operations must consider the possible presence of UXO and follow Fort Huachuca's standard operating procedures (July 2004) for encounters with UXO. The presence of UXO has resulted in the exclusion of fire from Impact Area Z under this IWFMP.

The Directorate of Emergency Services has responsibility for UXO procedures in the cantonment area or other developments beyond it. Range Control handles UXO incidents on training lands. The Fire Chief will advise the officer/NCO in charge on measures to minimize range fires that include:

- Optimum detonation location
- Watering/foaming around detonation location
- Positioning of firefighting equipment

Along with the Fire Department, Military Police and ENRD personnel are charged with minimizing impacts to public safety and sensitive environmental resources during UXO disposal activities. For UXO that pose an immediate and serious threat to life and property, assistance from off-base specialists is immediately requested. The final step before UXO disposal is completion of the Fire Department and ENRD checklists and hand-off to the officer/NCO in charge.

### **OUTREACH ACTIVITIES**

Keeping people informed and safe is a critical component of any fire operation at Fort Huachuca. Public safety and information rely on clear, directed, and frequent communications and relate directly to IWFMP goals and objectives:

Protect life as the highest priority.

- Provide for the safety of army personnel, dependents, employees, visitors, and fire staff.
- Maintain a qualified and properly trained fire staff.
- Reduce fuels that threaten high-use areas.

Protect installation and personal property.

- Reduce fuels that threaten high-value areas.
- Coordinate structural and wildland fire operations.

Coordinate fire operations with other installation divisions and neighboring land owners.

- Bring together structural and wildland fire planning operations.
- Maintain communication and educate the neighbors about the fire program.
- Maintain formal agreements and conduct joint fire management activities with neighbors.

### **Public and Employee Safety**

Public and employee safety is a primary management concern. The rugged topography, limited surface water, and limited access to many areas combine to create hazardous situations under extreme fire behavior. The highest risk areas are identified above in "Fuels Considerations." Entrapment is possible, especially when a fire starts at the mouth of canyons and blocks safe passage on the road. Garden and Blacktail canyons are especially at risk with their one-way-in-and-out roads. Early evacuation of the public, employees and others in canyon areas may be necessary under conditions of extreme fire behavior. The Director of Emergency Services (DES) will make the decision to evacuate and supervise necessary actions.

Backcountry visitor and undocumented immigrant safety during high to extreme fire danger is also a concern. Some of the trails are in canyon bottoms, which could be dangerous because of

thick vegetation and steep slopes preventing acceptable escape routes. Alerting hikers of possible impending hazardous situations during wildfire incidents is critical to ensuring visitor safety. This operation requires careful coordination to ensure that all trails and sites are covered. Fort Huachuca will follow the lead of the neighboring Coronado National Forest to make the decisions about restrictions on backcountry use. The Public Affairs Officer (PAO) will inform the public, and the fire department will take necessary implementation actions. The Director of Morale, Welfare, and Recreation may close campgrounds, with the PAO again informing the public, and MPs and Environmental Protection Officers enforcing closures with patrols.

The Burn Boss will ensure that closure and informational signs on all prescribed fires are properly posted, and the DES will enforce closures.

### **Public Information and Education**

The focus for public education activities at Fort Huachuca is to provide information on (1) fire behavior and the danger imposed by fire, (2) the role of fire in fire-dependent ecosystems, (3) the goals and rationale for fire management on the installation, and (4) current and proposed fire activity within the installation. Interpretation helps generate public awareness and support for fire management at Fort Huachuca and in surrounding communities; it can also help build a tolerance for the smoke that comes with fire events.

## **FIRE REVIEWS AND CRITIQUES**

### **Incident**

The Fire Chief may call for reviews of wildland fires, fire-related incidents, and prescribed fires (as deemed appropriate) in order to:

- confirm or correct decisions
- identify improved procedures
- apply lessons learned to the fire management program
- improve prescriptions and burn objectives for prescribed and fire use fires
- understand anomalous incidents and deal with possible negligence

All situations resulting in human entrapment, fatalities, or serious injuries (or had the potential to do so) require reviews. It is the intent of reviews to resolve operational issues, not impose punitive actions.

### **Program**

Program-level reviews fine tune Fort Huachuca's management of fire:

- to assure compliance with changing Department of the Army guidelines
- after an unusual fire season
- for budgetary purposes
- to assure continued preparedness

### **Annual Fire Management Plan Review**

Fort Huachuca's IWFMP will be reviewed annually in order to update, amend, and re-certify the effectiveness of the plan. Representatives from the Fire Department, Range Control, Environmental Division, and the Sierra Vista Ranger District will meet after the summer fire season to review the fire management plan: The meeting will be called by the Fire Chief and Environmental Division Chief, and the group will revise and update the plan as required. The

IWFMP will undergo formal evaluation and reaffirmation or revision every 10 years or less, when needed. The Environmental and Natural Resources Division will oversee reviews and send changes to individuals holding copies of the plan.

## CHAPTER 6: WILDLAND FIRE MANAGEMENT

This chapter discusses general procedures for wildland fire management, including wildland fire use and suppression strategies. The fire management goals and objectives presented in Chapter 1 guide employment of these strategies at Fort Huachuca; protection of life and property remains the highest priority through all activities.

Wildland fire management at Fort Huachuca remains closely tied with the neighboring Sierra Vista Ranger District of the Coronado National Forest (CNF). The interagency agreement between the USDA Forest Service and the U.S. Army, Fort Huachuca covers the transfer of fire management to the CNF. The primary weather station used for fire management purposes is Carr, station 21411, which is located on the CNF south of Fort Huachuca.

### COMPLEXITY DECISION PROCESS FOR INCIDENT MANAGEMENT TRANSITION

Criteria for the need to transition from initial attack to extended attack include situations where:

- the fire cannot be contained with initial attack resources within 2 operational periods of fire detection
- fire behavior exceeds capability of initial attack resources to contain the fire
- the fire threatens any installation's natural or cultural resource for which there may be legal protection requirements

Criteria for the need to transition from extended attack to Type 1 or Type 2 incident management include situations where:

- fire behavior exceeds the capability of extended attack resources to contain the fire
- the fire threatens any installation natural or cultural resource for which there may be legal protection requirements
- firefighter and public safety has the potential to be significantly compromised.

Appendix H contains the installation's form for Delegation of Authority for transferring fire management responsibility to CNF.

### PREPAREDNESS ACTIVITIES

Preparedness actions include fire prevention activities, community education, annual training needs assessment, fire readiness, fire weather and fire danger assessments, index-trend monitoring and seasonally adjusting staffing. The Fort Huachuca prevention program consists of a combination of public education, regulations enforcement, safety inspections, hazard fuel reduction, and related maintenance activities. The annual work plan for the Fire Department specifies activities for the coming fire season. Table 6-1 lists routine tasks and responsibilities for them.

**Table 6-1. Prevention Tasks and Responsibilities**

Task	Responsibility
Use and update the Main Gate, East Gate and Garden Canyon Road fire danger indicators on a daily basis.	FD
Include a fire prevention message in routine communications.	PAO
Conduct fire prevention patrols to ensure compliance with restrictions and regulations.	DES
Post fire warning signs at the mouth of Huachuca and Garden Canyons during periods of very high to extreme fire danger.	FD
Prepare news release stating NO FIREWORKS allowed just prior to July 4 <sup>th</sup> .	PAO
Prepare news releases for local media during extended periods of very high to extreme fire danger.	PAO
Empty campground fire grills seasonally.	MWR
Maintain and strengthen fuel reduction zones around structures.	DPW
Conduct annual fire safety inspections for all structures.	FD
Equip vehicles with a fire extinguisher; during the fire season, equip designated vehicles with fire tools.	FD/Range Control
Impose emergency restrictions on campground fires and backcountry trail use during periods of extreme fire danger, if necessary.	FD
Conduct community outreach concerning fire prevention and management.	DPW, FD

FD = Fire Department

PAO = Public Affairs Office

DES = Directorate of Emergency Services

MWR = Morale, Welfare, and Recreation

DPW = Directorate of Public Works

## COMMUNICATIONS

Communications procedures cover working with internal and external parties. Within the installation, the Fire Department receives communications at 172.32500 and transmits at 162.10000. Fire personnel on foot during fire activities communicate via hand-held radios; newer fire trucks are equipped with radios. It is a priority for the Fire Department to upgrade and acquire more hand-held radios. For incidents on the installation, Fire Station 1 serves as the dispatch center. The primary frequency for communicating (transmitting and receiving) externally with the Coronado National Forest is 168.15000 (CNF fire net). Fort Huachuca's mountains and canyons can interfere with radio transmissions. For a large fire with multiple agencies, parties switch to the Arizona State Land Department's mutual aid frequency 154.280. The regional air-to-ground frequency (SE Zone) is 171.4750. Other activities, particularly those involving air support, may require identifying and programming additional frequencies.

## DETECTION PROCEDURES

Historically, the residents of the Sierra Vista area to the east and valleys to the north and west have reported smoke in the Huachucas that alerts the Fort Huachuca to the presence of fires. The Coronado National Forest uses lookouts at Red Mountain (Patagonia Mountains on the west side of the Sierra Vista Ranger District) and Lemmon Rock (Catalina Mountains northwest of the district) to detect fires. Red Mountain is generally staffed from April until August. The Coronado also flies the forest twice a day (morning and afternoon) during periods when fire danger is extreme (usually late May until early July).

## SAFEGUARDING SENSITIVE SITES

Fort Huachuca will manage wildland fire use and suppression in ways that minimize unnecessary impacts to resources and convey the importance of this strategy to all fire management forces. Minimum impact management strives to minimize landscape alteration and disturbance to natural resources and historic properties while safeguarding human lives and property and accomplishing resource-related objectives. These measures particularly benefit sensitive natural resource and historic properties sites. Without compromising safety, lines will be located where they do the least damage, and use natural firebreaks when possible. Staging areas and helipads will be placed where damage to natural resources and historic properties is minimized. Agency resource advisors will be consulted prior to implementing management tactics.

No-slurry areas (water drops instead) include:

- Pictograph areas in Garden Canyon
- Garden Canyon Creek
- Tinker Pond
- Cantonment area
- Aerostat
- Airfield
- Sensitive wildlife habitat (see Chapter 8)

The decision on whether to dig line in archaeological site areas depends on a judgment about the effects of potentially high-severity fire versus the disturbance, erosion, and siltation that might occur as the result of digging line.

### REHABILITATION GUIDELINES

Many wildfires cause minimal damage to the land and pose few threats to the land or people downstream. Fire-adapted landscapes can be expected to change following fire events; erosion following wildfire, for example, is an element of natural landscape change, and its effects are not necessary deleterious. Some fires, however, cause damage that requires special efforts to prevent problems afterwards. Major loss of vegetation exposes soil to abnormal levels of erosion; water runoff may increase and cause flooding; sediments may move downstream and damage developments or fill water bodies putting endangered species and water supplies at risk.

After a fire the first priority is emergency stabilization to prevent unacceptable resource degradation and to minimize threats to life and property. The stabilization work begins before the fire is out and may continue for up to a year. Emergency actions do not necessarily eliminate the need for future repair of damaged facilities, long-term monitoring, or actions to control invasive non-native species. The longer-term rehabilitation effort to repair damage caused by the fire begins after the fire is out and continues for several years. Rehabilitation focuses on the lands unlikely to recover naturally from wildland fire damage.

Department of the Interior agencies and the USDA Forest Service undertake Burned Area Emergency Response (BAER) programs designed to protect life, property, and critical natural resources and historic properties. BAER teams are staffed by specially trained professionals: hydrologists, soil scientists, engineers, biologists, vegetation specialists, archeologists, and others who rapidly evaluate the burned area and prescribe emergency stabilization treatments. A BAER assessment usually begins before the wildfire has been fully contained.

In most cases, only a portion of the burned area is actually treated. Severely burned areas, very steep slopes, places where water runoff will be excessive, fragile slopes above developments, and other valuable facilities are focus areas. The treatments must be installed as soon as possible, generally before the next damaging storm. Time is critical if treatments are to be effective.

A BAER team might recommend mulching with straw or chipped wood, construction of straw, rock or log dams in small tributaries, placement of logs to catch sediment on hill slopes are the primary stabilization techniques used, and reseeded of ground cover with quick-growing or native species. Unlike the Forest Service, the National Park Service recommends seeding or replanting only when damage from pending erosion or potential for invasion by non-natives are predicted to be intolerable. Otherwise, natural recovery of plant communities is preferable. A BAER team also assesses the need to modify road and trail drainage mechanisms by installing debris traps, modifying or removing culverts to allow drainage to flow freely, adding additional drainage dips and constructing emergency spillways to keep roads and bridges from washing out during floods.

BAER Task List



- Install warning signs.
- Remove hazardous trees; fall trees on contour.
- Rake and seed on contour.
- Mulch with straw.
- Place log structures, rock check dams, and straw wattles on contour (20' biodegradable mesh tubes filled with straw).
- Plant for erosion control or stability reasons.
- Install erosion control measures at critical cultural sites.
- Install temporary barriers to protect treated or recovering areas.
- Replace minor safety related facilities.
- Install appropriate-sized drainage features on roads, trails.
- Remove critical safety hazards.
- Prevent permanent loss of T&E habitat.
- Plant grass to prevent spread of noxious weeds.
- Avoid use of rehabilitated areas as travel corridors.
- Monitor BAER treatments.

A Forest Service analysis (<http://www.fs.fed.us/fire/wfsa/WFSA%20BAER%20cost%20est.pdf-8-23-05>) of wildfires in 2002 and 2003 showed BAER costs running about 6% of suppression costs in the Southwest. BAER teams are available in the region for projects on Fort Huachuca.

#### **WILDLAND FIRE USE**

Wildland fire use is a step toward restoring natural fire regimes at Fort Huachuca and in the region. Natural fires probably burned for several weeks to a month or more. Similar behavior should be expected if lightning-initiated fires are allowed to burn early in the season. Fire sizes ranged from patchy, small fires to mountain range-wide fires. Fuel buildups that are the legacy of the full suppression era dictate that great caution is still required when considering letting natural ignitions burn. Wildland fire use must be soundly based on management objectives—public and firefighter safety, natural resources and historic properties benefits, interagency collaboration—and may include the full range of fire management strategies on a fire’s entire perimeter. Ongoing fire use that does not meet predetermined prescriptive elements or fails to meet resource management objectives will be suppressed.

When a wildland fire meets the conditions of a predetermined prescription for fuel reduction or ecological improvement, it becomes a candidate for fire use. The Fort Huachuca Fire Chief will make the decision about declaring wildland fire use in areas below Charlie Break, and the Forest Service and FH Fire Chief will jointly make a decision for areas above Charlie Break. The Coronado National Forest amended its land management plan in 2005 to permit wildland fire use in non-wilderness as well as the previously sanctioned wilderness areas. Table 6-2 outlines initial and daily wildland fire decision criteria used by the CNF. A “go” decision results when all the criteria in Table 6-2 are satisfied. Because of extensive wildland-urban interface, especially on the east slope of the range, the likelihood of satisfying all the criteria is not great. Reducing fuels in the Huachuca high country remains a dilemma for all the land managers in these mountains.

**Table 6-2. Wildland Fire Use Decision-making Criteria/Daily Review.**

Based on the USDA/USDI Interagency Wildland Fire Use Implementation Procedures Reference Guide (2005). A “go” decision results when all answers are “no.”

**Decision Element****Yes/ No**

Is there a threat to life, property, or public and firefighter safety that cannot be mitigated?

- If known threats cannot be adequately mitigated, managing the fire as a wildland fire use has potential concerns due to fire location, serious threats to firefighter safety, and potentially significant consequences.

Are potential effects on cultural and natural resources outside the range of acceptable effects?

- Potential outcomes and desired effects are closely correlated with burning conditions and fire behavior. Objectives and constraints include air quality and effects on natural and cultural resources, as applicable. References for objectives and constraints include the unit FMP, unit land management plan, and agency administrator input.

Are relative risk indicators and/or risk assessment results unacceptable to the appropriate agency administrator?

- The third decision element involves an relative assessment of the risk for the fire. The relative risk assessment uses three risk components: values, hazards, and probability. Values are those ecological, social, and economic resources that could be lost or damaged because of a fire. Hazards in wildland fire are made up of the conditions under which it occurs and exists, its ability to spread and circulate, the intensity and severity it may present, and its spatial extent. Probability refers to the likelihood of a fire becoming an active event with potential to adversely affect values.

Is there other proximate fire activity that limits or precludes successful management of this fire?

- This element pertains to other local and regional fire activity, commitments of unit and cooperator resources, specific unit FMP limitations on fire numbers, and availability to fill special skill positions from local resources for this fire. If current fire activity precludes the ability to manage the fire with adequate resources and skill mixes, then the response to this element will be “Yes” and a suppression response indicated.

Are there other agency administrator issues that preclude wildland fire use?

- The final decision element allows agency administrator discretion in the event there are other issues which were unknown to the fire staff and must be considered as part of the decision to manage the fire for resource benefits. Agency administrators will document other issues that precluded management of the fire for resources benefits.

## SUPPRESSION

Automatic suppression applies to wildland fires in FMU 1 and FMU 2, or natural ignitions failing to qualify for wildland fire use. These fires will receive prompt, safe suppression actions that minimize resource damage and suppression costs. Under an appropriate management response, changes in fire perimeter may be allowed to protect firefighter safety and take advantage of natural barriers or other advantageous site conditions (confinement strategy).

### Information Used to Set Initial Attack Priorities

Information sources for setting suppression priorities include:

- GIS map, depicting urban interface areas, areas of high visitor use, and trail and road system
- Vegetation map (GIS and paper copy)
- Maps of archeological and cultural resource sites
- Smoke modeling data
- Maps of sensitive natural resource areas (Mexican spotted owl PACs, agave areas, riparian areas, springs, locations of other sensitive species)

Keeping firefighter and public safety as paramount, the following are initial attack priorities for Fort Huachuca:

- Fires burning into wildland urban interface areas where fire effects would not be desirable or beneficial, or where public and firefighter safety would be jeopardized
- Vegetation types with potential for rapid rates of spread into areas where fire is not desirable for public and firefighter safety reasons
- Archeological sites whose value will be destroyed by fire
- Fires producing undesirable fire effects in sensitive natural resource areas—riparian corridors, sensitive or rare plant/animal habitats
- Fires that produce smoke detrimentally affecting sensitive receptor sites within and outside the installation

Fire behavior is directly influenced by season, weather, fuel characteristics, and topography; fires burning during the monsoon rains tend to burn more slowly and with less intensity than fires burning before the monsoon season or in the late Fall. Seasonal curing as related to fuel moisture and fuel arrangement play critical roles in determining potential fire behavior in all vegetation types.

### Confinement as an Initial Attack Suppression Strategy

A confinement strategy may be implemented as an initial attack option in lieu of wildland fire use to maximize firefighter safety, minimize suppression costs, minimize loss in specific resource areas, and to maximize availability of critical suppression and management resources during periods of high fire danger associated with fire in highly valued resource areas.

Confinement can also be a strategic selection when the fire is expected to exceed initial attack capability or planned management capability. When confinement is selected as the initial action, the same management process applies as for wildland fire use decisions. A long-term implementation plan is needed to guide the implementation of the confinement strategy.

## CHAPTER 7: PRESCRIBED FIRE

Fort Huachuca has been conducting prescribed burns since the 1950s for natural resource management and to reduce fuels to support the military mission. The “prescriptions” behind these burns are predetermined environmental conditions that are predicted to yield desired outcomes. In recent decades, burns have been carried out for ecological purposes as well as fuel reduction. Prescribed burns pretreat the landscape to prepare for the return of fire as a natural process. Such fires become the process when lack of ignitions and restrictive conditions prevent wildland fire use. Benefits of prescribed fire include support for military training, structure protection, and reduction in severity of future wildfires that might otherwise damage sensitive plant and animal communities, promote erosion and sedimentation, and negatively affect sensitive historic properties.

Prescribed fires also compensate for ignitions off the installation that might naturally move onto Fort Huachuca but are instead suppressed. Non-fire treatments, chiefly mechanical thinning, mowing, and herbicide application, allow for fuel reduction and ecological restoration in areas where fire is undesirable or too difficult to manage. Non-fire treatments cannot always provide the ecological services rendered by fire: recycling nutrients, releasing nutrients, and triggering seed germination.

Since 1973, prescribed burns and wildfires have burned about 35% of the installation (25,000 acres). Future burns are scheduled for approximately 50,000 acres, including areas that burned previously. There are no current plans to burn about one-third of the installation—above Charlie Break because of difficult terrain and heavy fuels, in the Cantonment Area because of developments, and in impact area Z because of unexploded ordnance. Some mechanical treatments followed by conservative prescribed burns may be considered for these areas in the future.

### SEASON

Prescribed fires frequently take place outside the natural fire season. The typical lightning fire occurs in the late spring or summer as the monsoon pattern sets up and frequent thunderstorms develop (Danzer et al. 1996). While the greatest ecological benefit should be derived during the natural fire season, extreme weather conditions during these months coupled with high fuel loads can make fire difficult to manage. Cooler season burns reduce the risk of fires exceeding prescription. Thus fall or early spring may be suitable for first entry burns for understory fuels reduction where overstory is thick. Winter burning of thinned trees or slash piles is appropriate. Spring and summer burns can take place in areas that are not characterized by heavy fuels. Since natural warm season fires are taking place during the growing season, bare areas begin to recover quickly.

## BURN PLANS

Burn plans establish parameters that promote the desired fire behavior and effects. They also document steps taken to avoid loss of life, equipment, and property. Federal agencies have their own formats for burn plans. Generally burn plans contain:

Burn area description	Public safety provisions
Fuel models/loading/arrangement	Smoke management provisions
Prescription	Monitoring, evaluation, documentation procedures
Predicted fire behavior and test burn procedures	Staffing/organization, including burn boss, crews, monitors
Burn goals and objectives	Protection of sensitive resources
Range of acceptable results	Funding and costs
Complexity and risk assessment and contingency plans	

Because Fort Huachuca relies on the CNF to manage fires beyond the capability of the fire department, it is adopting the USDA Forest Service burn plan template for prescribed fires (Appendix I). The Forest Service plan contains a number of items not found in the Department of Army recommended format, and the CNF has requested that Fort Huachuca follows its guidelines and provide the additional material.

## RESPONSIBILITIES FOR PRESCRIBED BURNS

This IWFMP proposes a 10-year program of prescribed burns. On an annual basis, Environmental Division staff, Range Control, Fire Department, and other personnel will meet to review the year's proposed projects and update the schedule. The Fort Huachuca Forester will oversee completion of necessary burn plans and coordinate review, approval, and ADEQ air quality compliance activities with other Fort Huachuca personnel, including the Fire Chief and Ecologist. The Forester also coordinates with the Fire Department for qualified personnel to carry out projects, working with the Forest Service when needed.

## DOCUMENTATION

The permanent record for prescribed fire projects should contain the following documents:

Original signed prescribed fire plan	Agency administrator go/no-go approval
Checklist of pre-burn activities	Operational go/no-go checklist
All reviewer comments	Incident action plan(s)
All maps	Unit logs, daily validation, other unit leader documentation
Notification checklist	Press releases, public comments, complaints
All permits (burn, smoke, others)	Smoke dispersal information
Monitoring data	Post-fire analysis
Weather forecasts	Photographs

## PROPOSED PROJECTS

Table 7-1 is a schedule of prescribed burning and non-fire treatment projects proposed under this fire management plan. The schedule was developed considering, for any given area, time since last fire and location relative to other burned parcels. These projects are intended to treat all of the areas on Fort Huachuca where prescribed fire is feasible on about a 10-year cycle and to create a large-scale mosaic of recently and less recently burned units. Figure 7-1 shows the locations of the units listed in Table 7-1. Table 7-1 also briefly describes the purpose of each project. Most are designed to yield both fuels reduction and ecological benefits.

### Smoke Management

Although prescribed fire is essential to meet military training, resource and public safety objectives, the short-term effects on air quality may violate certain air quality standards, either on or off the Fort. Smoke, (or particulate matter), produced from wildland fires is a pollutant which can present a health hazard to humans and animals. It can also impair visibility which can create safety hazards along roads, airports, and highways. The degree to which fuel is consumed during a fire determines the amount of smoke produced. Nearly complete oxidation of fuels produces very little smoke, while fires where consumption is poor produce a great deal. Climatic conditions determine how smoke will rise, flow, and dissipate into the atmosphere. Basically, dry fuels burning under hot dry conditions will produce little smoke. The opposite is true for green fuels under wetter and/or cooler conditions. Daytime burns in the May through June season will have smoke plumes which rise vertically several thousand feet and are dispersed by high speed winds aloft. During the nighttime as the earth's surface cools, nocturnal air flow is such that smoke does not rise but drifts down slope to settle in valley areas. Air inversions can trap warm smoke-filled air in these low lying areas causing severe air pollution at the ground surface (National Wildfire Coordinating Group 1985).

Mitigation of smoke related impacts caused by prescribed fires will be addressed in the Prescribed Burn Plan format (Appendix I) for Fort Huachuca and monitored in accordance with ADEQ regulations (Appendix J). The Plume Observation Form required by ADEQ for burns larger than 250 acres/day can be found on the ADEQ website Forms also available at <http://www.azdeq.gov/enviro/air/smoke/fires.html>.

#### Annual Air Quality and Smoke Management Activities

- *December 31(with grace period until January 31):* Complete Annual Prescribed Burn Registration Form for upcoming year's activities; list of completed projects from previous year (see Appendix J)
- *Between February 1 and March 31:* Attend annual meeting with ADEQ to discuss program and emission goals for upcoming projects
- *At least 14 days prior to ignition:* Submit ADEQ Burn Plan Form (Appendix J); smoke dispersion map, with location of burn relative to locations of smoke-sensitive areas, Class I areas, or non-attainment areas within 15 miles in any direction of the project.
- *Before large burns (>250 acres/day):* Run Simple Approach Smoke Estimation Model (SASEM) that calculates fuel consumption, particulate emissions, and dispersion of particulate matter produced by prescribed burning. Submit with ADEQ burn plan form.

**Table 7-1. Proposed Fire Project Schedule 2005 – 2015**

Year	Project Name and Number	Acres	Ecological Mapping Unit	Project Description
2005	Site Papa	100	Grassland on elevated plains (#3)	Emergency burn required for proposed military training complex
2005	Range 13	900	Grassland on elevated plains (#3) and Madrean oak-pine woodland (#10)	Support live-fire training, improve grassland habitat and watershed values
2005	Lima/Kilo	1,000	Grassland on elevated plains (#3)	Support increased military training, reduce woody vegetation and improve grassland habitat and watershed values
2005	Whiskey	1,000	Grassland on elevated plains (#3)	Support increased military training and improve grassland habitat and watershed values
2005	Planning Area 1	300	Chihuahuan desert scrub and grassland (#2)	Reduce shrub encroachment and improve watershed values
2005	Planning Area 6 (South)	700	Chihuahuan desert scrub and grassland (#2)	Reduce shrub encroachment and improve watershed values
2005	Helipad Maintenance	2	varies	Reduce woody vegetation on 7 helipads for future use
2005	Firebreak Maintenance	n/a	n/a	
2006	Kilo Burn	900	Grassland on elevated plains (#3)	Reduce woody vegetation and improve grassland

Year	Project Name and Number	Acres	Ecological Mapping Unit	Project Description
				habitat and watershed values
2006	X-Ray Burn - West	500	Grassland on elevated plains (#3)	Support military training, reduce woody vegetation and improve grassland habitat and watershed values
2006	Victor Burn - West	300	Grassland on elevated plains (#3)	Reduce woody vegetation and improve grassland habitat and watershed values
2006	East Range - Planning Area 6 (North)	1,300	Chihuahuan desert scrub and grassland (#2)	Reduce shrub encroachment and improve watershed values; Burnable acreage approx. 500.
2006	Old Range 12 Burn	750	Grassland on elevated plains (#3) and Madrean oak-pine woodland (#10)	Support live-fire training, improve grassland habitat and watershed values
2006	Area Golf Burn	1,000	Grassland on elevated plains (#3)	Reduce woody vegetation and improve grassland habitat and watershed values
2006	Area Yankee - Southwest	150	Grassland on elevated plains (#3)	Reduce woody vegetation and improve grassland habitat and watershed values
				APPENDIX N
2007	Area India - South	400	Grassland on elevated plains (#3)	Reduce woody vegetation and improve grassland habitat and watershed values
2007	Area T2 - Southeast	600	Grassland on elevated plains (#3)	Support live-fire training, improve grassland habitat and watershed values
2007	Area T1 - East	800	Grassland on elevated plains (#3)	Support live-fire training, improve grassland habitat



Year	Project Name and Number	Acres	Ecological Mapping Unit	Project Description
				and watershed values
2007	Area T3 - West	800	Madrean oak-pine woodland (#10)	Support live-fire training, improve grassland habitat and watershed values
2007	Area Uniform - Northcentral	300	Grassland on elevated plains (#3)	Reduce woody vegetation and improve grassland habitat and watershed values
2007	East Range – Planning Area 8 (South)	800	Chihuahuan desert scrub and grassland (#2)	Reduce shrub encroachment and improve watershed values. Burnable acreage approx. 300 acres.
2007	East Range – Planning Area 5 (South)	600	Chihuahuan desert scrub and grassland (#2)	Reduce shrub encroachment and improve watershed values. Burnable acreage approx. 300 acres.
2008	Area Hotel - South	2,100	Grassland on elevated plains (#3)	Support increased military training, reduce woody vegetation and improve grassland habitat and watershed values
2008	Area T2 - Northcentral	750	Grassland on elevated plains (#3) and Madrean oak-pine woodland (#10)	Support live-fire training, improve grassland habitat and watershed values
2008	East Range – Planning Area 8 (North)	800	Chihuahuan desert scrub and grassland (#2)	Reduce shrub encroachment and improve watershed values. Burnable acreage approx. 250 acres.
2008	Area Uniform - Northwest	500	Grassland on elevated plains (#3) and Madrean oak-pine woodland (#10)	Support military training, improve grassland habitat and watershed values

Year	Project Name and Number	Acres	Ecological Mapping Unit	Project Description
2009	East Range – Planning Area 5 (North)	1,800	Chihuahuan desert scrub and grassland (#2)	Reduce shrub encroachment and improve watershed values. Burnable acreage approx. 600 acres.
2009	Area T2 - Northeast	375	Grassland on elevated plains (#3)	Support live-fire training, improve grassland habitat and watershed values
2009	Area P - Southeast	300	Madrean oak-pine woodland (#10)	Support military training, improve grassland habitat and watershed values
2009	Area T1 - Southwest	1,200	Grassland on elevated plains (#3) and Madrean oak-pine woodland (#10)	Support military training, improve grassland habitat and watershed values
2009	X-Ray - East	735	Grassland on elevated plains (#3)	Support military training, reduce woody vegetation and improve grassland habitat and watershed values
2009	Victor One Burn	550	Grassland on elevated plains (#3)	Reduce woody vegetation around developed areas and improve grassland habitat and watershed values; avoid research area
2010	Area Hotel - North	2,100	Grassland on elevated plains (#3)	Support increased military training, reduce woody vegetation and improve grassland habitat and watershed values
2010	Area Yankee - West	700	Grassland on elevated plains (#3)	Support increased military training, reduce woody vegetation and improve grassland habitat and

APPENDIX N

Year	Project Name and Number	Acres	Ecological Mapping Unit	Project Description
				watershed values
2010	Area Uniform - Southcentral	400	Madrean oak-pine woodland (#10)	Support military training, reduce fuels and improve habitat and watershed values
2010	Area R - East	300	Grassland on elevated plains (#3) and Madrean oak-pine woodland (#10)	Improve habitat and watershed values
2010	East Range – Planning Area 3	1,000	Chihuahuan desert scrub and grassland (#2)	Reduce shrub encroachment and improve watershed values. Burnable acreage approx. 300 acres.
2011	Area T1 - Northwest	800	Grassland on elevated plains (#3) and Madrean oak-pine woodland (#10)	Reduce fuels, improve habitat and watershed values
2011	Area T2 - Southwest	650	Madrean oak-pine woodland (#10)	Reduce fuels, improve habitat and watershed values
2011	Area Uniform - East	300	Grassland on elevated plains (#3)	Reduce woody vegetation and improve grassland habitat and watershed values
2011	Area T2 - Southeast	600	Grassland on elevated plains (#3)	Support live-fire training with short burn interval, improve grassland habitat and watershed values
2011	Area R/N - North	450	Grassland on elevated plains (#3) and Madrean oak-pine woodland (#10)	Reduce fuels, improve habitat and watershed values
2011	East Range – Planning Area 2	1,600	Chihuahuan desert scrub and grassland (#2)	Reduce shrub encroachment and improve watershed values. Burnable acreage approx. 400 acres.

Year	Project Name and Number	Acres	Ecological Mapping Unit	Project Description
2012	Area Yankee - East	550	Grassland on elevated plains (#3)	Support increased military training, reduce woody vegetation and improve grassland habitat and watershed values
2012	Area India – North	1,800	Grassland on elevated plains (#3)	Reduce woody vegetation and improve grassland habitat and watershed values
2012	Whiskey – West Burn	741	Grassland on elevated plains (#3)	Support increased military training and improve grassland habitat and watershed values
2012	Mike - Northwest	487	Grassland on elevated plains (#3)	Reduce woody vegetation and improve grassland habitat and watershed values
2012	Area Uniform - Central	500	Grassland on elevated plains (#3) and Madrean oak-pine woodland (#10)	Reduce woody vegetation and improve habitat and watershed values
2013	Area N - Northcentral	200	Grassland on elevated plains (#3) and Madrean oak-pine woodland (#10)	Reduce fuels, improve habitat and watershed values
2013	Range 13	900	Grassland on elevated plains (#3) and Madrean oak-pine woodland (#10)	Support live-fire training, improve grassland habitat and watershed values; Short burn interval will need to be approved by USFWS
2013	East Range – Planning Area 4	5,000	Chihuahuan desert scrub and grassland (#2)	Reduce shrub encroachment and improve watershed values. Burnable acreage approx. acres.

APPENDIX

Year	Project Name and Number	Acres	Ecological Mapping Unit	Project Description
2014	Victor Burn - East	400	Grassland on elevated plains (#3)	Reduce woody vegetation and improve grassland habitat and watershed values
2014	Juliet	1,111	Grassland on elevated plains (#3)	Reduce woody vegetation and improve grassland habitat and watershed values
2015	Whiskey – East Burn	741	Grassland on elevated plains (#3)	Support increased military training and improve grassland habitat and watershed values
2015	Mike - Southeast	600	Grassland on elevated plains (#3)	Reduce woody vegetation and improve grassland habitat and watershed values

*By 2 pm the day prior to ignition:* Submit Daily Burn Request (Appendix J). Parties cannot submit one request for entire burn duration. Separate requests for Saturday, Sunday, and Monday may be sent together via fax to ADEQ Air Quality Division (AQD) on Friday, but are separate pieces of paper. AQD will either post approval on its website, call with approval, or fax it to the requesting office on the same business day as the Burn Request submittal. All smoke permit approvals are also posted on the USDA Forest Service Southwest Area Fire website. A “no reply” from AQD by 10 p.m. on the business day on which the request is made can be interpreted as approval to burn. Good faith effort must be made to contact AQD to confirm the burn request was received. Only a statement of disapproval can prevent or stop an ignition.

- *By 2 pm on the day following an approved ignition:* Submit Burn Accomplishment form (Appendix J). Include successive acreage covered and Best Management Practices used.

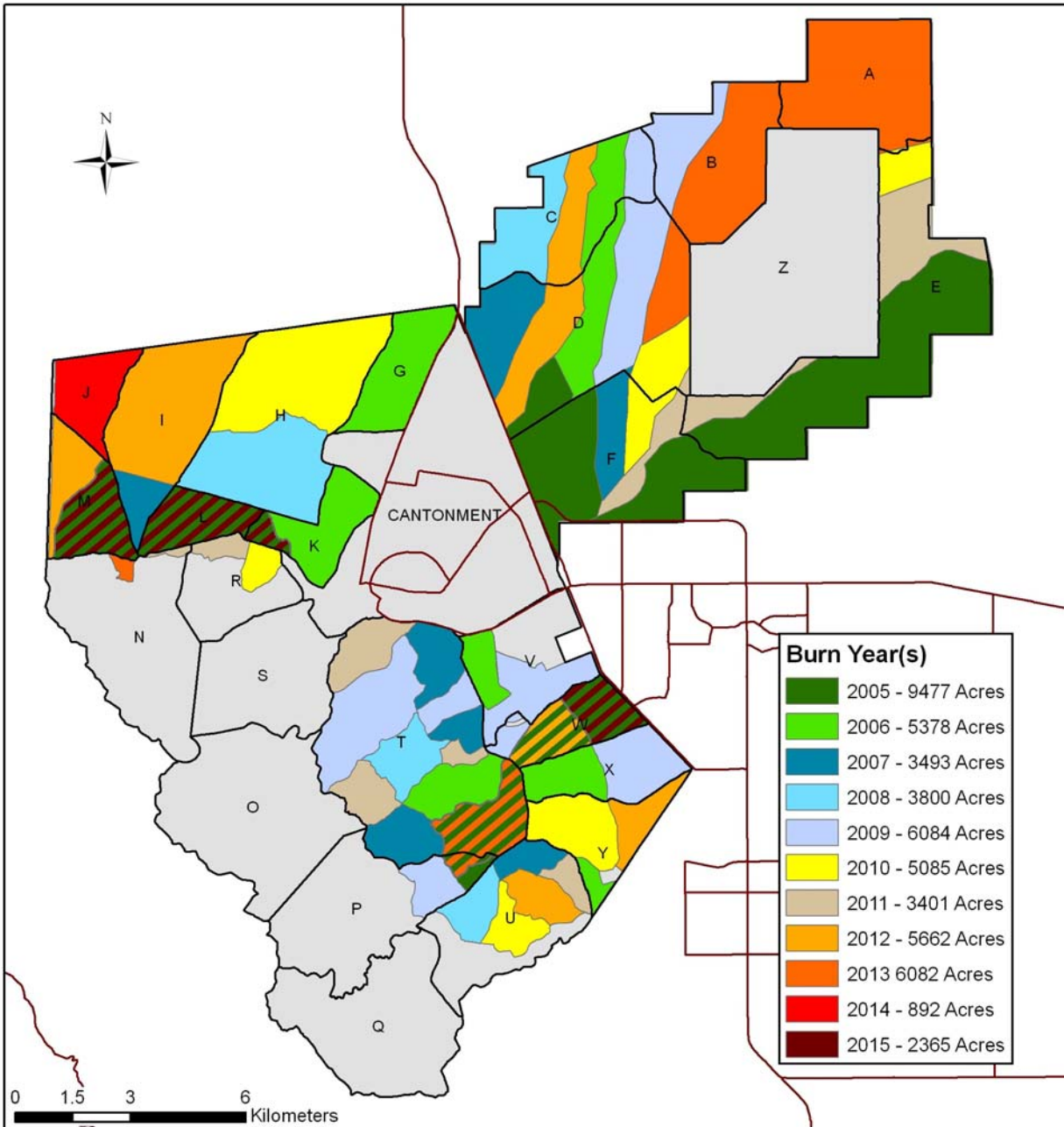
The regulations in Appendix J also address smoke management for wildland fire use.

### MECHANICAL AND OTHER TREATMENTS

Mechanical, chemical, biological, and manual treatments complement prescribed burning to reduce fuels that might sustain high-severity fires. Mechanical techniques such as bush-hogging and mowing should only be used to modify grass and shrubby fuels around facilities, structures, and firing ranges as they are used at present. As new construction is undertaken in areas which are now open grassland, a minimum of twenty-foot-wide strips of mowed grass should be maintained throughout the dry seasons along roadways adjacent to these newly developed areas. Where construction is undertaken in shrub grassland, especially in areas where desert broom is present, a minimum of fifty foot wide strips should be brush-hogged and maintained throughout the dry season alongside roadways adjacent to built up areas.

Manual thinning techniques consist of hand crews cutting out dog-hair thickets and ladder fuels of young juniper, pinyon, oak, pine, and fir on slopes less than 20 percent. Individual plants are cut down and the slash disposed of in several ways. Slash can be piled in open areas, where flames won't scorch tree canopies, and burned in the October-November window for pile burning in Arizona. Slash left on the ground from these operations could be disposed of by broadcast burning in the October-November window using fuel model 12 (Anderson 1982, Rothermel 1983). Slash can be piled in level areas accessible by rubber tire tractors and the piles can be crushed down on the ground several months later. In areas where little or no grass cover is present and with vehicle access, slash can be chipped and blown onto bare soil areas.

Thinning dog-hair thickets or dense ladder fuels under pine or fir canopies should be done in irregular patterns to break up fuel continuity. Spacings and widths can be designed to accommodate fuel types involved and to preserve or enhance other values for wildlife species in the area, esthetics, and soil protection. The lifespan of thinnings can be enhanced by locating treatments where non-sprouting species like pinyon, pine, or fir form the understory and avoiding areas where oak and alligator juniper dominate. If oak and juniper thickets are thinned, provisions should be made to cut back sprouts at appropriate intervals until pine trees reach heights that reduce their susceptibility to crown fires.



Source: Jim Hessel  
Wildlife Biologist  
ENRD, Ft. Huachuca

Created By Joshua Swanson  
ITAM GIS Analyst  
Range Control, Ft. Huachuca  
June 2005



**Figure 7-1. Proposed Fire Projects by Year.**

Prescribed fire can be used to reduce fuel levels in Garden Canyon and Sawmill Canyon, particularly from around the Scout Cabin to Gate 7. In Sawmill Canyon, thinning areas of dense ladder fuels under pine stands could prevent the occurrence of stand replacing fires. This would allow pine trees to reach heights of seventy to eighty feet and assume dominance. Thinning in a

few places in Scheelite Canyon, where slopes are less than twenty percent, could break up fuel continuity and help prevent extensive crown fires in stands of young pine and fir trees.

Manual tree pruning is being used in valley areas near firing ranges where frequent fires occur. Trees are hand pruned to about a five-foot level. A more efficient approach for landscape-scale pruning is the use of prescribed fire to thin lower branches to prevent flames from uncontrolled grass fires from getting into the oak canopy and damaging old oak trees in their peak acorn producing years.



## CHAPTER 8: SENSITIVE RESOURCES

Sensitive natural resources and historic properties addressed in this IWFMP are defined as those that are either known to be directly affected by fire, have close ties with the identity of the installation, or are rare or uncommon. This chapter reviews federally listed species, other sensitive species, and historic properties. Figure 8-1 shows general locations that apply to the discussion below. The Fort Huachuca Fire Operations Guide, a separate document that complements this IWFMP, contains more detailed maps that provide guidance for protecting the resources discussed in this chapter.

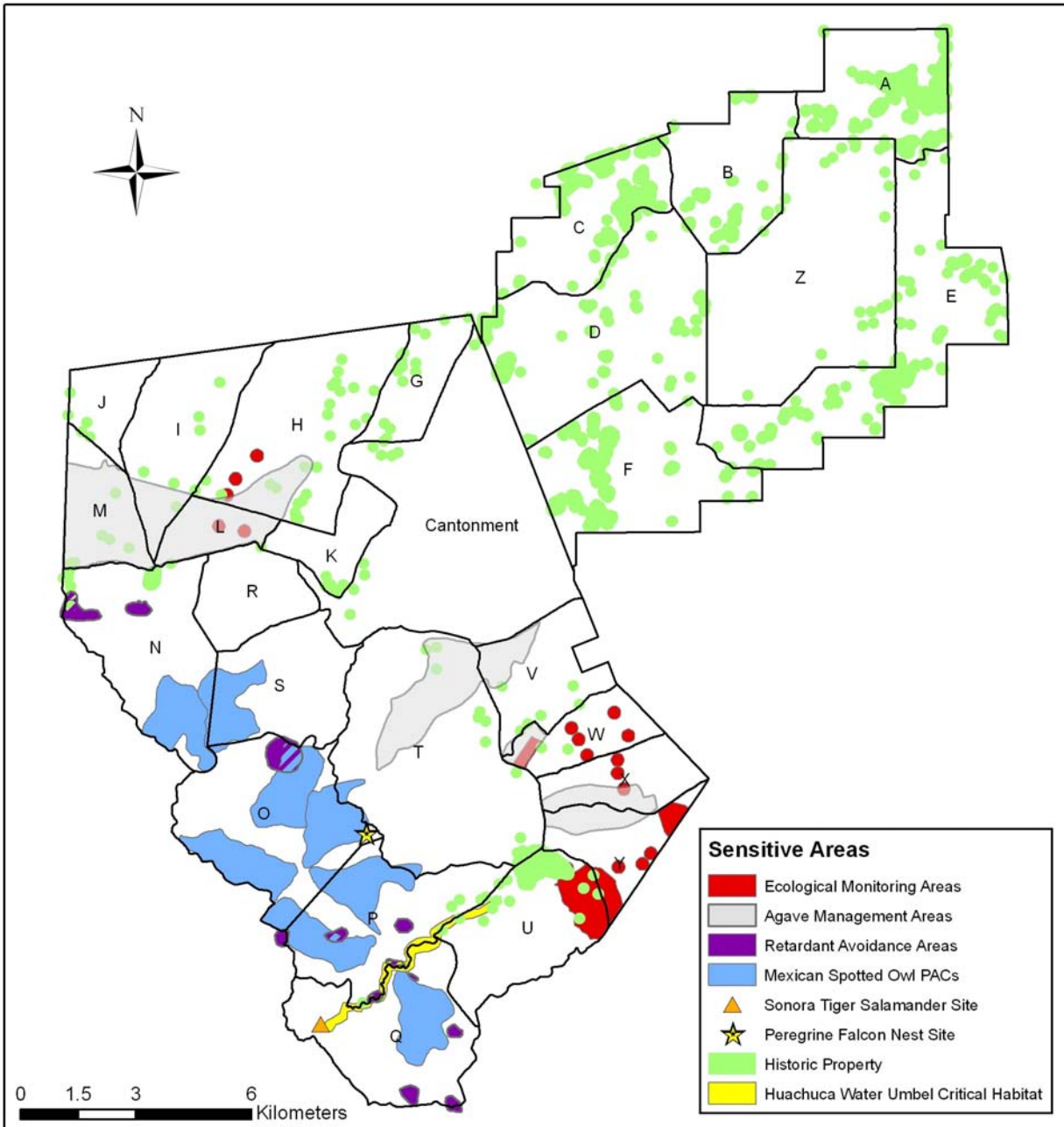
### NATURAL RESOURCES

#### Listed Species

The 2002 Biological Opinion (BO) from U.S. Fish and Wildlife Service directed Fort Huachuca to consider the effects of its activities on federally listed species, and much of the text below comes directly from that document.

General fire management conservation measures that apply to all listed species dictated by the Fort Huachuca BO (see BO pp. 53 to 55 for full text) include:

- Protect populations of the lesser long-nosed bat and its agave food plants, Huachuca water umbel, Mexican spotted owl, and Sonora tiger salamander. This objective will not prevent actions needed to protect life and property.
- Resource advisors qualified to address sensitive/listed species concerns will be on call 24 hours/day during the fire season and will be present during fire activities and serve as liaisons with U.S. Fish and Wildlife Service. Advisors will oversee implementation and monitoring of feasible protective measures.
- Off-road vehicle travel will be minimized and led, when necessary, by local firefighting units with knowledge of the area.
- Use of tracked vehicles will be restricted to improving roads or constructing line when minimal line might prevent burning of a large area.
- Obliterate vehicle tracks made during the fire, especially from tracked vehicles.
- Locate camps, landing strips, staging areas, and other work sites in previously disturbed areas or with minimum new disturbance.
- Develop mitigation and monitoring plans in conjunction with USFWS for fire program activities that may adversely affect listed species and their habitats. Obtain USFWS approval for mitigation and monitoring plans for wildland fire use as soon as possible after the decision to “let burn” is made.
- Develop an IWFMP.



Created By Joshua Swanson  
 ITAM GIS Analyst  
 Range Control, Ft. Huachuca  
 June 2005



Figure 8-1. General Locations of Sensitive Resources

- In the spring (and fall, if needed) black line or burn out from Alpha Break into the area where ignitions are most prominent from Range 6 to Range 10. Burn out line along the north side of Range 6, the south side of Range 10, and along Alpha Break One, located up-canyon from where most ignitions occur on Range 9. The desired line width is 100 feet but could vary with fuel type, topography, and risk of escape from the break.
- The Fire Department will be present on small arms firing ranges whenever tracer rounds are fired and will confine and contain any fires ignited in front of the black line to Alpha Break. Fires ignited west of Alpha Break will be suppressed.

Species-specific measures include the following:

**Huachuca water umbel** (*Lilaeopsis schaffneriana* ssp. *recurva*)

Federally listed as endangered in 1997

The umbel is an herbaceous, semiaquatic perennial plant documented from 27 sites in southern Arizona and adjacent Sonora (Warren et al. 1991). The types of microsites required by the umbel were generally lost from the main stems of the San Pedro and Santa Cruz rivers after channel entrenchment occurred a hundred years ago. On Fort Huachuca, populations of umbel are found in Garden, Sawmill, and McClure canyons. Occupied sites are low-gradient cienega habitats with permanent water and stable channels. The main concerns for this species involve (1) trampling and crushing by vehicles and (2) sedimentation from upstream watershed disturbance as a result of fire program activities.

Conservation measures that relate to fire for the Huachuca water umbel dictated by the Fort Huachuca Biological Opinion (see pp. 119-120) include:

- Begin prescribed fire and fuel management in the Huachuca Mountains.
- Implement general fire conservation measures mentioned above.
- Maintain the barrier to vehicle travel at Gate 7.
- Fund water umbel habitat management or restoration on and off the installation.
- Monitor and document disturbance to the umbel or its habitat and report it to USFWS.
- Protect Garden Canyon, particularly, from activities that disturb the streambed or cause sedimentation.

**Lesser long-nosed bat** (*Leptonycteris currosoae yerbabuenae*)

Federally listed as endangered in 1988

The lesser long-nosed bat is a migratory nectar feeder that is still found throughout its historical range, from southern Arizona and extreme southwestern New Mexico, through western Mexico, and south to El Salvador. The species inhabits mainly desert scrub in the U.S. portion of its range and roosts in caves and abandoned mines at the base of mountains where agave, saguaro, and organ pipe cacti are present. It forages at night on nectar, pollen, and fruit of paniculate agaves and columnar cacti. These bats are seasonal (April - November) residents of

southeastern Arizona. No maternity roosts are known from Fort Huachuca; day roosting has been observed on the installation at Pyeatt Cave and Manila Mine (thought to be a post-maternity roosts). Wren Bridge is a night roost, and bats have been mist-netted in Woodcutters Canyon.

Concerns related to fire include (1) potential loss of food plants, particularly *Agave palmeri* (and possibly *A. parryi*), on and around Fort Huachuca, (2) disturbance of roosts, particularly maternity roosts, by fire program activities.

Conservation measures that relate to fire for the lesser long-nosed bat dictated by the Fort Huachuca Biological Opinion (see pp. 141-145) include:

- Implement general fire conservation measures mentioned above.
- Prevent access to known roosts.
- Avoid seeding or planting with nonindigenous grasses or other plants that may alter fire regimes in wildland areas. Sterile hybrids can be used for temporary erosion control when it is not feasible to seed with natives.
- Prohibit helicopter flights within 350 feet of Pyeatt Cave, Manila Mine, or other identified day roosts between July 1 and October 31 and other times bats are present.
- Avoid nighttime training in agave management areas between July 1 and October 31.
- Conduct prescribed burns to reduce fuel loading in agave habitat and coordinate projects with USFWS.
- Prescribed fires must kill no more than 20% of agaves in the project area.
- Manage fire in agave areas for 10-year return interval (suppress if too frequent).
- Avoid burning agave management areas where more than half the plants fall into young age classes (plants with four or fewer spiral courses of leaves).
- Develop a mitigation plan for burns in agave management areas or within 0.5 mi of roosts.
- Fire crews will attend rocketed-assisted UAV take-offs to suppress potential fires in agave management areas.
- Avoid off-road travel in agave management areas.
- Monitor *A. palmeri* populations on West and South ranges every five years.
- In the event of a wildfire, monitor bat take, roost site disturbance, and acres burned in agave management area and report to USFWS.

#### **Mexican spotted owl (*Strix occidentalis lucida*)**

Federally listed as threatened in 1993

The historic range of the Mexican spotted owl (MSO) falls across much of the southwestern U.S. Populations in Arizona are patchily distributed and occur in all but the arid southwestern portion of the state or much of the lowland riparian zones. The owls are resident and occur in disjunct locales that correspond to isolated, forested, mountain systems, canyons, and in some cases steep, rocky canyon lands. As of 2005, no Fort Huachuca lands are designated MSO Critical Habitat. In forested habitat, uneven-aged stands with a high canopy closure, relatively high tree

density, and a sloped terrain are key habitat components listed in the recovery plan (USFWS 1995). Danzer (in press) has shown that MSO at Fort Huachuca also use Madrean oak habitats. Oak woodlands have been documented in recent years to be used for foraging and successful nesting in the Huachuca Mountains more than is reflected in the MSO Recovery Plan (which focuses on and is based on knowledge mostly from northern areas). Nests are found in live trees, snags, and on canyon walls. Small mammals are the major prey.

Eight protected activity centers (PACs) have been delineated at Fort Huachuca (see Figure 8-1). PACs are areas of no less than 600 acres that enclose the best owl habitat in the area, with nest or known roosting sites near the center of the PAC.

Concerns related to fire include destruction or degradation of nesting and foraging habitat, smoke effects on nesting owls or young, and disturbance of nesting owls by fuel reduction or fire suppression activities on the ground or in the air. Specific concerns regarding fuel reduction effects on foraging habitat focus on loss of a significant proportion of large, down woody debris that provides habitat for key prey species, particularly rodent populations.

Conservation measures that relate to fire for the Mexican spotted owl dictated by the Fort Huachuca Biological Opinion (see pp. 167-170) include:

- Implement general fire conservation measures mentioned above.
- Monitor known PACs annually and survey potential MSO habitat.
- Monitor effects of prescribed fires, wildland fire use, and other fuels treatments on owls and habitat components.
- Protect PACs from wildfire, but life and property considerations can overrule.
- Locate fire operations camps and staging areas outside of PACs.
- Notify resource advisor if MSO are spotted during fire operations; resource advisor will assess situation and advise burn boss or IC on preventing harm to owls; resource advisor will maintain records of owls encountered.
- Use light-on-the-land suppression techniques in PACs.
- Leave a mosaic of burned and unburned areas and of MSO habitat components as specified in the recovery plan. Unburned vegetation patches within burned areas will not be burned out unless necessary.
- Develop mitigation and monitoring plans for each preplanned fire program activity (prescribed burn, wildland fire use, non-fire treatment) for USFWS approval.
- Prescribed burns and treatments will avoid 100-acre core areas – unless the revised MSO Recovery Plan (in draft as of June 2005) changes its recommendations and USFWS changes its guidelines.
- Introduce fire into PACs in blocks of 100 acres or less, during the non-breeding season (between September 1 and February 28).
- Suppress fires predicted to exceed prescription within 24 hours.
- Manage fires to avoid “crowning out” more than 10 percent of any PAC’s canopy.

- Plan such that no more than 2 PACs per year are affected by fire activities.
- Minimize low-level helicopter flights within 1 mile of nests and avoid flights closer than 0.25 mi from active nests during the breeding season (March 1 to August 31).
- Advise visitors that smoking is prohibited in Scheelite Canyon.
- In the event of a wildfire, monitor owl take and owl or habitat disturbance and report to USFWS.

**Sonora tiger salamander** (*Ambystoma tigrinum stebbensi*)

Federally listed as endangered in 1997

Historically, the Sonora tiger salamander probably inhabited springs, streams, backwaters, and cienegas containing a permanent or nearly permanent water source in the area of San Rafael Valley, Arizona and Sonora, Mexico. It is known from about 50 breeding localities, but not all sites are occupied all the time. All sites are within the headwaters of the Santa Cruz and San Pedro rivers. These include sites in San Rafael Valley and the foothills of the Patagonia and Huachuca mountains, located in Santa Cruz and Cochise counties, Arizona and Sonora, Mexico. Small, isolated populations are subject to environmental, genetic, and demographic stochasticity. The salamander currently breeds in stock tanks and some adults probably spend much of the year in rodent burrows, rotted logs, and other moist cover sites. On Fort Huachuca, tiger salamanders are known from Upper Garden Canyon Pond and from the effluent recharge basins and golf course. The Biological Opinion assumes that the Garden Canyon animals are *A. t. stebbensi*, while the others are likely the introduced, invasive *A. t. mavortium*, not a listed subspecies. Chief threats from fire activities include smoke or ash toxicity and post-fire erosion and sedimentation.

Conservation measures that relate to fire for the Sonora tiger salamander dictated by the Fort Huachuca Biological Opinion (see pp. 181-182) include:

- Implement general fire conservation measures mentioned above.
- Begin prescribed fire and fuel management in the Huachuca Mountains.
- Conduct annual monitoring in Upper Garden Canyon Pond and report results to USFWS.
- Avoid disturbing aquatic habitat during suppression activities, but life and property considerations should overrule.
- Prohibit off-road vehicle use at Upper Garden Canyon Pond.
- Reduce fuel loadings in woodland areas to protect nearby aquatic habitats.
- Maintain the barrier to vehicle travel at Gate 7.
- Monitor take of Sonora tiger salamanders and document any disturbance of salamanders or habitat; report monitoring results to USFWS.

**SOUTHWESTERN WILLOW FLYCATCHER** (*EMPIDONAX TRAILLII EXTIMUS*)

Federally listed as endangered in 1995

The southwestern willow flycatcher is a neotropical migrant that breeds between about April 1 and September 1. It is a riparian obligate species, nesting along rivers, streams, and other wetlands that host dense growths of willow (*Salix* spp.), seepwillow (*Baccharis* spp.), buttonbush (*Cephalanthus* spp.), boxelder (*Acer negundo*), and saltcedar (*Tamarix* spp.). Nests are found in thickets of trees and shrubs about 13-23 ft in height, among dense and homogenous foliage. Historically the flycatcher was found throughout most of the southwest. However, the species has been extirpated from much of its historic range, with just over 900 breeding pairs currently documented in the Southwest. Remnant populations survive in historic locations. Individuals in Arizona are found in several areas including the lower San Pedro River.

Suitable habitat for willow flycatcher is mostly lacking at Fort Huachuca. Habitat north of the main gate near Highway 90 burned in 1999. Gravel Pit Pond and Middle Garden Canyon Pond may provide marginal habitat.

The BO states that wildfire could possibly but not likely result in adverse effects on the flycatcher. A wildfire ignited by military training activities could destroy habitat or nests. Adverse effects could potentially occur due to disturbance of flycatchers or habitat at Research, Development, Test, and Evaluation survey points sites in the San Pedro Riparian National Conservation Area (SPRNCA). Conservation measures that relate to fire for the Southwestern willow flycatcher dictated by the Fort Huachuca Biological Opinion (see pp. 200-201) include:

- Implement general fire conservation measures mentioned above.
- Maintain existing fire breaks on the East Range.
- Vigorously suppress fire on the eastern third of the East Range, except in the impact area.
- If surveys confirm presence of southwestern willow flycatcher, take action to ensure that fire ignited on the training ranges does not spread to flycatcher habitat and work with USFWS to prevent take.
- Continue conducting periodic habitat assessments in areas (Research, Development, Test, and Evaluation survey points along the San Pedro River) found unsuitable to date.
- Continue monitoring following Section 5.4.4 of the Biological Assessment; apply the USFWS protocol to habitat on Fort Huachuca, the Babocomari Cienega (if permission is obtained), and throughout the SPRNCA in cooperation with the BLM.

Fort Huachuca's participation in the Huachuca Area Fire Partners puts it in a position to assist with protecting riparian areas potentially affected by fire program activities. The BO also suggests the Fort offer to help neighboring land owners with riparian restoration that would enhance willow flycatcher habitat.

#### **Non-listed Species**

Fire may also affect other, non-listed sensitive species. Fire program activities should also consider the following species:

**Lemon lily** (*Lilium parryi*)

Populations are known from three moist locations on the installation. Two populations are found in Huachuca Canyon: a small one in the upper reaches of the main canyon and a large one in a side canyon on the southeast side of the main Huachuca Canyon drainage. The third population lives near Sawmill Springs (20-30 non-flowering individuals in 2003 and 2004). Under extremely dry conditions, a fire might burn the canyon bottom habitat and threaten these plants through loss of canopy shading and subsequent scouring of moist sediment and organic soils.

**Lemmon fleabane** (*Erigeron lemmonii*)

This plant is scattered in cliff and large boulder habitat in the lower mile of Scheelite Canyon that is relatively safe from fire. A hot fire in the canyon, however, could threaten individual plants low enough in the canyon bottom to be exposed to intense heat.

**Huachuca springsnail** (*Pyrgulopsis thompsoni*)

This springsnail occurs in ten locations in perennial springs and stream flows in Garden, McClure, Sawmill, Huachuca, and Blacktail canyons. Under extremely dry conditions, a fire might burn the canyon bottom habitat and threaten these snails. Effects on upland vegetation and soil severe enough to reduce recharge and spring flow is the primary concern. Impacts to water quality and chemistry are also a potential concern, but not nearly as well understood.

**Barking frog** (*Eleutherodactylus augusti*)

Scattered populations were discovered in one area of Garden Canyon during the summer of 2002 on limestone surfaces and outcrops. Suppression operations should avoid disturbing known barking frog sites.

**Peregrine falcon** (*Falco peregrinus*)

These raptors are known to nest or winter at Fort Huachuca. Fire is unlikely to directly affect birds or nesting habitat on cliffs on the east side of Huachuca Peak, but high-severity fire in the upper canyons could modify foraging habitat and temporarily reduce prey base.

**Northern goshawk** (*Accipiter gentilis*)

Goshawks prefer large tracts of large trees in a variety of forest types, and loss of these trees is the chief threat of fire. On the installation, goshawks are known to nest in Huachuca Canyon within the perimeter of a MSO PAC. Sawmill and Scheelite canyons are documented to be historic nesting locations. Scheelite as well as Blacktail canyons have had goshawk nest-building activity in recent years, although no actual nesting was found. Goshawks in southeastern Arizona feed as much or more on birds than mammals, but fire-related concerns for goshawks and their habitat are similar to those for MSO.

## HISTORIC PROPERTIES

Cultural sites, structures, and artifacts are resources requiring actions with varying fire management actions and responses. Figure 8-1 marks general locations of historic properties on the installation. Table 8-1 is a matrix of resources, values at risk, and protection measures for the broader Huachuca Area Fire Partners planning area. Values are defined as the unique research



and interpretive potential of historic properties that are potentially affected by fire program activities. This matrix considers historical, archeological, architectural, engineering, and cultural values. It is useful as a planning and operations guide to prevent resource loss or degradation. The Huachuca Area Fire Partners conducted the analysis in Table 8-1 by defining historic contexts and a list of cultural resource types that included elements and values at risk from fire. Historic contexts are defined as patterns, themes, or trends in history by which a specific occurrence, property, or site is understood. In this analysis, there are two historic contexts: Native American and Euro-Historic. Historic properties professionals from Fort Huachuca, National Park Service, Bureau of Land Management, and the Coronado National Forest guided the exercise.

### **Routine Operations**

Archaeological surveys and monitoring are routine steps in the planning and following up of fire management projects at Fort Huachuca.

- Coordinate with the Archeologist
- Check existing maps and/or surveys
- GPS boundaries of sensitive sites and flag
- Black line sensitive sites as needed
- Be sure fire personnel are briefed on protecting historic properties
- Conduct post-fire assessment

**Table 8-1. Historic properties and Fire**

**Native American Context**

<b>Major site types</b>	<b>Site elements</b>	<b>What values are at risk from what activities?</b>	<b>Take action to protect?</b>
Habitation sites	surface architecture (pit houses), features (roasting pits, trash heaps...), ceramics, chipped stone, ground stone	alignment, enclosure, remnants of structure, research potential of pollen and carbon samples, date contamination, spatial arrangement	involve tribes, remove items by hand, black-line, limit intensity of prescribed burns, thin fuels, avoid disturbance—restrict suppression activities at sites
Artifact scatter/ limited activity sites	ceramics, chipped stone, ground stone food processing features	visibility (post-fire), date contamination, spatial arrangement	collect/ not collect, seed to conceal and stabilize soil, thin fuels, restrict suppression activities at sites
Rock shelters/caves	chipped stone, ground stone, food processing features, perishable features, rock art	date contamination, date of classification, spatial arrangement, feature integrity, interpretive value, preservation	clear away entrance of caves to avoid convection damage, avoid retardant, construct lines, thin fuels, restrict suppression activities
Rock art sites	pictographs, petroglyphs associated artifacts	obsidian artifacts, pigments	thin fuels, construct line, conduct test burns to assess impacts
Other	gathering area, ceremonial areas proto-historic sites, graves	ground disturbance, research potential from pollen, carbon, etc.	avoid disturbance, black-line, remove items by hand

**Euro-Historic Context**

<b>Major site types</b>	<b>Site elements</b>	<b>What values are at risk from what activities?</b>	<b>Take action to protect?</b>
Ranching/livestock	homesteads fences and corrals, dumps-perishables, windmills-wells, fruit trees	remnants of structure, historic signage, feature integrity	protect area with buffer and thinning, restrict ground disturbance, black-line, suppress, use retardant
Mining	wooden structures, trails/roads, wells, metal mining tools	remnants of structure, historic signage, timbers, feature integrity, dating/ information, interpretive value	thin fuels near mine entrances, restrict ground disturbance, black-line, suppress, use retardant
Military	earth works, range towers, wooden towers, historic weapons	remnants of structure, rock alignment, trenches	avoid unexploded ordnance
Spanish colonial	Spanish forts with adobe walls, other structures, perishables, historic weapons	remnants of structure, historic signage, research potential of carbon and pollen samples	thin fuels, black-line, suppress
Transportation, communication (people and water)	trusses, rail lines, and railroad ties, water lines, telegraph lines	remnants of structure	thin fuels, restrict ground disturbance, suppress
Administration (CCC structures, camps, lookouts, A.S., boundary monuments)	fire lookout, dams and ditches, flumes camps, survey markers and boundaries	remnants of structure	black-line, restrict line construction, rehab for erosion
Other	wagon trails (stage road), historic fire breaks, outhouses	remnants of structure, historic signage	thin fuels, restrict ground disturbance, monitor post-burn

## CHAPTER 9: MONITORING AND RESEARCH

Monitoring can quantify the effects of mechanical fuels treatments, prescribed burning, and wildland fire by evaluating community response and assessing soil and vegetation trends through time. Prior to application of fire, it is advisable to collect baseline, pre-burn data that characterizes vegetation and other resources on areas subject to prescribed burns. Monitoring is an essential element of adaptive management that can enable managers to assess the effectiveness of actions taken and to adjust future management plans in order to meet goals and objectives (USDI/USDA 1995).

To date 240 permanent and special use plots have been established throughout the installation by the Range and Training Land Assessment (RTLTA) component of the Integrated Training Area Management (ITAM) program. (RTLTA was formerly known as LCTA—Land Condition Trend Analysis.) The focus of RTLTA is to measure the response of plant communities to military training and natural resource management on military training lands. Knowledge and results obtained through RTLTA monitoring can be used to revise the fire management plan and write and modify prescriptions to meet military training, safety and resource goals.

This chapter outlines the monitoring potential for vegetation types described in this IWFMP. Vegetation community types on Fort Huachuca range from low elevation Chihuahuan desert scrub through high elevation mixed conifer communities.

### MAP UNIT 1: DRY DESERT RIPARIAN ZONES

Dry desert riparian zones include the ephemeral stream beds that are found in semi-desert grassland and Chihuahuan desert communities. Many of these areas have a tree overstory with an understory of dense vines and shrubs. However, because there is more water availability in riparian areas, there is likely to be a higher density of plants. The historical role of fire in desert riparian zones is not well established, but if they are adjacent to grasslands, they may share the fire return interval of the grassland. The high amounts of shrubs and vines in these riparian areas may be a result of fire suppression, and as a result, effects of fire in desert riparian zones are unknown. Shrubs and vines can act as ladder fuels allowing fire to get into tree crowns, damaging the overstory canopy.

Currently there are RTLTA monitoring plots placed in and adjacent to desert riparian zones that are to be burned sometime in 2005. Other areas will be burned in successive years. Monitoring can provide information where little exists on effects of fire in desert riparian plant communities. Some common desert riparian tree species are known to resprout as a result of fire (e.g., oaks, juniper, and hackberry) (Johnson et al. 1962, Rasmussen and Wright 1989, Bennett and Kunzemann 1992). Although sprouting is undocumented in other riparian plant species, it is likely that they will also sprout after disturbance if they are adapted to fire, or they will be eliminated because they were only there due to fire suppression.

### MAP UNIT 2: CHIHUAHUAN DESERT SCRUB

Most of the Chihuahuan desert scrub community type is located on the East Range; precipitation ranges from 11 inches at the lowest elevations adjacent to the San Pedro River to about 15 inches at higher elevations. East Range soils have a high sodium and gypsum content making them subject to gully erosion and piping (INRMP 2001). Percent slope is generally <10%. Many areas on the East Range are highly disturbed as a result of overgrazing prior to military acquisition and past military training activities. These activities removed much of the herbaceous vegetation which resulted in a subsequent increased the shrub component and loss of inter-shrub soil. In areas where there is still grass cover, much of the native grasses have been replaced with Lehmann lovegrass (*Eragrostis lehmanniana*) (ERLE), a nonnative grass.

The goal of reducing or maintaining exotic grasses at current levels, increasing native grasses, and decreasing shrub canopy cover may be accomplished with prescribed burning, although this method may only apply to areas with sufficient surface fuels. Pre and post-fire monitoring could provide information on potential changes in species composition and structure. In 2003 RTLA established 19 fire-monitoring plots in Planning Areas One and Six, which are outlined in the East Range Watershed Rehabilitation Plan. While all plots have had pre-burn data collected, not all plots have been burned to date (2005). Because of plot variability and time, plots may need to be remeasured and some additional plots may have to be established prior to burning in adjacent areas to increase sample size for a robust analysis of the data.

Fire should be re-applied initially on the lower end of the fire return interval (i.e., 4 years) to maximize shrub mortality and to minimize the potential for fire to have a detrimental effect on native grasses. Fire will have more of an effect on small diameter shrubs than on well-established shrubs (i.e., mesquite). Current research suggests that fire does not have an effect on limiting the spread of ERLE in favor of native grasses (McPherson et al. 2004), so removing encroaching shrubs may be the goal of prescribed burning in the Chihuahuan desert scrub. Although burning prior to or just after onset of monsoon rains may provide the environmental conditions necessary for effective fire spread and effect in this community type, it may also increase the potential for runoff and erosion. Monitoring should be done annually for two to three years post-treatment to assess treatment goals.

### MAP UNIT 3: GRASSLAND ON ELEVATED PLAINS

The semi-desert grassland community on Fort Huachuca receives 12 to 18 inches of annual precipitation. Soils are mainly alluvial and well-drained; slope <20%. Semi-desert grasslands have scattered mesquite at lower elevations and oaks at higher elevations. Several sources identify an increase in shrub/tree density due in part to a reduced fire frequency (Hastings and Turner 1965, Wright and Bailey 1982, Bahre 1991). Lower elevations have significant amounts of ERLE mixed with native grasses, decreasing with increasing elevation.

Monitoring in grasslands can provide information on changes in invasive/native grass structure and composition, use of fire to minimize shrub/tree invasion, and the effects of fire on *Agave palmeri*, a food plant for the endangered lesser long-nosed bat. Forty-six agave/ERLE plots were established in the grassland areas on Fort Huachuca through the RTLA program. These plots are currently being monitored to assess changes in ERLE and the effects of fire and no fire on agave and ERLE populations. These and other RTLA plots, established in the early 1990s, can also be used to assess changes in shrub/tree density. Although oak and mesquite trees and shrubs

resprout after any disturbance, including fire, repeated, frequent application of fire may remove them, or minimize their encroachment into the semi-desert grassland.

#### MAP UNIT 4: VALLEY RIPARIAN PLUS CANYON RIPARIAN

Deciduous and montane riparian zones on Fort Huachuca include all of the steep-sided canyons on the installation and range into the grassland community. The streams are either perennial or intermittent. These riparian zones can have a mature overstory of deciduous and/or evergreen trees, which includes oak and pine species. In many areas there are significant ladder fuels and high fuel loads in the understory. Many of these areas have had no documented fire for over 100 years (Danzer 1998).

Currently, there are several RTLA and special use Fuel Inventory plots in or adjacent to these riparian zones, as well as other plots established by researchers for various reasons. The RTLA and special use plots were established either to monitor sensitive species or to assess fuel loads. Many of the sensitive species plots are monitored on an annual basis, but unless there is a reason to do comparative sampling on the fuel plots, these will probably not be re-monitored unless there is a wildfire that affects them. Because the deciduous riparian zones are habitat to many of the sensitive plant and animal species on the installation, there would be many opportunities for monitoring, if fire was prescribed for these areas. No plans currently exist to apply managed fire in the deciduous riparian zones.

Monitoring after wildfire or prescribed fire may include assessing changes in the Huachuca water umbel (*Lilaeopsis schaffneriana* var. *recurva*) population, in fuel amounts compared to previous measurements or adjacent unburned areas, in stand structure, surface water flow, or any other plant or animal that had been previously monitored. One caveat about remonitoring in previously monitored areas is that the initial data may have been important to that particular study but may not provide comparable information on the effects of fire.

#### MAP UNITS 10 AND 11: OAK-PINE AND PINE-OAK WOODLANDS (ENCINAL)

The oak woodland (encinal) community type ranges from oak savanna at the lowest elevation through pine/oak. Slope varies between 0 and 80%. Precipitation ranges from 14 to 25 inches annually. Composition, types and amounts of surface fuels, and stand density varies depending on topographic position and soil type. High stand densities are due partly to fire suppression. Unless there are severe drought conditions (extremely hot, dry, and windy), most mature trees will not be affected by fire. However, fire can prevent seedling establishment. Some areas have little surface fuel and mature trees; the potential for fire in these communities without pretreatment is minimal.

There is reluctance to use fire to maintain the encinal, because little is known about the effects or behavior of fire in this community type. The Coronado National Forest has used fire in the encinal but only after significant pretreatment, which includes lopping low branches, and removing small diameter trees and shrubs to minimize ladder fuels. There has been virtually no monitoring in the encinal, but there have been projects to collect live fuel moisture and to assess

fuel loads in specific areas. On Fort Huachuca surface fuels and stand density were assessed in the encinal as part of the wildland fuel inventory.

A future monitoring project may include modeling fuel consumption in the oak woodland community type. It is desirable to predict fuel consumption prior to the application of fire to identify immediate treatment effects and the likelihood of treatment success (i.e., desired change in vegetation or fuel structure). Fuel consumption is quantified by establishing and monitoring plots prior to and post-burning. Change in the vegetation structure (i.e., fuel composition, amount and arrangement) is often the most critical measure of treatment success. In addition, information on smoke emissions, regional haze, nutrient cycling, plant succession, species composition changes, plant/tree mortality, wildlife habitat restoration and maintenance, erosion, soil heating, and carbon cycling could be provided through the modeling process. If funded, this project will begin in 2005.

#### MAP UNIT 12: MIXED CONIFER AND MADREAN PINE-OAK WOODLAND

Although the ponderosa pine/mixed conifer vegetation type comprises only a small portion of the installation, in addition to the canyon environments it is an important component particularly for sensitive species. In this zone, precipitation is over 25 inches annually; slopes range from 0 to 80%.

Fire has not burned for >30 years in some of the high elevation conifer stands and >100 years in many other stands. Wildland fire use may be allowed under restricted conditions, but no fire will likely be prescribed for these rugged areas with heavy fuel loading. Monitoring after wildland fires could compare burned area vegetation composition and structure with unburned. One of the sensitive species that is monitored on an annual basis is the Mexican spotted owl (*Strix occidentalis lucida*) (MSO). Many RTLA and fuel inventory plots are distributed both within and outside of the MSO protected areas. In addition to the fuel plots, many RTLA plots have fuels and stand structure data associated with them. In 2004 stand structure was measured around known MSO nest sites. Post-burn data could be collected on any or all of these plots to obtain comparative data. Comparisons could be made between differences in fuel levels (including density of large downed logs), the herbaceous layer, stand density and presence and nesting success of MSO.

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## Appendix A. Army Wildland Fire Policy Guidance

US EPA ARCHIVE DOCUMENT

**DEPARTMENT OF THE ARMY  
ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT  
600 ARMY PENTAGON  
WASHINGTON DC 20310-0600**

(retyped for this appendix)

DAIM-ZA (200-3)  
MEMORANDUM FOR SEE DISTRIBUTION

SEP 04 2002

SUBJECT: Army Wildland Fire Policy Guidance

1. References:

- a. AR 420-90, 10 Sep 97, Fire and Emergency Services.
- b. AR 200-3, 28 Feb 95, Natural Resources - Land, Forest and Wildlife Management.

2. The enclosed policy guidance is effective immediately. Resource-dependent requirements should be included in budget strategies and implemented as soon as possible, but not later than the end of FY 07. Implementation is necessary to address safety, land management, and environmental compliance. This guidance supplements references 1a and 1b and applicability is the same as those regulations. Army wildland fire policy guidance is compatible with Transformation of Installation Management.

3. Where this guidance impacts bargaining unit employees' condition of employment, statutory and contractual labor relations' obligations must be met prior to its implementation.

4. Responsible organization for all fire and emergency services is Director of Facilities and Housing supported in wildland fire management by Director of Environmental Programs. The points of contact are Mr. Bruce Park, (703) 428-6174 and Mr. Bill Woodson, (703) 693-0680, respectively.

Encl  
as

Larry J. Just  
Major General, GS  
Assistant Chief of Staff  
for Installation Management

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SUBJECT: Army Wildland Fire Policy Guidance

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## ARMY WILDLAND FIRE POLICY GUIDANCE

**1.0 Integrated Wildland Fire Management Policy.** The Army adopts the following policies and standards:

1.1 Review and Update of the 1995 Federal Wildland Fire Management Policy, Jan 01.

1.2 National Wildfire Coordinating Group (NWCG) Wildland and Prescribed Fire Qualification System Guide (PMS 310- 1/NFES 1414), Jan 00.

1.3 National Fire Protection Association (NFPA) Standard 295 - *Standard for wildfire control*, Standard 299 - *Protection of life and property from wildfire*, and Standard 1051- *Wild/and firefighter professional qualification standard*

1.4 DoD Instruction 6055.6, 10 Oct 00, DoD Fire and Emergency Services Program.

**2.0 Applicability.** This policy guidance has the same applicability as AR 420-90, Fire and Emergency Services and A.R 200-3, Natural Resources - Land, Forest and Wildlife Management. This policy guidance supplements both of these Army Regulations. In addition, it is applicable under Transformation of Installation Management,

**3.0 Planning.** Installations with unimproved grounds that present a wildfire hazard and/or installations that utilize prescribed burns as a land management tool will develop and implement an Integrated Wildland Fire Management Plan (IWFMP) that is compliant and integral with the Integrated Natural Resources Management Plan (INRMP), the installations' existing fire and emergency services program plan(s), and the Integrated Cultural Resources Management Plan (ICRMP).

### 4.0 Program Authority

4.1 The Assistant Chief of Staff for Installation Management (ACSIM) is responsible for oversight of the program, updating policy, and resolving policy questions through the Facilities and Housing Directorate in coordination with the Environmental Programs Directorate.

4.2 The ACSIM, through the HQ Installation Management Agency, Regions and the Headquarters, National Guard Bureau (HQ, NGB) will provide information to installations necessary to perform wildland fire management in accordance with this guidance. The ACSIM and HQ, NOB will assure that wildland fire program reviews are incorporated into Fire and Emergency Services Operational Readiness inspections and Environmental Compliance Assessment Screenings.

4.3 The garrison commander, or appropriate designee, defines the roles and responsibilities for wildland fire management on the installation, plans and programs resources, and will designate an installation Wildland Fire Program Manager in either the Fire and Emergency Services or Natural Resources organization.

4.4 The garrison commander, or appropriate designee, approves the installation IWFMP.

4.5 The garrison commander approves the deployment of Army civilian firefighters to any off installation incident.

4.6 The installation Wildland Fire Program Manager is responsible for development of the IWFMP. Additionally, the Wildland Fire Program Manager reviews and approves bum plans for prescribed fires to insure consistency with the IWFMP, the INRMP, and other applicable operating instructions such as State and local regulations.

4.7 The Director of Military Support is responsible for deployment of military firefighters and equipment.

**5.0 Wildland Fire Standards.** Army organizations involved in wildland fire activities will incorporate NWCG organizational standards into their organizational structure when necessary to accommodate cooperation and integration with other federal, state, and local wildland fire organizations across jurisdictional boundaries.

## **6.0 Certification, Training, and Fitness Standards for Wildland Fire Management Personnel,**

**6.1 Certification Standards.** All civilian, contractor, and emergency services personnel involved in wildland fire management must possess certifications appropriate for their expected level of involvement in the wildland fire organization. All Army personnel must meet the NFPA or NWCG Standards for certification or be certified by the State in which the installation is located as a Prescribed Bum Manager. This certification does not apply to military personnel deployed by orders from the Director of Military Support.

6.1.1 Personnel in the GS-081 job series, 51M career paths, and contractors will meet the certification standards specified in NFPA Standard 1051 - Standard for Wildland Fire Fighter Professional Qualifications and NFPA Standard 1002 - Standard for Fire Apparatus Driver/Operator Professional Qualifications. All other Army personnel with jobs requiring wildland fire responsibilities may use the NWCG Wildland Fire Qualification Subsystem Guide (PMS 310-I /NFES 1414) to attain the required NFPA certification. Personnel who have learned skills from sources outside wildfire suppression, such as agency specific training programs or training and work, in prescribed fire, structural fire, law enforcement, search and rescue. etc., may not be required to complete specific courses in order to qualify in a wildfire position. However, position task books must be completed for documentation of certification.

6.1.2 Personnel mobilized to participate in wildland fire management activities on properties not under DoD jurisdiction, either through mutual aid agreement or other means, must be certified for the expected level of involvement under NWCG standards. GS-081 job series, Army contractor, and 51 M personnel that seek certifications other than the NFPA Job Levels must comply with the appropriate NWCG criteria. Deployment of civilian or military personnel by national request and reimbursement procedures is contained in Appendix A.

6.1.3 Position descriptions for new hires that will participate in wildland fire activities will reflect the expected level of involvement and required certifications. Position descriptions with wildland fire management duties must state if the position qualifies the position holder as a primary or secondary wildland firefighter, as described in Chapter 46 of the Office of Personnel Management Civil Service Retirement System and Federal Employees Retirement System Handbook for Personnel and Payroll Offices. Personnel not classified as a primary or secondary wildland firefighter will perform duty in wildland fire management activities as qualified.

6.1.4 Primary and secondary wildland firefighters will be certified, as a minimum requirement, in Cardio-Pulmonary Resuscitation (CPR) and Standard First Aid by the American Red Cross or comparable certification authority.

6.1.5 HQ Air Force Civil Engineering Support Agency/Civil Engineering Fire Protection is the executive agent for the DoD Fire Fighter Certification Program (FFCP) and is responsible for issuing, maintaining, and tracking of NFPA wildland firefighter certifications. The ACSIM, Facilities and Housing Directorate, is responsible for maintaining and annually updating a list of NWCG certified wildland firefighters for the Army. The installation Wildland Fire Program Manager is responsible for issuing, signing, maintaining, and tracking of NWCG Qualification Card/Incident Command System (also known as “Red Cards”) for installation personnel.

## 6.2 Physical Fitness Standards.

6.2.1 The installation IWFMP will describe a measurable and objective evaluation test (medical exam, step-test, pack test, etc.) that will be used to establish physical fitness standards for personnel that participate in wildland fire management activities. All required exams will be paid for by the Government. DoD 6055.6-M Department of Defense Fire and Emergency Services Certification Program, and NWCG Publications Management System (PMS) 310-1/National Fire Equipment System (NFES) 1414 *Wildland and Prescribed Fire Qualification System Guide*, NFES 1596-*Fitness and Work Capacity*, and NFES 2071 - *Fit to Work, Fatigue and the Firefighter* provide guidance for establishing physical fitness standards for wildland fire management activities.

6.2.2 Personnel whose job description requires participation in wildland fire management activities as a primary or secondary firefighter on Army installations will meet the preemployment medical and physical criteria contained in NFPA 1500 *Standard on Fire Department Occupational Safety and Health Program* and receive a physical examination as specified in NFPA 1582 *Standard on Medical Requirements for Fire Fighters*. Medical and physical requirements for personnel not classified as primary/secondary wildland firefighters shall be as specified in the installation IWFMP.

**7.0 Integrated Wildland Fire Management Plan.** The Installation IWFMP should be developed to reduce wildfire potential, effectively protect and enhance valuable natural resources, integrate applicable state and local permit and reporting requirements, and implement ecosystem management goals and objectives on Army installations. It should be reviewed and updated annually and revised at a minimum once every five years. The IWFMP will directly support installation missions and be consistent with installation emergency operations plans, while being integrated with the INRMP, the installation’s fire and emergency services plan, and the ICRMP, if they exist. The IWFMP may be included in the TNRMP or the fire and emergency services program plan(s). Regional IWFMPs under the Transformation of Installation Management are acceptable but must be supplemented locally as needed. The IWFMP will ensure integration by including in its development all organizations having fire responsibility on the installation, and it will be coordinated with installation mission operations and other appropriate installation organizations. Response to wildland fire will be based on the IWFMP and in accordance with land management objectives. Installations with minor wildfire hazard and/or prescribed burning activities may be exempted from the IWFMP requirement by the ACSIM, Facilities and Housing Directorate or HQ, NGB with concurrent notification of the ACSIM, Facilities and Housing Directorate, as a minimum, the installation IWFMP will include the following components:

**7.1 Goals and Objectives.** The Plan shall establish goals and objectives for the wildland fire management program on the installation.

**7.2 Organizational Structure and Responsibilities.** The IWFMP will describe the wildland fire management organizational structure, and will indicate its position within the installation command structure. The organizational structure for wildland fire activities will be consistent with NWCG Incident Command System (ICS) standards. The plan will describe responsibilities for all installation personnel

involved in fire and emergency response.

**7.3 Interagency Cooperation and Mutual Aid Agreements.** The IWFMP will identify procedures for cooperative management, emergency assistance, and mutual aid off the installation. Installations are encouraged to develop regional partnerships through reciprocal agreements among DoD installations and other federal, state, local, and private entities to share planning/management strategies and resources (e.g. human, logistical, and operational resources). These reciprocal agreements must be in place if emergency assistance is planned off the installation. Emergency assistance and mutual aid agreements will conform to the guidelines stated in DODI 6055.6 - DoD Fire and Emergency Services Program and AR 420-90, Fire and Emergency Services. Place copies of interagency agreements or mutual aid agreements in the appendix to the IWFMP.

**7.4 Smoke Management and Air Quality.** Describe the mission, environmental, human health, and safety factors as well as applicable state and local permit reporting requirements specific to the installation and region that affect smoke management and identify necessary mitigation practices. Refer to NWCG publication PMS 420-2/NFES 1279 — *Prescribed Fire Smoke Management Guide* for guidance on factors to consider.

**7.5 Safety and Emergency Operations.** Identify installation-specific safety and emergency operations protocols. Identify safety procedures for unexploded ordnance in wildfire situations. Identify areas where quality, quantity, or types of unexploded ordnance render the area inappropriate for fire fighting, such as 40 mm. grenade impact areas. Establish appropriate specialized procedures when ammunition or hazardous materials storage areas might be involved. Use NFPA 1977 - *Standard on Protective Clothing and Equipment for Wildland Fire Fighting*, which establishes the requirements for protective clothing. The IWFMP must reflect that firefighter and public safety is the highest priority in every wildland fire management activity.

**7.6 Risk Assessment/Decision Analysis Processes.** Sound operational risk management will be the foundation for all wildland fire management plans and activities. Identify the indices and/or fire danger rating systems that must be considered before conducting wildland fire activities to determine fire hazard, severity, intensity, and other significant factors affecting the protection of life and property. Identify the environmental factors that will be measured prior to ignition of a prescribed fire treatment. Identify normal and unique weather patterns that affect fire behavior on the installation.

**7.7 Wildland Fire History.** Include an appendix that provides an analysis of both recent and long-term wildland fire history.

**7.8 Natural and Cultural Resource Considerations.** Identify sensitive natural and cultural resources that should be given consideration before conducting any wildland fire management activity. Consider development of a comprehensive, interagency strategy for fire management to help achieve ecosystem sustainability. Incorporate mitigation, burned-area rehabilitation, and fuels reduction and restoration activities that contribute to ecosystem management. Consider use of maintained, vegetated firebreaks to protect sensitive areas.

**7.9 Mission Considerations.** Identify mission requirements and potential impacts to the installation and tenant unit missions (positive and negative) that may occur as a result of implementation of the IWFMP.

**7.10 Wildland Fuel Factors.** Identify the effects of installation and community wildland fuel types and fuel loads on fire behavior. Display data on fuel types and fuel loading by maps or other means. Conduct fuel surveys to collect wildland fire fuels data if necessary.

**7.11 Monitoring Requirements.** Identify the environmental factors that will be monitored and the frequency of monitoring required for both a wildfire and prescribed fire. Identify post-fire assessment protocols for both wildfire and prescribed fires.

**7.12 Public Relations.** Identify a protocol for notifying the media or other affected public for wildfire incidents and prescribed burning activities. Incorporate wildland fire, both protection and ecological aspects, into installation and public awareness programs.

**7.13 Funding Requirements.** Identify the funding requirements to train and equip wildland fire management personnel to ensure safe, effective, and cost-efficient operations in support of the IWFMP. Identify the appropriate sources of funding for wildland fire activities.

#### **7.14 Personnel Training and Certification Standards and Records.**

7.14.1 Identify the staffing requirements, according to specific certification and training requirements, for the tasks associated with wildland fire management activities on the installation. Current training and qualification records will be maintained for all personnel involved in wildland fire management activities. The garrison commander or designee will assure the maintenance of training records (e.g. through the Civilian Personnel Office, Wildland Fire Program Manager, or Fire Chief (see also paragraph 6.1.5)).

7.14.2 Provide opportunities for maintenance of current knowledge on the science of fire and fire management and to take advantage of new technology.

**7.15 Programmatic Environmental Assessment.** Implementation of the IWFMP requires an assessment of the environmental effects as required by AR 200-2, *Environmental Analysis of Army Actions*, dated 29 Mar 02.

### **8.0 Funding.**

8.1 Funding for IWEMP implementation, wildland fire prevention, fuels management for hazard reduction, wildland fire suppression, prescribed burning, and other wildland fire management is an installation operations and maintenance responsibility. Resource planning and programming responsibility should be addressed in the next Program Objective Memorandum cycle.

8.2 The integrated Training Area Management funds may be used for construction and maintenance of fire/fuel breaks, or other fuel removal directly associated with ranges/training areas.

8.3 Proceeds from the sale of forest products may be used for protection of forests on land in forestry reimbursable programs in accord with Memorandum, DAIM-ED-N, 17 Aug 99, subject: Army Regulatory Guidance for Reimbursable Agricultural/Grazing and Forestry Programs.

8.4 Wildland fire management activities conducted for the purpose of compliance with environmental laws and regulations will be supported by environmental conservation funds.

8.5 Mission activities, e.g. training and testing, may support wildland fire management and suppression as required and agreed to by the participating organizations. The garrison commander or designee will mediate and organize such arrangements.

### **9.0 Prescribed Fires.**

**9.1 Use of Prescribed Fire on Army Installations.** Prescribed fire may be used as a

management tool to support mission needs and to attain the goals and objectives of the INRMP. The Army recognizes two types of prescribed fires: 1) those ignited by qualified personnel in accordance with an approved prescribed burn plan, and 2) wildfires managed under prescribed conditions as addressed in an approved IWFMP.

**9.2 Site Specific Burn Plans.** A site specific burn plan will be developed for each prescribed burn conducted on Army property. The installation IWFMP will identify the required components for site-specific burn plans. At a minimum, burn plans will include the following:

- Burn objectives
- Acceptable weather and fuel moisture parameters
- Required personnel and equipment resources
- Burn area map
- Smoke management plan
- Safety considerations
- Pre-burn authorization/notification checklist
- Coordination to consider wildlife, endangered species, cultural resources, and noxious weed effects.
- Alternative plan to cover plan of action if wind direction changes during prescribed burn.
- Plan for analysis of burn success and identification of lessons learned.

**9.3 Use of Fire Breaks.** When planning for prescribed fires, and when suppressing wildfire, utilize natural and existing man-made features whenever possible. Fire breaks must be constructed, maintained, or rehabilitated to prevent erosion.

## **10.0 Mutual Aid.**

10.1 Following proper coordination with the office of the Deputy Chief of Staff, G-3, military assistance (both military and civilian personnel) may be furnished to the National Interagency Fire Center (NIFC) in national fire emergencies pursuant to the Memorandum of Understanding between the Department of Defense and The Departments of Agriculture and the Interior dated 1975. Support to NIFC is reimbursable under the Economy Act. Procedures for deployment of civilian or military personnel by national request are provided in Appendix A.

10.2 Local area assistance included in existing agreements (paragraph 7.3) may be authorized by the garrison commander.

**11.0 Labor Relations.** In the implementation of this policy guidance, activities should ensure compliance with their statutory labor relations obligations.

## **APPENDIX A. DEPLOYMENT AND REIMBURSEMENT PROCEDURES (not applicable outside the Continental US)**

**1.1 Preparedness Levels 1 - 5 (Non-Military).** Army civilian firefighters may be deployed if requested by the National Interagency Fire Center (NIFC) and coordinated with the Director of Military Support (DOMS). The request will be channeled from NIFC through the Geographic Area Coordination Center (GACC) to the Dispatch Center and finally to the specific civilian resource. Conditions for any deployment of civilian personnel include willingness of civilians to volunteer, approval by the installation or garrison commander, and coordination (through the chain of command) with DOMS. If deployed to a different set of duties than normally assigned, the assignment must be accomplished by detail. The Army will annually assemble a list of Department of Army civilians that are certified (red card), their level of certification, and dates of availability. It is from this list that NIFC, through the GACCs, requests appropriate civilian resources. This list is provided to each of the GACCs and to the DOMS annually. This procedure is different than the procedure for deployment of other military assets as outlined below. It is designed to accommodate national requirements for specific civilian expertise to be integrated with other Federal and State agencies.

**1.2 Preparedness Level 5 (Military).** Army military firefighters may be deployed if requested by the National interagency Fire Center (NIFC) through (DOMS).

**2.0 Fiscal and Entitlement Support.** Support to NIFC is fully reimbursable under the Economy Act. Volunteers will continue to be paid from their current payroll offices. All actual costs, including base salary, overtime, TDY travel, and per diem will be paid IAW paragraph 2.2. Employees selected for these assignments would be detailed to a set of duties and placed on TDY. NIFC will report employee work hours and leave to each employee's timekeeper weekly.

**2.1 Benefits and Entitlements.** All current enrollments in Federal benefit coverage will continue, i.e., Federal Employees Health Benefits, Federal Employee Group Life Insurance, Thrift Savings Plan, Workers Compensation, etc. individuals with private insurance should check with their respective carriers to determine coverage. Firefighters identified for deployment should be advised to update their designation of beneficiaries, emergency contacts, and medical allergies statements. If required, components would submit a request for waiver of the biweekly maximum earnings limitation for approval.

**2.2 Reimbursement.** Local resource managers should establish a local automatic reimbursable account. At the conclusion of the mission, components will prepare and forward a SF 1080 billing for all actual expenses incurred to NIFC. For fires located west of the Mississippi River, this should be done through the coordinating activity at 5th Continental U.S. Army, Ft. Sam Houston, TX. The POC for reimbursement can be reached at DSN, 471-2566, commercial, (210) 221-2566. For fires located East of the Mississippi River, the coordinating activity is the 1st Continental U.S. Army, Ft. Gillem, GA. The POC for reimbursement can be reached at DSN, 797-7560, commercial, 404-469-7560.



## **Appendix B. Interagency Agreements with Coronado National Forest**

**US EPA ARCHIVE DOCUMENT**

Agreement # W91QUS-04317-001

**INTERAGENCY AGREEMENT  
BETWEEN  
FORT HUACHUCA, U.S. ARMY  
UNITED STATES DEPARTMENT OF DEFENSE  
AND  
SIERRA VISTA RANGER DISTRICT, CORONADO NATIONAL FOREST  
UNITED STATES DEPARTMENT OF AGRICULTURE**

This interagency agreement made and entered into by and among the Commander, Fort Huachuca, U.S. Army Garrison, Department of Defense (hereinafter referred to as the Army), under the provision of the Department of Defense Fire Protection Program, DoDI 6055.6 and AR 420-90 Fire and Emergency Services, 10 Sep 97, and the Sierra Vista Ranger District, Coronado National Forest, Forest Service, United States Department of Agriculture (hereinafter referred to as the Forest Service), under provisions of the Federal Land Policy and Management Act of 1976 (307B), Section 601 of the Economy Act of June 30, 1932 (31 U.S.C. 1535), and the memorandum of understanding between the Department of Defense, Department of Agriculture and Department of Interior, June 26, 1978.

**A. PURPOSE**

1. The purpose of this Agreement is for the Forest Service to provide wildland fire support to the Army at Fort Huachuca, Arizona, and for the Army to provide wildland fire support to the Forest Service within the Sierra Vista Ranger District in the Coronado National Forest, Arizona. Wildland fire support is described as any wildland fire management, suppression or rehabilitation action requested by the receiving agency and performed by the sending agency. The reimbursable costs to be paid by either party will be determined at an annual meeting to be held in January of each year. Staffing and reimbursable costs will be documented in an annual operating plan.

2. This Agreement will also provide a basis for cooperation between the agencies of the Departments of the Defense and Agriculture on all aspects of fire suppression and management. In addition, it will facilitate the cooperative use of resources. The Forest Service has established a fire protection unit at Libby Army Airfield and other units are stationed adjacent to Fort Huachuca. It is deemed to be in the best interest of the Government to provide assistance when either agency determines that assistance is needed. The following are guidelines that should be followed throughout the length of this Agreement.

**B. IT IS MUTUALLY AGREED AND UNDERSTOOD BY AND BETWEEN THE TWO PARTIES THAT:**

1. Employees of the Forest Service and the Army will be authorized to enter upon Army or Forest Service Lands when requested to engage in wildland fire activities.
2. Each agency is in charge of wildland fire activities that occur within its jurisdiction area assuming there is an employee of the agency present and available to assume such responsibility.
3. Each agency will not be expected to deplete its own protection resources to the detriment of its normal protection responsibilities.
4. It will be the responsibility of each agency to inform all responsible persons within their organization of the contents of this Agreement.
5. The parties will cooperate on an interagency basis to provide the required level of training consistent with the National Interagency Incident Management System (NIMS) and the National Wildfire Coordinating Group (NWCG).
6. The parties will recognize the other's qualification standards but in no case will these qualifications be less than those defined by the NWCG. For positions that do not have NWCG standards, the individual agency standards will apply.
7. In the event the supporting agency determines its initial attack resources are not or will not be successful, or if a wildfire is beyond the capabilities of suppression resources, then the IC of both agencies will work to provide assistance needs.
8. This Agreement shall not affect the rights of either party to recover suppression costs as a result of the negligence or willful act of any person causing the fire.
9. Prior to an anticipated incident assignment all personnel will be briefed on what to expect on the assignment.
10. Any fire occurring within one-half mile of their common boundary will be considered as influencing the lands of the other in which either party, upon notification of the other, may take action to suppress the fire.
11. Both parties will cooperate to the fullest extent possible in the management of all fires on both Forest Service and Army lands and especially within the confines of their common boundary.
12. Both parties will take appropriate suppression action occurring within their jurisdictions. When location is in doubt, or when requested by the other agency, the suppression action will be made by the agency with the closest available resources.
13. The Initial Attack Incident Commander shall remain in charge of the fire until command is relinquished to a fully qualified IC.

14. Fires originating on the lands of one agency and discovered by personnel from the other agency will be reported immediately to the Southeast Zone Coordination Center. The Center will notify appropriate personnel for action.

15. The supplying agency will provide the standard compliment of gear and personnel protective equipment for each individual dispatched.

16. Each agency will make available personnel and equipment to assist with prescribed fire projects on each other's lands provided such resources are available and proper documentation has been completed in compliance with NWCG standards.

17. Cost and damages to firefighting equipment will be considered under DoDI: 6055.6 and/or the Federal Tort Claims Act.

18. The Army and Forest Service will provide Initial Attack coverage at no charge to either party. If the wildland fire is not contained within the Initial Attack period (24 hours), the receiving party will reimburse the supplying party for any costs incurred after the 24-hour Initial Attack period expires.

19. Any reimbursable costs associated with the air operations at Fort Huachuca (e.g. water, electricity, manpower, etc.) will be negotiated between the parties at the annual meeting to be held in January of each year.

20. The Army and Forest Service will be responsible for any and all liability associated with respect to their employees, to include Office of Workmen's Compensation Program (OWCP) claims for personal injury.

21. Prior to beginning the initial work on a project, all personnel will be briefed by one or both of the parties on the scope of the project and their expectations.

22. The Army and Forest Service will provide supervision or a liaison on all projects agreed to in the annual operating plan.

23. The Army and Forest Service will provide supplies and equipment maintenance for mutually agreed projects consistent with the annual operating plan.

#### C. THE FOREST SERVICE SHALL:

1. Upon the request of the designated Incident Commander (IC) or through a request filed through the Fort Dispatch System from the IC, provide support to the Army with all reasonably available resources for wildland fire suppression. This will include the use of Forest Service-owned equipment and personnel as well as Forest Service contracted air tankers and helicopters. The initial request for resources can also be made informally to the district and then formally through Southeast Zone (SEZ) Coordination Center or can be made solely through SEZ Coordination Center in Tucson.

2. Provide a person or persons from the local District to assist the Army IC in the capacity of Liaison Officer to provide both support and communications with all Forest Service resources assigned to the fire.

3. Request, when necessary, the support of military equipment and personnel in accordance with the memorandum of understanding between Department of Defense, Department of Agriculture and the Department of Interior. The only resources that can be requested through this agreement are those personnel and equipment assigned to the Fort Huachuca Fire Department and normally used in wildland fire activities.

#### D. THE ARMY SHALL:

1. When requested by the Forest Service, provide support to the Forest Service on Sierra Vista Ranger District lands with all reasonably available resources to include Army-owned equipment and personnel at Fort Huachuca.

2. Provide a designated Deputy Incident Commander who would meet standards required by the Army, when the Army Liaison Officer is providing assistance and support on the wildland fire or National Forest.

3. Notify the Forest Service Management Liaison of any fire caused by actions of Army units working on or adjacent to Forest Lands and obtain approval to take suppression action, as appropriate.

#### E. ACCESS TO RECORDS

The Army and Forest Service agree to give, through any authorized representative, access to and the right to examine all books, papers, or documents related to this instrument.

#### F. MODIFICATION

Modifications within the scope of this instrument will be made by mutual consent of the parties, by the issuance of a written modification, signed and dated by both parties prior to any changes being performed. Either party is not obligated to fund any changes not properly approved in advance.

#### G. RESTRICTION FOR DELEGATES

Pursuant to Section 22, Title 41, United States Code, no member of, or delegate to, Congress will be admitted to any share or part of this instrument, or any benefits that may arise therefrom.

#### H. COMPLETION DATE

This instrument is executed as of the last date shown below and expires five years after that date, at which time it will be subject to review, renewal, or expiration.

## I. OBLIGATIONS

Nothing herein will be construed as obligating the Forest Service or the Army to expend or as involving the United States in any contract or other obligation for the future payment of money in excess of funding approved and made available for payment under this instrument and modifications thereto.

## J. PRINCIPAL CONTACTS

1. Fort Huachuca Fire Chief  
Chief Steve Hauck  
US Army Garrison  
ATTN: ATZS-PSF  
Fort Huachuca, AZ 85613-7012  
PHONE: (520) 533-2116
2. Fort Huachuca Environmental Chief  
Thomas Cochran  
US Army Garrison  
ATTN: ATZS-ISB  
Fort Huachuca, AZ 85613-7010  
PHONE: (520) 533-5215
3. Forest Service Liaison (Fire Management)  
William Wilcox  
Sierra Vista Ranger District  
5990 S. Highway 92  
Hereford, AZ 85615  
PHONE: (520) 378-0311
4. Forest Service Liaison (Fire Management)  
William Crollly  
Sierra Vista Ranger District  
5990 S. Highway 92  
Hereford, AZ 85615  
PHONE: (520) 378-0311
5. Forest Service Liaison (District Ranger)  
Stephen L. Gunzel  
Sierra Vista Ranger District  
5990 S. Highway 92  
Hereford, AZ 85615  
PHONE: (520) 378-0311
6. Forest Fire & Aviation Staff

Dean McAlister  
Coronado National Forest  
300 W. Congress  
Tucson, AZ 85701  
PHONE: (520) 670-4528

#### K. ADMINISTRATIVE CONTACTS

1. Carmen Melendez  
Grants and Agreements  
Coronado National Forest  
300 W. Congress  
Tucson, AZ 85701  
PHONE: (520) 670-4523
  
2. Alva Lenzen  
US Army Garrison  
ATTN: ATZS-RMY  
Fort Huachuca, AZ 85613-7013  
PHONE: (520) 533-1300

#### L. TERMINATION

This instrument may be canceled at any time by mutual consent of both parties. Either party will give at least 30 days written notice to terminate this instrument in whole, or in part, at any time before the date of expiration. Neither party will incur any new obligations for the terminated portion of this instrument after the effective date and will cancel as many obligations as possible. Full credit will be allowed for each party's expenses and all non-cancelable obligations properly incurred up to the effective date of termination.

IN WITNESS WHEREOF, the parties hereto have executed this agreement as of the last date written below.

ACCEPTANCE for the US Army Garrison:

BY: \_\_\_\_\_  
LAWRENCE J. PORTOUW  
COL, MI  
Commander, US Army Garrison

DATE: \_\_\_\_\_

ACCEPTANCE for the USDA Forest Service:

BY: \_\_\_\_\_  
JEANINE DERBY  
Forest Supervisor  
Coronado National Forest

DATE: \_\_\_\_\_

Note: This agreement was signed by James A. Chambers, Deputy Garrison Commander for Lawrence J. Portouw on 02/18/04 and by Jeanine Derby on 03/01/04

US EPA ARCHIVE DOCUMENT



## MODIFICATION NO. 01

to

INTERAGENCY AGREEMENT, NO. 04-IA-110305-03-020  
between

USDA FOREST SERVICE, CORONADO NATIONAL FOREST  
and

FORT HUACHUCA, U.S. ARMY  
UNITED STATES DEPARTMENT OF DEFENSE

1. Purpose of the Modification: The purpose of the modification is to add reference to the National Forest Management Act (NFMA) of 1976 (16 U.S.C. 1600); expand the purpose statement to include additional types of natural resource management projects; add reference to ecosystem management programs, projects, and procedures; change the Forest Service administrative contact name to Norene Norris; add billing information; and add authorized representative clause.

This modification is issued pursuant to:

**Add the National Forest Management Act (NFMA) of 1976 (16 U.S.C. 1600) as one of the authorities in the opening paragraph.**

**Insert after the first sentence in A. PURPOSE, 1. ...” The further purpose of this agreement is for the Forest Service to provide natural resource management support to the Army, and for the Army to provide natural resource management support to the Forest Service.”**

ADDITION OF CLAUSE B., 24, TO READ AS FOLLOWS: THE PROVISIONS OF THIS INTERAGENCY AGREEMENT EXTEND TO THOSE ACTIVITIES OF THE ARMY AND FOREST SERVICE THAT IMPACT THE NEED FOR, AND THE DEVELOPMENT OF, ECOSYSTEM MANAGEMENT PROGRAMS, PROJECTS, AND PROCEDURES THAT MIGHT HAVE APPLICATION TO BOTH THE ARMY INSTALLATION AND THE FOREST SERVICE. THE SPECIFICS OF SUCH PROJECTS WILL BE PROVIDED IN THE ANNUAL OPERATING PLAN.

**K. CHANGE THE NAME OF THE FOREST SERVICE ADMINISTRATIVE CONTACT TO NORENE NORRIS.**

ADD: M. BILLING. BILLINGS WILL BE SUBMITTED ON STANDARD FORM 1080, VOUCHER FOR TRANSFER BETWEEN APPROPRIATION AND/OR FUNDS, OR ON DD FORM 448, TO THE ABOVE NAMED ADMINISTRATIVE CONTACT.

ADD: N. AUTHORIZED REPRESENTATIVES. BY SIGNATURE BELOW, THE COOPERATOR CERTIFIES THAT THE INDIVIDUALS LISTED IN THIS DOCUMENT AS REPRESENTATIVES OF THE COOPERATOR ARE AUTHORIZED TO ACT IN THEIR RESPECTIVE AREAS FOR MATTERS RELATED TO THIS AGREEMENT.

Except as provided herein, all terms and conditions of the referenced document remain unchanged and in full force.

ACCEPTANCE for the US Army Garrison:

\_\_\_\_\_  
JONATHAN B. HUNTER  
Colonel, US Army  
Commander, US Army Garrison

DATE: \_\_\_\_\_

ACCEPTANCE for the U.S.D.A. Forest Service:

\_\_\_\_\_  
JEANINE A. DERBY  
Forest Supervisor  
Coronado National Forest

DATE: \_\_\_\_\_

Forest Service Use

Job Code: \_\_\_\_\_

Note: This agreement was signed by Jonathan B. Hunter on 07/21/04 and Jeanine Derby on 07/23/04.

US EPA ARCHIVE DOCUMENT

## Appendix C. Agreement with Local Fire Districts

US EPA ARCHIVE DOCUMENT

Note: This appendix contains the unexecuted July 2005 draft of this agreement.

MEMORANDUM OF UNDERSTANDING  
BETWEEN  
FORT HUACHUCA, U.S. ARMY  
UNITED STATES DEPARTMENT OF DEFENSE  
AND  
FIRE DEPARTMENTS OF LOCAL COMMUNITIES  
(Fire Protection - Mutual Fire Fighting Contingency Aid)

This Memorandum of Understanding made and entered into by and among the Commander, Fort Huachuca, U.S. Army Garrison, Department of Defense (hereinafter referred to as the Army), under the provision of the Department of Defense Fire Protection Program, DoDI 6055.6 and AR 420-90 Fire and Emergency Services, 10 Sep 97, and Fire Departments of Local Communities to Fort Huachuca, under provisions of the Federal Land Policy and Management Act of 1976 (307B), Section 601 of the Economy Act of June 30, 1932 (31 U.S.C. 1535), and the memorandum of understanding between the fire departments of local communities to Fort Huachuca.

A. PURPOSE

1. The purpose of this Agreement is for the Fire Departments to provide fire, HazMat and EMS support to the Army at Fort Huachuca, Arizona, and for the Army to provide fire, HazMat and EMS support to the fire departments of Local Communities to Fort Huachuca. Fire/EMS support is described as any fire or EMS management, or rehabilitation action requested by the receiving agency and performed by the sending agency.
2. This Agreement will also provide a basis for cooperation between the parties Fire Departments of Local Communities and Fort Huachuca on all aspects of fire suppression and management. In addition, it will facilitate the cooperative use of resources. It is deemed to be in the best interest of the government to provide assistance when parties determine that assistance is needed. The following are guidelines that should be followed throughout the duration by this agreement.

B. IT IS MUTUALLY AGREED AND UNDERSTOOD BY AND BETWEEN THE PARTIES THAT:

1. The Chief or Senior Officer of the fire department may respond to calls for help received from the Fire Chief or Senior Officer of the other department, providing the services of the responding unit can be spared from their own area of responsibility with a margin of safety.

B. continued

2. Fire Chief or Senior Officer will not request assistance from the other fire department unless the fire is out of control and of such proportions that it cannot be handled by his/her personnel and equipment.

3. The Fire Chief or Senior Officer of the requesting/responding fire department will determine the amount of assistance (equipment and personnel) required.

4. The personnel and equipment of the responding department will be under the direct supervision of the requesting Fire Chief or Senior Officer.

5. The requested assistance under the terms of this agreement will be provided but the responding party will have the right to deny support if the demands of its own government unit will not allow providing the requested assistance.

6. Each party waives all claims against the other party or parties for compensation for any loss, damage, personal injury or death, occurring as a result of participation in this agreement.

7. The provider will be liable and reimburse the receiver for all damages, cleanup costs, and fines, from environmental damages that result from Provider's actions and are directly and legally attributable to the provider, unless the actions taken were at the direction and request of the requesting Fire Chief or Senior Officer, and consistent with the usual firefighting actions.

8. TRAINING: Personnel of the fire department are encouraged to attend activities, planned drills, and meetings conducted by the other department(s).

C. Fire Departments of Local Communities will respond to calls for assistance with resources within the boundaries of Fort Huachuca as needed. Responses to calls for assistance are limited by B section as stated above.

D. THE ARMY WILL:

1. When requested by the Fire Departments of Local Communities, provide support to the Fire Departments with reasonably available resources to include Army-owned equipment and personnel at Fort Huachuca.

2. Provide a designated Deputy Incident Commander who would meet standard required by the Army, when the Army Liaison Officer is providing assistance and support on the wildland fire or local emergency incident.

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D. continued

3. Notify the requesting agency Liaison of any fire caused by actions of Army units working on or adjacent to Forest or other Agency Lands and obtain approval to take suppression action, as appropriate.

#### E. ACCESS TO RECORDS

The Army and Fire Department agree to provide, upon request, any documentation, related to this instrument, as permitted by law, including the Freedom of Information Act and the Privacy Act.

#### F. MODIFICATION

Modifications within the scope of this instrument will be made by mutual consent of the parties, by the issuance of a written modification, signed and dated by all parties prior to any changes being performed. Parties are not obligated to fund any changes not properly approved in advance.

#### G. RESTRICTION FOR DELEGATES

Pursuant to Section 22, Title 41, United States Code, no member of, or delegate to, Congress will be admitted to any share or part of this instrument, or any benefits that may arise there from.

#### H. COMPLETION DATE

This instrument is executed as of the last date shown below and expires five years after that date, at which time it will be subject to review, renewal, or expiration.

#### I. OBLIGATIONS

Nothing herein will be construed as obligating the fire departments or the Army to expend or as involving the United States in any contract or other obligation for the future payment of money in excess of funding approved and made available for payment under this instrument and modifications thereto.

#### J. PRINCIPAL CONTACTS

1. Fort Huachuca Fire Chief  
Chief, Kevin E. Baylor  
U.S. Army Garrison, Fort Huachuca  
ATTN:IMSW-HUA-ESF  
Fort Huachuca, AZ 85730  
Phone: (520) 533-5054

- 3-

J. continued

2. Fort Huachuca Environmental Chief  
Thomas Cochran  
U.S. Army Garrison, Fort Huachuca  
ATTN: ATZS-ISB  
Fort Huachuca, AZ 85613-6000  
Phone: (520) 533-5215
  
3. Palominas Fire Department  
Chief, James Leiendecker  
Palominas Fire Department  
9903 South Palominas Road  
Hereford, AZ 85615  
Phone: (520) 366-5400  
Phone 520-366-5552, Cell: 266-0385
  
4. Fry Fire Department  
Chief, Bill Miller  
Fry Fire Department  
4817 S. Apache Ave.  
Sierra Vista, AZ 85650  
Phone: (520) 378-2665 Cell: 249-5079 or 249-5080
  
5. Huachuca City Fire Department  
Chief, Bob Fenimore  
Huachuca City Fire Department  
500 N. Gonzales Blvd  
Huachuca City, AZ 85616  
Phone: (520) 456-1353 Cell:520-249-5253
  
6. City of Sierra Vista  
Chief, Bruce Thompson  
City of Sierra Vista  
1327 E. Fry Blvd  
Sierra Vista, AZ 85635  
Phone: 458-3319, Cell (520) 236-6378

K. TERMINATION

This instrument may be canceled at any time by mutual consent of parties. Parties will give at least 30 days written notice to terminate this instrument in whole, or in part, at any time before the date of expiration.

IN WITNESS WHEREOF, the parties hereto have executed this agreement as of the last date written below.

ACCEPTANCE for the U.S. Army Garrison, Fort Huachuca:

BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
JONATHAN B. HUNTER  
Colonel, MI  
Commander, US Army Garrison Fort Huachuca

ACCEPTANCE for the Fire Departments of Local Communities: USDA Forest Service:

BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
Chief, James Leiendecker  
Palominas Fire Department

BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
Chief, Hubert Jackson  
Fry Fire Department

BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
Chief, Bob Fenimore  
Huachuca City Fire Department

BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
Chief, Bruce Thompson  
City of Sierra Vista Fire Department



## Appendix D. Fort Huachuca Fire Department Standard Operating Guidelines

US EPA ARCHIVE DOCUMENT

**WILDLAND FIRE SUPPRESSION**  
**STANDARD OPERATION GUIDELINES**  
**"SOG"**

1. Purpose - To establish standard procedure of operations for the suppression of wild land fires, either man caused or nature caused, occurring on Fort Huachuca.

**2. Policy - Suppression of wild land fires on Fort Huachuca will follow the NATIONAL FIRE MANAGEMENT POLICY (NIWFMP), the FORT HUACHUCA FIRE MANAGEMENT POLICY (FHIWFMP), & the FIRE MANAGEMENT PLAN for Fort Huachuca.**

3. **Highest priority of fire suppression is protection of life, (public & firefighter).**
4. **Second priority of fire suppression is property, sensitive species of plants & animals along with their habitat, natural/cultural resources, & military training.**
5. **Upon confirmation of a wild land fire the Environmental Division of Fort Huachuca will be notified.**
6. **All wild land fire suppression will be geared to control & extinguish fire as safely & quickly as possible.**
7. **Exception to policy above under number 6. is when other objectives have been set forth in the Fire Management Plan of Fort Huachuca.**
8. **All wild land fire suppression actions will be undertaken in a fashion as to be "light on the land" when ever possible.**
9. **"Light on the land" in the context of this SOG is meant to be broadly understood as –**
  - a) **Suppression action will not inflict more damage on the land then the fire. This includes, but is not limited to the soils.**
  - b) **Suppression action will use existing fuel breaks, natural or man made, for control lines when ever possible.**
  - c) **Fire IC will take into account as many environmental factors as possible when determining what suppression action is to be taken.**

- d) Fort Huachuca's Environmental Division personnel will be used to help consider, if the fire or planned suppression actions will be a deterrent to the environment.
10. The limits of where & how fire apparatus & equipment is to be driven or used will be based on the following -
- a) Safety of personnel.
  - b) Safety of equipment or apparatus.
  - c) The designed use & limits of the apparatus.
  - d) Operator's experience & personal limits concerning the use of a particular piece of apparatus or equipment.
11. Great care will be given by all operators to not over drive or cause unwarranted damage to any wild land fire vehicles or equipment.
12. When crews are unable to drive all the way to the fire they will
- a) Park vehicles in a fire safe area.
  - b) Secure & lock vehicles.
  - c) Keys will be left with the vehicle, hidden under the red lights on the roof.
  - d) Fight the fire with hand tools & other equipment.
13. Any suppression action that cannot be accomplished safely will not be attempted.
14. The Ten Standard Firefighting Orders will be adhered to during all fire fighting operations.
15. All fires will be fought in accordance with NWCG, NIMS & NFPA Standards & Guidelines.
16. It is the Fire Chief's policy that there will be no fire suppression in impact areas by Fire Department personnel. Adjoining roads, breaks (natural or man made) may be used. As on all fires fuel load and fire conditions will dictate suppression methods used. East Range is an impact area. West Range has no impact area designations. South Range has designated ranges & impact areas.
- Caution: Due to Fort Huachuca's historical uses, ordnance of many varieties may be found Post wide. Exercise caution & call range control if any ordnance is found.

**WILDLAND FIRE SUPPRESSION**  
**STANDARD OPERATION GUIDELINES**  
**"SOG"**

1. Purpose - To establish standard procedure of operations for issue of the Red Card to F.H.F.D. personnel & training requirements for Red Card qualifications.
  
2. **Policy - (Issue of Red Card)**
  - a) **To receive a Red Card all fire personnel will have to pass the pack test at the arduous level.**
  - b) **To receive a Red Card all fire personnel have to be job qualified at the minimum of Firefighter 1.**
  
3. **Policy - (Training Requirements)**
  - a) **For fire personnel to be Job Qualified on their Red Cards they will meet all NWCG & NIMS Standards & Guidelines.**
  - b) **For fire personnel to have positions listed on their Red Cards under "on the job training needs" they will meet all NWCG & NIMS Standards & Guidelines.**

**WILDLAND FIRE SUPPRESSION**  
**STANDARD OPERATION GUIDELINES**  
**"SOG"**

1. Purpose - To establish a standard minimum list of gear & personal items to be carried by all Fort Huachuca Fire Department Fire Personnel in their Two Week Pack.
2. **Policy - Each firefighter's two week pack will be packed & ready for use at all times.**
3. **Each firefighter's two-week pack shall contain at minimum the following items -**
  - a) **Sleeping bag or something similar.**
  - b) **One fire shirt.**
  - c) **One pair of fire pants.**
  - d) **Three each of – socks, t-shirts, under wears.**
  - e) **One set of civilian clothes including comfortable tennis shoes.**
  - f) **Warm jacket.**
  - g) **Personal items – tooth brush, tooth paste, soap, hand towel, bath towel, face cloth, prescription medication, razor, shaving cream, shampoo, sun screen.**
4. **Each firefighters two-week pack may contain other items such as those listed below.**
  - a) **Book to read**
  - b) **Fire Line Handbook**
  - c) **Nail clippers**
  - d) **Music player with headphones.**
  - e) **Cash or credit card for food or other items on long trips.**
  - f) **Sleeping pad of some kind.**
  - g) **Pillow**
  - h) **Other comforts or needs.**
5. **Total weight of firefighter's gear, two-week pack & initial attack pack cannot exceed 55 pounds.**

**WILDLAND FIRE SUPPRESSION**  
**STANDARD OPERATION GUIDELINES**  
**"SOG"**

1. **Purpose - To establish standard procedure of operations for the maintenance, checking of & care of, wild land fire equipment & apparatus.**
2. **Policy - All wild land firefighting vehicles will be checked on Tuesdays, Thursdays, Saturdays & after each fire assignment.**
3. **Checks will follow the 5379 designed for that individual vehicle.**
  - a) **Anything found needing to be fixed or that needs attention will be brought to the crew chiefs attention for repair.**
  - b) **All fuel & drip torch mix stored on vehicles will have "Fuel Stabilizer" in it for long fuel life.**
4. **All inventories will be done during the Saturday vehicle checks.**
  - a) **Inventories will also be done after each fire assignment.**
  - b) **All inventoried items will be on or in the vehicle.**
5. **All wild land equipment & apparatus will be cleaned, inside & out after each use or when needed.**
6. **All fuel levels, (vehicles, pumps, drip torch fuel, etc.) will be topped off after each use.**
7. **All radio batteries will be fully charged after each use.**

**WILDLAND FIRE SUPPRESSION**  
**STANDARD OPERATION GUIDELINES**  
**"SOG"**

1. Purpose - To establish standard procedure of operations for administration & oversight of fires not only in the wild land areas of Fort Huachuca, but fires that threaten to encroach on the installation. This SOG is from when a fire will not be able to be contained by the initial attack crew or crews.
2. Policy - When Initial Attack IC has determined that the fire has escaped the initial attack he/she will notify the shift supervisor.
  - a) Shift supervisor, if deemed necessary, will then request through the proper channels a Type 3 IC.
  - b) If a Type 3 IC is not available on the department, one will be brought in from an outside agency.
  - c) When transfer of the fire to the Type 3 IC takes place, shift supervisor will assign a fire department person to be the Liaison between the IC & The Fort Huachuca Fire Department.
  - d) Liaison person will be at the Incident Command Post.
3. The Liaison person(s) will remain in operation until the fire is turned back over to the Fort Huachuca Fire Department.
4. All assignment of duties on all wild land fires will be done according to Red Card Qualifications.
5. Wild Fire Organization/Management on Fort Huachuca Fires will follow the National Wildfire Coordinating Group (NWCG) & Incident Management System (NIMS).

**WILDLAND FIRE SUPPRESSION**  
**STANDARD OPERATION GUIDELINES**  
**"SOG"**

1. **Purpose - To establish standard procedure of operations for care & maintenance of hand tools used in wild land firefighting.**
2. **Policy - All wildland hand tools on vehicles & ten of each tool in storage will at all times be fire ready.**
  - a) **Wildland tools in this context will be –  
Pulaski, shovel, mcloud, swatter, Swedish brush hook & combo tool.**
3. **Fire ready in this context will mean-**
  - a) **Wooden handles will be sanded smooth.**
  - b) **Cutting & grubbing ends of tool will be sharpened.**
  - c) **Tools will have a 2" red stripe next to the tool head.**
  - d) **Tools will have a 1" white stripe located 1" below the red stripe.**
  - e) **Sharpened ends of tool will either have a tool sheath in place or be secured with duck tape.**
4. **Tools will be sharpened, sanded and cared for in accordance with USDA, Forest Service standards.**



**WILDLAND FIRE SUPPRESSION**  
**STANDARD OPERATION GUIDELINES**  
**"SOG"**

1. Purpose - To establish a standard minimum list of gear to be carried by all Fort Huachuca Fire Department Fire Personnel in their Initial Attack Pack.
2. **Policy - Each firefighter's initial attack pack will be packed & ready for use at all times.**
3. **Each firefighter's initial attack pack shall contain at minimum the following items -**
  - a) **Fire shelter in fire ready condition.**
  - b) **Plastic fire shelter carrying case.**
  - c) **Fire shelter use instructions.**
  - d) **Hearing protection.**
  - e) **Four 1-quart canteens with water.**
  - f) **Four fuses**
  - g) **Pair of leather gloves.**
  - h) **Headlamp with batteries.**
  - i) **Extra set of batteries for headlamp.**
  - j) **One-person first aid kit.**
  - k) **Goggles**
  - l) **Snacks or food for one meal.**
4. **Each firefighter's initial attack pack may contain other items such as those listed below -**
  - a) **Extra set of bootlaces.**
  - b) **Toilet paper.**
  - c) **Jacket, sweatshirt or sweater for night operations. (These are to be wore under the fire shirt, cotton is best)**
  - d) **Light rain gear.**
  - e) **Sting Relief Pads**
  - f) **Insect repellent**
  - g) **Any medicines person might need.**
5. **Total weight of firefighter's gear, initial attack pack & two-week pack cannot exceed 55 pounds.**
6. **Initial attack pack should be of the weight that the firefighter would be able to carry it for long periods of time.**

## WILDLAND FIRE SUPPRESSION STANDARD OPERATION GUIDELINES "SOG"

- 1. Purpose - To establish standard procedure of operations for administration & oversight of fires not only in the wild land areas of Fort Huachuca, but fires that threaten to encroach on the installation. This SOG is from dispatch, through initial attack phase into control or escaped fire status.**
- 2. Policy - When crew is dispatched crew chief or acting crew chief will ensure all personnel are fully equipped for fire assignment.**
  - a) Each fire fighter is dressed in proper PPE.**
  - b) Each fire fighter has a portable radio with extra battery.**
  - c) Each fire fighter has his/her initial attack pack & his/her 2-week pack on the unit they are assigned.**
- 3. Transit to fire - All wild land equipment will run Code 3.**
  - a) Red lights & siren.**
  - b) Will not exceed posted speed limit.**
  - c) All will take the same route to the fire unless directed by crew chief.**
- 4. Arrival - Crew chief of first arriving crew or a person designated by crew chief will take command of the fire. He/she will become the incident commander, (IC).**
  - a) IC will name the fire.**
  - b) IC will be addressed as (fire name) IC.**
  - c) IC then will size up fire.**
  - d) Assignments then shall be issued.**
  - e) Dispatch will then be briefed.**
- 5. Change of IC. - No change of IC takes place without a face-to-face meeting with current IC.**
- 6. Incident Support - Any time logistical support is needed through EOG, a fire department representative will be placed on site with the EOG team. This fire department representative(s) will remain in place until EOG is no longer needed by the fire department for fire support.**
- 7. All assignment of duties on all wild land fires will be done according to Red Card Qualifications.**
- 8. Wild Fire Organization/ Management on Fort Huachuca Fires will follow the National Wildfire Coordinating Group (NWCG) & Incident Management System (NIMS).**



**WILDLAND FIRE SUPPRESSION**  
**STANDARD OPERATION GUIDELINES**  
**"SOG"**

1. **Purpose - To establish standard procedure of operations to ensure that, whenever possible, all Environmentally Sensitive areas on Fort Huachuca will be a priority in the planning of suppression actions taken on all wild land fires.**
2. **Policy - Environmentally Sensitive areas in the context of this SOG will include but not be limited to the following –**
  - a) **Sensitive species of plants.**
  - b) **Threatened & endangered plants.**
  - c) **Threatened & endangered animals & their habitat.**
  - d) **Natural & cultural resources.**
  - e) **Other areas identified by Fort Huachuca's Natural Resources people.**
3. **Upon confirmation of a wild land fire the Environmental Division of Fort Huachuca will be notified.**
4. **Upon arrival of a representative of the Environmental Division on the fire, he will be used as a resource for identifying environmentally sensitive species or habitat's in the fire's path.**
5. **Suppression actions, whenever possible, will not inflict more damage on the land than the fire.**
6. **Fire IC will direct the use of existing fuel breaks, natural & man made, for control lines when ever possible.**
7. **From the initial attack phase until the fire is declared out, Fort Huachuca Fire Department personnel will aggressively strive to avoid any lasting disturbance to the plant life, soils & other habitat resources in the fire area.**
8. **In March of each year, a briefing from the Environmental Division, Wildlife Branch, will be requested by the fire department.**
9. **Each wild land fire vehicle & the A/C unit will have on board maps of the base that will have environmentally sensitive areas marked for easy identification.**
10. **All wild land fire suppression actions will follow NFPA & NWCG Standards & guidelines.**
11. **All fire personnel will review the NATIONAL FIRE MANAGEMENT POLICY, the FORT HUACHUCA MANAGEMENT POLICY & the FIRE MANAGEMENT PLAN during the month of March each year.**

**Appendix E. Fort Huachuca Wildland Fire Qualifications (February 2005)**

	Alexander	Angulo	A	Bryan	Castro	Cheatum	Clowser	Crone	Faccio	Ferguson	Goetz	Gray	Hathaway	Hernandez	Jimenez	Kelso	King	Kline	Krause D.	Krause S.	Melendez	Mendoza	Mixon	Nussbickel	Petroski	Possien	Pyle	Rhodes	Robles	Simmons	Slater	Tepe	Urkov	Zaida			
<b>PAC Test Current</b>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
<b>I-100</b>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
<b>S-130</b>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
<b>S-190</b>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
<b>S-131</b>		X	X					X							X	X			X		X				X				X			X	X				
<b>S-134</b>			X																						X												
<b>I-200</b>			X					X								X								X													
<b>S-211</b>			X																		X				X				X								
<b>S-212</b>		X	X					X						X							X				X				X		X		X				
<b>S-200</b>			X					X								X																					
<b>S-203</b>																																					
<b>S-230</b>			X					X								X						X			X				X								
<b>S-231</b>			X					X								X									X												
<b>S-215</b>			X					X																													
<b>S-234</b>								X																													
<b>S-216</b>																																					
<b>S-217</b>																X																					
<b>S-232</b>																																					
<b>S-233</b>																																					
<b>S-244</b>																																					
<b>S-245</b>																																					
<b>S-248</b>																																					
<b>S-258</b>																																					
<b>S-260</b>			X					X								X																					
<b>S-261</b>																																					
<b>S-270</b>			X													X									X												
<b>S-273</b>																																					
<b>S-290</b>		X	X				X	X				X			X	X			X	X		X		X	X			X	X					X			
<b>S-300</b>			X																						X												
<b>S-301</b>																																					
<b>S-330</b>			X																						X												
<b>S-336</b>																																					
<b>S-339</b>			X																						X												

## Appendix F. Incident Complexity Analysis Worksheet

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### Worksheet for Southwestern Region

This complexity analysis should be used as a guide for Agency Administrators and/or fire managers to identify and mitigate certain complexity or safety issues by selecting a different strategy, tactic, or higher qualification of incident management personnel to safely and effectively manage the incident.

The complexity analysis should be reviewed periodically to determine the level of management required. Discussion with Incident Commanders, Fire Managers, and Agency Administrators is critical to completion of worksheet.

<b>Safety</b>	YES	NO
Exposure of personnel to unusually hazardous conditions	___	___
Accidents have occurred	___	___
Multiple aircraft are involved or anticipated	___	___
Potential for public evacuations	___	___
Terrain adversely affects tactical capability / limits safety zones	___	___
Fire fighter performance affected by cumulative fatigue	___	___
 <b>External / Political Factors</b>		
Potential for numerous damage claims	___	___
More than one jurisdiction involved	___	___
Fire policy is controversial	___	___
Sensitive public/media relationships	___	___
Lack of cohesive organizational structure	___	___
 <b>Resource Issues</b>		
Structures	___	___
Cultural values	___	___
Recreational developments	___	___
Urban interface	___	___
Critical watershed	___	___
T & E Species	___	___
 <b>Fire Behavior</b>		
Current or predicted fire behavior dictates indirect strategy	___	___
Fuels are extremely dry (90th percentile)	___	___
Red Flag Warnings present or predicted	___	___
Extreme fire behavior exhibited	___	___
Current or predicted winds above 20 MPH	___	___
Severe fire weather predicted for next two burning periods	___	___

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**Personnel / Equipment**

100 or more personnel assigned to incident	_____	_____
Variety of special support personnel or equipment	_____	_____
Resources unfamiliar with local conditions and accepted tactics	_____	_____
Heavy commitment of local resources to logistical support	_____	_____
Local Initial forces nearly depleted	_____	_____
Two operational periods worked with limited success	_____	_____
Communication challenges are present	_____	_____
 Total number of elements checked:	 _____	 _____

**Complexity Analysis Criteria:**

A “yes” in each of the five major elements above could indicate a complexity level sufficient to warrant consideration of utilizing a Type 2 level Incident Management Team. Multiple checks in each element may indicate consideration for a Type I level Incident Management Team. If some elements are not involved then **use the following ranges as a guide:**

- 1-3 Current resources/management should be able to handle the incident. The local organization fills positions as needed. Continue to monitor objectives and accomplishments; consider a Type 3 organization.
- 4-6 Indicates complexity level suggesting a Type 3 organization.
- 7-10 Scrutinize overall complexity and safety concerns, consider past fire history and current and expected situation, and review WFSA. This complexity suggests the need for a Type 2 Team.
- 10+ May warrant consideration of a Type 1 Team.

Decision / Decision Rationale:

Prepared by: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

Reviewed by: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

Reviewed by: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

Slight modifications were made to match Interior “Red Book”.

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### Appendix G. Incident Organizer

<b>Incident Name</b>
Incident Number
Fire Code
Other Code
Unit
IC Time & Date
IC Time & Date
Containment Date & Time
Control Date & Time
Final Size

Directions and Intent:

**MOST INCIDENTS ONLY REQUIRE FILLING OUT THE FIRST FEW PAGES - i.e., TYPE 4 AND 5 INCIDENTS.** (In these situations, fill out afterwards when doing your AAR.)

- Intended to provide the IC with a format and focal point to begin processing an incident that is emerging. (Start to plan the fight – delegate – instead of fighting the fight and possibly losing your situational awareness as IC.)
- Use until an Incident is out or operating on an IAP.
- Serves as an Incident Workbook used in conjunction with the Incident Response Pocket Guide, Redbook or Fireline Handbook.
- Red-blocked items are required to be filled in for 30-mile accident prevention (Forest Service).

**IC Signature:** \_\_\_\_\_

**IC Signature:** \_\_\_\_\_

**Version 2004**

INITIAL ATTACK FIRE SIZE-UP					
Fire Name:	Fire Number			DOI:	
				USDA:	
IC Name:				State:	
Descriptive Location:					
*Arrival Date:			Time:		
*Legal:	Township	Range		Section(s)	
*Coordinates:	Latitude			Longitude	
	UTM:	E:	N:		
Reported by:					
*Estimated Size: acres			Ownership:		
ESTIMATED CONTAINMENT	Date:		Time:		
ESTIMATED CONTROL	Date:		Time:		
Fire Investigator?	No	Yes, on order		Name:	
Resources Responding (use resource summary on next page to record this data):					
Initial Fire Size-Up					
*Are any structures threatened? No Yes - specify:					
Does the fire constitute any control problems? No Yes - specify:					
Are additional resources needed? No Yes - specify:					
*Hazard(s):					
*Spread Potential:	1. Low	2. Moderate	3. High	4. Extreme	
*Character of Fire:	1. Smoldering	3. Running	5. Torching	7. Crown/spotting	
	2. Creeping	4. Spotting	6. Crowning	8. Erratic	
*Slope at Head of Fire:	1. 0-25%	2. 26-40%	3. 41-55%	4. 56-75%	5. 76+%
Position on Slope:	1. Ridgetop		4. Middle 1/3 of slope		7. Valley bottom
	2. Saddle		5. Lower 1/3 of slope		8. Mesa/Plateau
	3. Upper 1/3 of slope		6. Canyon bottom		9. Flat or rolling
*Fuel Type:	1. Grass		4. Pinon/Juniper		7. Aspen
	2. Grass/brush		5. Lodgepole/pine		8. Logging/Thinning Slash
	3. Oakbrush		6. Spruce/fir		9. Other (specify)
*Windspeed: mph					
*Wind Direction	1. Calm	3. NE	5. SE	7. SW	9. NW

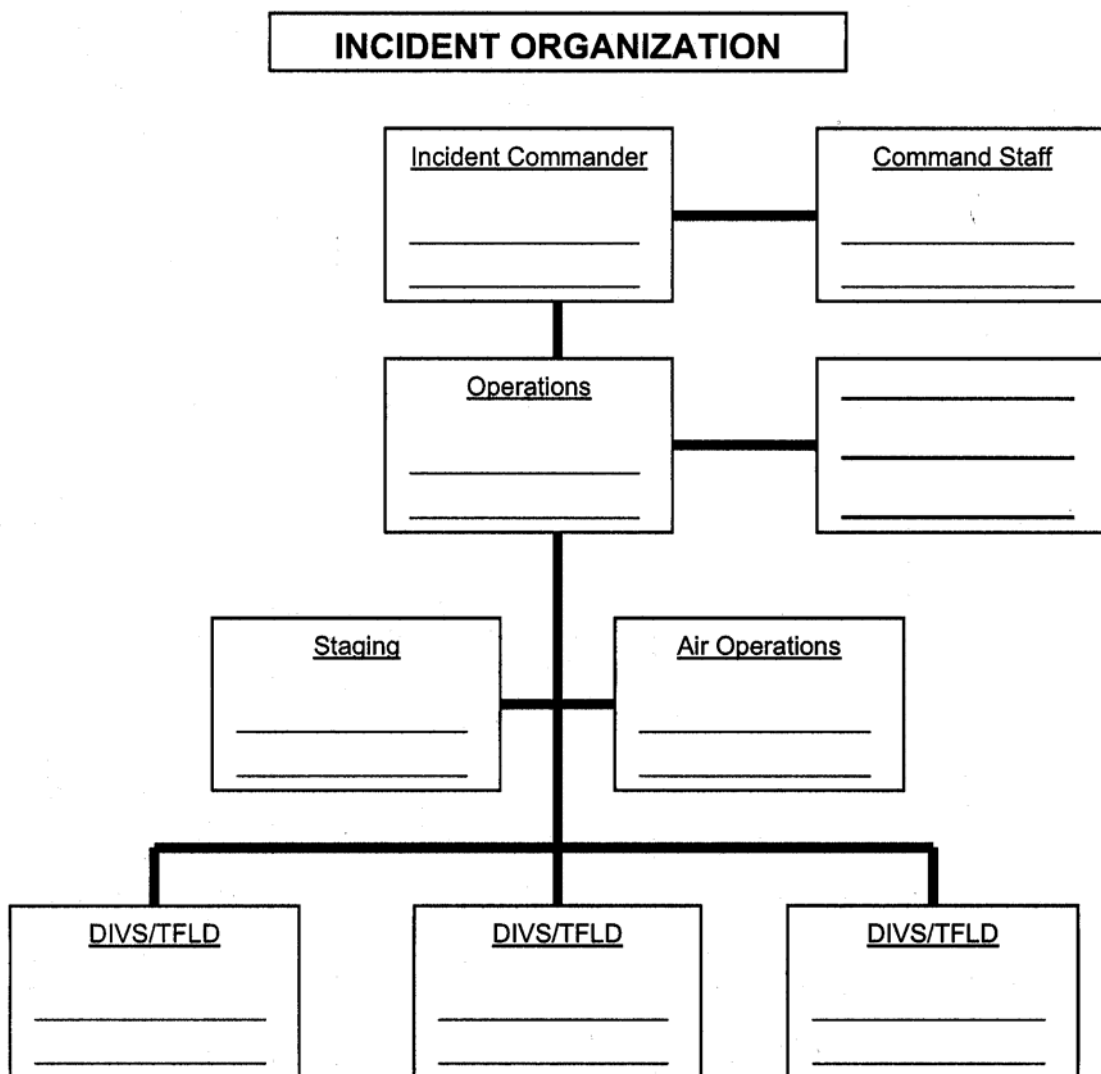
	2. North	4. East	6. South	8. West	10. Erratic
Today's ERC or BI of Unit, record here:					

\*Call into Dispatch Immediately

<b>Resource Summary</b>								
Resource ID	Resource Type	ETA/OS	Arrival Time	No. of People	Briefed Y/N	Assignment	Release Time	E-Number
<b>DOCUMENT BRIEFING FOR ALL INCOMING RESOURCES (USE PAGE 16 OF THE IRPG)</b>								

Incident Objectives
1. SAFETY of firefighters and public.
2.
3.
4.
Your goal is to manage the incident and not create another.

(Examples: protect structures, keep fire to east of road, river or ridge)





Risk Management		
<p>Maintain your situational awareness. Ensure compliance with the 10 Standard Firefighting Orders and LCES. Continually monitor the 18 Situations and apply appropriate mitigation. As the incident progresses, continually re-evaluate your situation. When hazards are identified mitigate them or change tactics and or strategy.</p>		
<p>Refer to the green pages in the IRPG.</p>		
YES	NO	Decision Points
<p>Controls in place for identified hazards? If no reassess your situation</p>		
<p>Are selected tactics based on expected fire behavior? If no reassess your situation</p>		
<p>Are the current strategy and tactics working? If no reassess your situation</p>		

Incident Risk Analysis (215a)		
Division/Group or Segment	Hazardous Actions or Conditions	Mitigations/Warnings/Remedies
Operational Period		



<b>Incident Complexity Analysis (Type 3, 4, 5)</b>		
<b>Fire Behavior</b>	<b>Yes</b>	<b>No</b>
Fuels extremely dry and susceptible to long-range spotting or you are currently experiencing extreme fire behavior.		
Weather forecast indicating no significant relief or worsening conditions.		
Current or predicted fire behavior dictates indirect control strategy with large amounts of fuel within planned perimeter.		
<b>Firefighter Safety</b>		
Performance of firefighting resources affected by cumulative fatigue.		
Overhead overextended mentally and/or physically.		
Communication ineffective with tactical resources or dispatch.		
<b>Organization</b>		
Operations are at the limit of span of control.		
Incident action plans, briefings, etc. missing or poorly prepared.		
Variety of specialized operations, support personnel or equipment.		
Unable to properly staff air operations.		
Limited local resources available for initial attack.		
Heavy commitment of local resources to logistical support.		
Existing forces worked 24 hours without success.		
Resources unfamiliar with local conditions and tactics.		
<b>Values to be protected</b>		
Urban interface; structures, developments, recreational facilities, or potential for evacuation.		
Fire burning or threatening more than one jurisdiction and potential for unified command with different or conflicting management objectives.		
Unique natural resources, special-designation areas, critical municipal watershed, T&E species habitat, cultural value sites.		
Sensitive political concerns, media involvement, or controversial fire policy.		

If you have checked “Yes” on 3 to 5 of the analysis boxes, consider requesting the next level of incident management support.

**Type 5 Characteristics:** (a) C&G Staff positions are not activated. (b) Resources vary from one to five firefighters. (c) Incident is normally contained rapidly during IA. (d) A written action plan is not required.

**Type 4 Characteristics:** (a) C&G Staff positions are not activated. (b) Resources vary from single Firefighter to several single resources or a single Task Force or Strike Team. (c) The incident is limited to one operational period in the control phase. Mop-up may extend into multiple periods. (d) A written plan is not required.

**Type 3 Characteristics:** (a) Some of the C&G Staff may be activated, as well as DIVS/GROP Supervisor and Unit leaders. (b) Resources vary from several single resources to several TFL's/STL's. (c) Incident may be separated into several divisions, but usually does not meet the DIVS/GROP Supervisor position for span or control. (d) May involve several burning periods prior to control, which requires a written action plan.

SUMMARY OF ACTIONS (ICS 214)	
DATE/TIME	MAJOR EVENTS (Important decisions, significant events, briefings, reports on conditions, etc...)

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Spot Weather Observation and Forecast Request									
1. Name of Incident or Project			2. Control Agency:			3. Request Made			
						Date:		Time:	
4. Location: (Township, Range, Section)				5. Drainage Name:		6. Exposure / Aspect			
7. Size of Incident or Project (acres):			8. Elevation		9. Fuel Type:		10. Project On:		
			Top	Bottom					
11. Weather Conditions at Incident or Project or from RAWS:									
Place	Elev.	Observation Date/Time	Wind Direction/ Velocity		Temperature		RH	DP	Sky Condition
			20 ft	Eye-level	Dry bulb	Wet bulb			
The Weather Forecaster will furnish the information for block 13						Date/Time:			
13. Discussion and Outlook:									

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**Work Rest Ratio Documentation Worksheet**

This worksheet is designed to help the IC document and calculate amount of rest required to meet the Work/Rest guidelines.

- For every 2 hours of work or travel provide 1 hour of sleep or rest.
- IC must justify and document work shifts exceeding 16 hours and those that do not meet the 2:1 work/rest guidelines -- see below.

Date	Operational Period Start Time	Operational Period Stop Time	Total Hours Worked	Rest Time (document hours when employee or module rested)

Approval for shift lengths exceeding 16 hrs given by:	Date/ Time Approval Given:
IC Signature:	Date:



Establish Presence as IC

Develop Action Plan

Provide Briefing

Operate as a dedicated IC

Maintain Situation Awareness

NOTES:

## Appendix H. Fort Huachuca Wildland Fire Delegation of Authority



**DEPARTMENT OF THE ARMY**  
**HEADQUARTERS, US ARMY GARRISON**  
**242 CHRISTY AVENUE**  
**FORT HUACHUCA, ARIZONA 85613-7001**

As of \_\_\_\_\_ I have delegated authority to manage the \_\_\_\_\_  
 Incident, number \_\_\_\_\_, Fort Huachuca Military Installation, to Incident Commander  
 \_\_\_\_\_ and his/her Incident Management Team.

My considerations for management of this incident are:

- Provide for the safety of army personnel, dependents, employees, visitors, and fire staff.
- Protect installation and personal property.
- Manage incident with appropriate suppression response actions that cause minimal resource damage
- Manage the fire cost-effectively for the resource and property values at risk
- Provide for minimum disruption of military activities, consistent with public safety.
- Protect historic properties: historic structures, pictograph sites, flammable artifacts.
- Coordinate suppression activities with Fort Huachuca resource advisor and historic properties manager.
- Protect natural resources: Mexican spotted owl habitat, Huachuca water umbel and its critical habitat, lesser long-nosed bat roosts and agave management areas, Sonora tiger salamander in Upper Garden Canyon Pond, riparian corridors, and other sensitive species and their habitats. Fire management activities must comply with the fire-related conservation measures set forth in the August 23, 2002 Fort Huachuca Biological Opinion and outlined in the IWFMP (Chapter 8).
- My Agency Advisor is the Fort Huachuca Fire Chief

\_\_\_\_\_  
 Fort Huachuca Fire Chief

\_\_\_\_\_  
 Date

**Appendix I. USDA Forest Service Burn Plan Template**



**FSM 5100 – FIRE MANAGEMENT**

**CHAPTER 5140 – FIRE USES**

**R3 Supplement No.:** 5100-2000-2

**Effective Date:** December 22, 2000

**Duration:** Effective until superseded or removed

**Approved:** JAMES T. GLADEN  
Deputy Regional Forester, Resources

**Date Approved:**  
12/13/2000

**Posting Instructions:** Supplements are numbered consecutively by Title and calendar year. Post by document name. Remove entire document and replace with this Supplement. Retain this transmittal as the first page of this document.

<b>New Document(s):</b>	5140	34 Pages
<b>Superseded Document(s):</b> (Last supplement was 5100-2000-1 to FSM 5140.)	5140	35 Pages

**Digest:**

5145.1	Revises direction via Table 1 relating to required skill, knowledge, and physical fitness for various positions on fire use projects.
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### 5140.3 - Policy.

#### 5140.31 – General Fire Use Policies.

1. A Wildland Fire Implementation Plan (WFIP) must be prepared and approved for wildland fire use (FSM 5143.2). Direction is contained in the Wildland and Prescribed Fire Management Policy Implementation Procedures Reference Guide (referred to as the “Implementation Guide”). For prescribed fire, a Prescribed Fire Burn Plan (exhibit 01) must be prepared for every burn unit regardless of the size or the complexity of the project. Each prescribed fire burn plan (RxBP) must meet minimum Regional requirements.

2. Personnel who were certified in a prescribed fire position prior to the implementation of the January 2000 edition of Publication Management System, PMS-310-1 may retain certification, as described in PMS 310-1, January 2000. To qualify in any other position, the individual must meet the new standards described in the January 2000, PMS-310-1 publication. The terminology changes for certain fire positions are:

<u>Before 12/31/99</u>	<u>As of 1/1/2000</u>
Prescribed Fire Planning Specialist	Prescribed Fire Planner (RXPL)
Prescribed Fire Manager, Type 1	Prescribed Fire Manager, Type 1 (RXM1)
Prescribed Fire Manger, Type 2	Prescribed Fire Manger, Type 2 (RXM2)
Burn Boss, Type 1	Prescribed Fire Burn Boss, Type 1 (RXB1)
Burn Boss, Type 2	Prescribed Fire Burn Boss, Type 2 (RXB2)
Lighting Boss	Ignition Specialist (RXIG)
Holding Boss	Prescribed Fire Crewmember (RXCM)

Fire use positions of FUMA, LTAN, RXB3, and FEMO are new PMS-310-1 positions, and require all standards of FSH 5109.17 to be met, including a performance based task book.

3. All aerial ignition operations must conform to the Interagency Helicopter Operations Guide (IHOG). The Plastic Sphere Dispenser Operator (PSDO) is a technical specialist position and the requirement is to be HECM (arduous fitness level) qualified. A qualified HEMG must be assigned to each helicopter utilizing aerial ignition in fire use operations. The HEMG and PSDO are two separate positions filled by two separate individuals on a fire use project.

Personnel utilizing ATV's must be trained and licensed to operate such equipment to perform patrol, firing, water handling, and provide logistical re-supply functions (fuel, saws, and so forth) on fire use projects.

The completed Job Hazard Analysis must include a final determination by the burn boss, regarding which positions are required to carry emergency fire shelters and to be trained in their use.

4. When the Regional Preparedness Level is IV or higher, Forests must coordinate and receive approvals from the Regional Forester prior to committing resources to a fire use project (Regional Mob Guide). This ensures contingency actions do not exceed Regional capabilities, and are coordinated with National needs.

5. If a fire use project (wildland fire use or prescribed fire) exceeds or is anticipated to exceed planned limits, and the FUMA or Burn Boss determines the fire use project cannot be returned to planned limits with available resources within 48 hours, the fire shall be declared "escaped" and a Wildland Fire Situation Analysis (WFSA) will be prepared to determine the appropriate suppression response.

When a fire use fire escapes and is declared a wildland fire, acres accomplished prior to the escape that were burned within prescription shall be considered acres accomplished for resource objectives. All acres burned after the declaration as a wildland fire, both inside and outside the planned burned area, shall be considered wildland fire acres.

Only trained and qualified personnel (including appropriate fitness levels) shall fill wildland fire positions once the fire is declared escaped. Once a fire use fire has been declared escaped, it cannot be returned to fire use status. The escaped fire must be suppressed.

Once the appropriate suppression response has been accomplished, the area may be treated with fire use in the future, but only after the original burn plan has been reviewed and revalidated.

6. Before a prescribed fire may be implemented, the RxBP must be approved in writing by the appropriate line officer. Each prescribed burn must be conducted by a qualified burn

boss. Similarly, before a wildland fire use project can be implemented, the WIFP must be approved in writing by the appropriate line officer. Each wildland fire use project must be conducted by a qualified Fire Use Manager (FUMA). The FUMA determines, through the Wildland Fire Implementation Plan (WFIP), the organization and expertise necessary to successfully manage wildland fire(s) to meet resource objectives.

**5140.32 – Implementation.**

The Wildland and Prescribed Fire Management Policy Implementation Procedures Reference Guide (referred to as the “Implementation Guide”), is incorporated into this supplement by reference.

5140.4 – Responsibility.

**5140.42 – Forest Supervisor.**

1. When the knowledge base (FSM 5145), experience and staff are available at the District level to plan, develop, and execute fire use in the complexity ratings of Low, Moderate, or High, then approval authority may be delegated to the District Ranger. If the knowledge base, experience, and staff are not available, then the approval authority shall be retained at the Forest Supervisor’s Office.

2. When fire danger reaches high (Regional Preparedness Level III), Forest Supervisors shall retain approval authority (go/no-go decisions) for wildland fire use projects (natural ignitions managed for resource benefits) related to their units. When the Regional Preparedness Level reaches IV or higher, fire use coordination must be done with the Regional Forester.

3. Forest Supervisors must furnish the Regional Forester a Fiscal Year summary of the fire use and mechanical fuels treatment accomplishments, by November 15. This report is used in the annual fire report and tracks the number of prescribed fires, wildland fire use fires, mechanical (fuels) treatment projects, and acreage accomplished.

	PRESCRIBED FIRE (Acres)	MECHANICAL TREAT. (Acres)
Rx Fire (Outside WUI)		
Mechanical (Outside WUI)		
Rx Fire – WUI Only		
Mechanical – WUI Only		
<b>TOTAL ACCOMPLISHED</b>		

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Wildland Fire Use		
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4. Forest Supervisors ensure that all portable and stationary fire weather stations on their forests are maintained on an annual basis to maintain accuracy of weather reports.

Wildland Urban Interface (WUI). WUI includes those areas of resident populations at imminent risk from wildfire, and human developments having special significance. These areas may 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.

#### **5142 - PRESCRIBED FIRE.**

5142.1 – Determining Prescribed Fire Complexity.

Complexity Rating Guide PMS-424, NFES 2474 must be used for Prescribed Fire.

5142.2 – Developing Prescribed Fire Burn Plans.

Refer to the parent text and exhibit 01. The Regional Prescribed Fire Burn Plan format (exhibit 01) is the required format for all forests. This format meets the requirements identified in the “Implementation Guide”.

5142.3 – Pre-Ignition Briefing and Forecast Requirements.

Pre-Ignition Briefing – refer to exhibit 02, and Item E - 3 in exhibit 01, Prescribed Fire Burn Plan.

Refer to parent text, and clarification of the following terms for a project specific weather forecast. The Complexity Rating Guide (PMS-424, NFES 2474, May 1995) provides an accurate measure of the complexity of the proposed burn. The burn will rate as Low, Moderate, or High.

The wording of FSM 5142.3 in the parent text is supplemented as follows: The intent during Low Complexity burns is not to require a “site specific” spot weather forecast for each individual pile burn or low complexity burn. If the complexity is low for a particular project, then the Local Zone Forecast may meet the intent of FSM 5142.3.

When a proposed prescribed burn is rated as Low Complexity, the Burn Boss must approve this rating. In a Low Complexity Rating, the Burn Boss may determine that safety and burn objectives can be met using the Local Zone Forecast, which would serve as the project specific forecast. If the Zone Forecast will not adequately address safety and burn objectives, a Spot Weather Forecast must be obtained. If the Burn Boss determines that the Zone Forecast will address the safety, fire behavior needs and burn objectives for a Low Complexity rating burn, this must be documented in the burn plan prior to ignition.

### Complex Burns

For large complex burns (as determined by the Burn Boss), the National Weather Service (NWS) is recommending that on-site weather observations be sent to the appropriate fire weather forecaster for the burn area beginning at least two days or more prior to ignition. With advance notification, the NWS can begin advance planning utilizing data from past, current and predicted weather to provide a more accurate forecast that will increase overall success of the project.

All spot weather forecasts for any burn requires a validation follow-up with the NWS.

5142 - Exhibit 01

PRESCRIBED FIRE BURN PLAN  
USDA Forest Service  
Southwestern Region

TYPE OF BURN:

Broadcast               
Pile                       
Other                   Describe: \_\_\_\_\_

Prepared By        \_\_\_\_\_            Title        \_\_\_\_\_        Date        \_\_\_\_\_  
Recommended By    \_\_\_\_\_            Title        \_\_\_\_\_        Date        \_\_\_\_\_  
Recommended By    \_\_\_\_\_            Title        \_\_\_\_\_        Date        \_\_\_\_\_  
Recommended By    \_\_\_\_\_            Title        \_\_\_\_\_        Date        \_\_\_\_\_  
Recommended By    \_\_\_\_\_            Title        \_\_\_\_\_        Date        \_\_\_\_\_  
Approved By        \_\_\_\_\_            Title        \_\_\_\_\_        Date        \_\_\_\_\_

NOTE:  
COMPLETE ONLY THOSE ITEMS PERTINENT TO THE TYPE OF BURN BEING PLANNED.  
EVERY LINE/BLOCK MAY NOT BE NECESSARY FOR THE PLANNED  
BURN. IF ADDITIONAL SPACE IS NEEDED, USE EXTRA PAGES OR THE  
BACK OF A PAGE.

5142 - Exhibit 01 -- Continued

SUMMARY OF PRESCRIBED FIRE COMPLEXITY (From Complexity Elements Worksheet)

RISK OVERALL RATING \_\_\_\_\_

POTENTIAL CONSEQUENCES OVERALL RATING \_\_\_\_\_

TECHNICAL DIFFICULTY OVERALL RATING \_\_\_\_\_

SUMMARY COMPLEXITY DETERMINATION \_\_\_\_\_

RATIONALE:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Signature: (Line Officer) Date

Designated Burn Boss (RXB1) (RXB2) \_\_\_\_\_

Designated Prescribed Fire Manager (RXM1) (RXM2) \_\_\_\_\_

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**Line Officer Daily Review Record**

Rx Fire approval authority remains with the Regional Forester when the National Preparedness Level is IV or V. Refer to the Current Regional Mobilization Guide.

Line Officer or acting in conjunction with the Burn Boss must review and sign daily for Moderate & High Complexity burns before ignition and/or before continuation of the next day's activity.

<p><b>DAILY REVIEW</b></p> <p><b>Yes or No Response Required</b></p> <p>(Write in Preparedness Level in the last column)</p>				<p>PREPAREDNESS LEVEL = I, II, III, IV, V</p>	<p>FIRE EFFECTS ACCEPTABLE ?</p>	<p>MITIGATION MEASURES WORKING ?</p>	<p>FIRE BEHAVIOR ACCEPTABLE ?</p>	<p>FOLLOW UP ON VALIDATION OF SPOT WEATHER FORECAST WITH "NWS" ?</p>	<p>WEATHER FCST CURRENT/ACCEPTABLE ?</p>	<p>LONG TERM DROUGHT CONSIDERATIONS ?</p>	<p>CONTINGENCY RESOURCES AVAILABLE ?</p>	<p>RISK ACCEPTABLE ?</p>	<p>ZONE NOTIFICATION &amp; BRIEFING ?</p>	<p>BURN ORGANIZATION ON SITE ?</p>	<p>SAFETY REQUIREMENTS MET ?</p>	
Month	Day	Time	BY													

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**A. DESCRIPTION OF THE PRESCRIBED FIRE AREA**

New Mexico:

T32S/R21W/Sec-17,18,19,30,31

T32S/R22W/Sec-23,24,25,26,35,36

T33S/R21W/Sec-5,6,7,8

T33S/R22W/Sec-1,2,11,12

Arizona:

T22S/R32E/Sec-22,23,26,27,28,33,34,35

T23S/R32E/Sec-2,3,4,5,6,7,8,9,10,11

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- 1. Project Size (Acres): 15,240 —
- 2. Size (Perimeter, Chains): 2,215 —
- 3. Elevation: Top: 6,444' Bottom: 4,450' —
- 4. Slope %: Max: 60% Min: 0% —
- 5. Aspects: All —
- 6. Drainage Name: Sycamore, Cottonwood, Cloverdale —
- 7. Fire Behavior Model(s) (or Custom Model from BEHAVE): 1, 6 —
- 8. Vegetation Type: Cured short grasses will carry the fire, with some open shrub component present – juniper, pinyon, mesquite and manzanita. —
- 9. Fuel Loading (Tons/acre by Size Class): FM 1 – 0.2 T/A to 0.7 T/A  
FM 6 – 1 hour – 1.5 T/A  
10 hour – 2.5 T/A  
100 hour – 2.0 T/A
- 10. Surface Fuel Depth: FM 1: 12 inches. FM 6: 2.5 feet
- 11. Continuity:
- 12. Arrangement:
- 13. Stems per acre by size class:  


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14. Site Preparation: (Type of line construction, fuel rearrangement, etc.):

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**B. BURN GOALS AND OBJECTIVES**

Purpose of the Burn:

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5142 - Exhibit 01 -- Continued

**1. RESOURCE MANAGEMENT GOALS FROM THE LAND MANAGEMENT PLAN:**

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2. Specific Objectives of the Burn, Stated in Measurable Terms:

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**C. RANGE OF ACCEPTABLE RESULTS EXPECTED**

Desired Effects:

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Range of Acceptable Results, Expressed in Quantifiable Terms:

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5142 - Exhibit 01 -- Continued

**D. PROJECT ASSESSMENT**

Complexity & Risk Rating: (Refer to Complexity Rating Guide for Criteria & Elements)

THIS BURN FITS COMPLEXITY CRITERIA FOR: Low \_\_\_\_\_, Moderate \_\_\_\_\_, High \_\_\_\_\_ (NWCG – Prescribed Fire Complexity Rating Guide – PMS-424 – NFES – 2474, and FSM 5141.2).

**COMPLEXITY ELEMENTS WORK SHEET**  
(PMS-424-NFES-2474)

ELEMENT	RISK	POTENTIAL CONSEQUENCE	TECHNICAL DIFFICULTY
1. Potential for escape 2. The number & dependence of activities 3. Values at risk 4. Fuels/Fire Behavior 5. Size of prescribed fire team 6. Magnitude of oversight/political activities 7. Fire treatment objectives 8. Environmental constraints 9. Safety 10. Ignition procedures/methods 11. Interagency problems 12. Project logistics 13. Special features inside fire area 14. Smoke management 15. Other			
SUMMARY			

RATIONALE:

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5142 - Exhibit 01 -- Continued

**E. PRESCRIBED FIRE IMPLEMENTATION ACTIONS**

1. Preburn Considerations, On and Off Site:

Define line to be built, snags to be felled or protected, equipment to be pre-positioned, special features to be protected, warning signs to be placed, weather recording and monitoring needs. Knowledge and strong consideration shall be given to fuels and fuel loadings near and adjacent to the project boundary in combination with the topographic features. Knowledge and strong consideration shall also be given to long-term drought indicators such as lack of past year snow pack(s), long-term rainfall deficits, long range weather forecasts, consistently low fuel moistures, delay of green-up, and current issues such as approaching frontal systems, etc.

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Special Considerations:

Wildlife, Wilderness Values, Soil and Watershed, Soil Moisture, Timber, Public Concerns, Private Land near or adjacent to the project, Archaeology, T&E, Wildland Urban Interface, Public Highways & Roads, High Voltage Transmission or Utility Lines, Pipelines, or Other Sensitive Features.

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5142 - Exhibit 01 -- Continued

2. Briefing:

**IDENTIFY AND ANALYZE THE TOPICS TO BE DISCUSSED ON THE FIRE USE DAILY BRIEFING RECORD (EXHIBIT 02) UNIQUE TO THE INDIVIDUAL PRESCRIBED FIRE PROJECT, AND SPECIFY PERSONNEL SAFETY AND EMERGENCY PROCEDURES.**

**IF AERIAL IGNITION DEVICES WILL BE USED, INCLUDE AN AERIAL IGNITION OPERATION HAZARD ANALYSIS AND AVIATION OPERATING PLAN INCLUDING FIRING MAP AND PRIMARY/SECONDARY AIRCRAFT LANDING SITES.**

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3. Test Fire:

**MAKE PROVISIONS FOR A TEST FIRE AND RECORD THE RESULTS. THE TEST FIRE MUST BE IGNITED IN A CONTROLLABLE AND REPRESENTATIVE LOCATION WITHIN THE PRESCRIBED FIRE AREA TO TEST KEY FIRE BEHAVIOR CHARACTERISTICS PRESCRIBED TO MEET MANAGEMENT OBJECTIVES. IN MANY APPLICATIONS, ANALYSIS OF THE INITIAL IGNITIONS MAY PROVIDE ADEQUATE TEST FIRE RESULTS.**

**ON MULTIPLE-DAY PROJECTS, EVALUATION OF CURRENT FIRE BEHAVIOR MAY PROVIDE A COMPARATIVE BASIS FOR CONTINUING. WHEN IN DOUBT, INITIATE A SEPARATE TEST FIRE AND EVALUATE RESULTS.**

5142 - Exhibit 01 -- Continued

Test Fire On-Site Data:

Shade % \_\_\_\_\_, Temperature (F) \_\_\_\_\_, RH % \_\_\_\_\_

1 Hr. TLFM % \_\_\_\_\_, 10 Hr. TLFM % \_\_\_\_\_, 100 Hr. TLFM % \_\_\_\_\_

Midflame Windspeed & Direction \_\_\_\_\_, Slope % and Aspect \_\_\_\_\_

Test Results of Fire Behavior:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. Prescribed Fire Prescription:

A prescribed fire prescription containing those key parameters needed to achieve desired results. Prior to ignition, compare prescription elements, both individually and collectively, against local weather forecasts and any other predicted conditions. Any changes to prescriptive parameters must be approved by the same level of authority required for plan approval.

Type of fire used (backing, head, etc.):

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Rate of Speed (Ch/Hr): Head \_\_\_\_\_ / \_\_\_\_\_ Backing \_\_\_\_\_ / \_\_\_\_\_  
Min Max Min Max

Fireline Intensity (BTU/Ft/Sec): \_\_\_\_\_ / \_\_\_\_\_

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Min Max

5142 - Exhibit 01 -- Continued

Heat Per Unit Area (BTU/Ft/Sec): \_\_\_\_\_

Flame Length (Feet): Maximum \_\_\_\_\_ Minimum \_\_\_\_\_

Scorch Height Allowable: \_\_\_\_\_

Other: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Narrative: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
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\_\_\_\_\_

BURNING PRESCRIPTION NECESSARY TO OBTAIN THE FIRE BEHAVIOR DESCRIBED ABOVE:

	DAY	NIGHT
<u>Temperature:</u>	Maximum _____ / _____	
	Minimum _____ / _____	
<u>Relative Humidity:</u>	Maximum _____	

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Minimum \_\_\_\_\_

5142 - Exhibit 01 -- Continued

<u>Fuel Moisture:</u>	Maximum	Minimum
1H	_____	_____
10H	_____	_____
100H	_____	_____
1000H	_____	_____

Define the acceptable range/s:

Live Fuel Moisture: \_\_\_\_\_

Midflame Wind Speed: \_\_\_\_\_

Time of Year: \_\_\_\_\_

Consideration given to long-term drought conditions: lack of winter snow pack/s, long-term rainfall deficit, delayed green up, continuing low fuel moistures, long range weather forecasts, other identified drought trends ? YES\_\_\_, NO\_\_\_.

5. Special Conditions, Public and Personnel Safety:

Describe public and personnel safety and emergency procedures. Specify that all personnel who are within the active burn area must have personal protective equipment, as identified in the Job Hazard Analysis. Identify safety hazards on the burn, measures taken to reduce those hazards, and EMS personnel on the burn, if needed. Specify emergency medical procedures, evacuation routes, and emergency facilities to be used.

5142 - Exhibit 01 -- Continued

6. Burn Organization: (Use Block Organizational Charts)

List required positions to be filled and include training opportunities. Specify the number, type and location of resources that are needed on site. No less than the organization described in the approved plan shall be used to execute the burn. In addition, ensure that the Contingency Plan can be executed as described under Contingency Plan "G" item 3.

7. Ignition Plan:

Describe necessary ignition operation including firing methods, techniques and patterns. Maps showing firing patterns may be included. Necessary equipment and supplies must be listed.

Firing Methods, Techniques, and Patterns:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
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Equipment \_\_\_\_\_ and \_\_\_\_\_ Supplies:

\_\_\_\_\_  
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\_\_\_\_\_  
\_\_\_\_\_  
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\_\_\_\_\_  
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5142 - Exhibit 01 -- Continued

8. Holding Plan:





5142 - Exhibit 01 -- Continued**G. CONTINGENCY PLAN**CONTINGENCY RESOURCES

The burn plan identifies resources needed to safely and successfully ignite, execute, and hold prescribed fire throughout the range of prescriptive parameters identified.

The contingency resources identified within the prescribed fire plan are identified for those rare events that occur creating or leading to a situation where the burn may become unsuccessful, considering capabilities of existing on-site resources. Contingency resources are additional resources that may be needed to maintain a planned prescribed fire within prescription parameters, and/or to quickly implement suppression alternatives if the prescribed fire exceeds those parameters.

If a prescribed fire exceeds the parameters within the written prescription, the “available resources” identified within contingency plans may be used to bring the prescribed fire back within written prescription guidelines during the 48 hour time frame, as directed in FSM 5140.31.

**In Preparedness Level IV and higher**, the **Southwest Mobilization Guide** states: “Limit prescribed fires and the fire use fires to those certified by the agency administrator to have little chance of requiring suppression resources beyond those committed **on the unit**. This determination shall be made daily, in writing, and shall become a permanent part of the prescribed fire situation analysis. All new natural ignitions must be classified as wildland fires and appropriate suppression action taken, except when approved by a Southwest Area agency head.”

5142 – Exhibit 01 – Continued









5142 – Exhibit 01 – Continued

**J. MONITORING**

Provisions for post-burn evaluation to enable resource managers and the agency administrator to determine if project objectives have been met.

The items listed below are suggested for full documentation of the project.

Document burn-day conditions, fire behavior, smoke dispersal, first order fire effects, and cost per acre of treatment. Specify the weather information (forecast and observed) required during all phases of the project, and if spot weather and smoke dispersal forecasts need to be requested. In addition to short-term monitoring to document the immediate results of a burn, long-term monitoring is strongly recommended. Permanent photo points, transects, or plots that are revisited in years following a burn will provide information on successional trends that result from the burn. Longer term monitoring may be necessary to determine if objectives were met.

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1. Equipment and Personnel Needs (Monitoring):

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5142 - Exhibit 01 - - Continued

**K. POST-BURN EVALUATION**

**Ignition Completed on Date:** \_\_\_\_\_ **Time:** \_\_\_\_\_

Date of Evaluation: \_\_\_\_\_

Safety Evaluation of this Project:

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Desired Results Achieved:

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Undesirable Effects:

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5142 - Exhibit 01 -- Continued

Smoke Management and Coordination, Objectives Met ?

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Plan Implementation:

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Financial Review:

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Training Opportunities:

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Visitors, Observations, Follow Up Work, Site Rehabilitation or Other Issues ?

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Accomplishments entered into Rx Burn Atlas, Data Base, or Other ?

YES \_\_\_\_\_ NO \_\_\_\_\_.

5142 – Exhibit 01 - - Continued**L. DOCUMENTATION**

All prescribed fires shall be documented with the following information and/or documents: (All documents are not required to be attached to the burn plan, but they must be complete, available, and on file.)

1. Prescribed Fire Plan ?
2. Line Officer Daily Review Record ?
3. Fire Use Daily Briefing Record ?
4. Map of Project Area and Surrounding Area ?
5. Monitoring Data, including weather, fire behavior, and fire effects observations ?
6. Weather Forecasts, spot, short and long term, & Follow Up with the National Weather Service (NWS) ?
7. Smoke dispersal information ?
8. SASEM runs complete and on file ?
9. Organizational Charts ?
10. Job Hazard Analysis ?
11. Safety Plan (including Public Safety) ?
12. Air Operations Plan and Flight Plan (if Air Operations is used) ?
13. For Aerial Ignition, include an Aerial Ignition Operation Hazard Analysis (FSM 5142.2) ?
14. Communications Plan ?
15. R3-FS-2300-4 Cultural Resources Inventory Standards & Accounting (IS&A) form?
16. Public and Media Contact List ?

5142 - Exhibit 02

**FIRE USE DAILY BRIEFING RECORD**

Date of briefing: \_\_\_\_\_ Time of briefing: \_\_\_\_\_

Briefing conducted by: \_\_\_\_\_

Attendance:


Items discussed: (X appropriate categories)

	Objectives	Risk assessment
	Maps, drop points, legend	Test fire results
	Topography	Fuels
	Boundary locations/types	Weather forecast
	Sensitive highways/roads	Expected fire behavior
	High voltage & utility Lines	Contingencies
	Pipelines: oil, gas, water	Logistical support
	Job Hazard Analysis / PPE	Management action points
	Personnel Safety (firefighter & public)	Smoke sensitive targets-mitigation
	Escape routes, safety zones	Archaeology/Historic properties
	Emergency procedures	Threatened & endangered species
	Communications-frequencies-protocols	Public issues
	Organization-responsibilities	Media information
	Tactics/firing/hold/patrol	Special considerations
	Aviation operations/Aerial ignition	Monitoring needs

5142 - Exhibit 02 -- Continued

US EPA ARCHIVE DOCUMENT



between the Agency Administrator and the Incident Commander. No human caused wildland fires, including any escaped fire use fires, will be managed for resource benefits.

Natural ignitions may be managed for resource benefits only when authorized in approved Forest Land Management Plans, Fire Management Plans, and via appropriate prescriptive criteria. FSH 5109.19, chapter 50 provides the required fire use elements to be included in the Fire Management Plan, which tiers from Forest Land Management Plan direction. A WFIP must be prepared and approved for wildland fire use. Refer to FSM 5140.32 and the “Implementation Guide”.

#### 5143.1 – Determining Wildland Fire Complexity.

When developing a Wildland Fire Implementation Plan concerning wildland fire utilized for resource benefits, the complexity rating guide incorporated as part of Stage II analysis may be used. The Stage II Complexity Analysis was developed using criteria weighted toward natural ignitions. Note: Because of this, Stage II complexity guides contain some criteria that differ from the Prescribed Fire Complexity Guide PMS-424, which is required for prescribed fire.

#### 5143.2 – Developing Wildland Fire Implementation Plans.

The Forest Supervisor shall notify the Regional Forester of all wildland fire use projects that undergo Stage I WFIP analysis with a “go” decision as soon as practical.

### 5145 – FIRE USE ORGANIZATION.

Show organization needed by position at planning time for each RxBP. Positions by name shall be finalized during the burn briefing.

Units must be able to utilize planned resources to hold and mop-up fires until objectives have been achieved. Use of “AD” personnel on prescribed fire projects is not allowed. All contractors, intermittent hires, out of Region or off-Forest detailers, must comply with all requirements of this chapter and the Wildland Fire Qualification Subsystem Guide (NWCG, PMS-310-1) and Wildland Fire Qualifications Handbook (FSH 5109.17).

#### 5145.1 – Required Skill, Knowledge, and Physical Fitness.

All personnel directly involved in the execution of fire use projects must maintain a minimum fitness score as shown in Table 1.

TABLE 1

POSITION	PHYSICAL REQUIREMENTS
Prescribed Fire Planning Specialist (RXPL)	None
Fire Use Manager (FUMA)	Moderate
Fire Behavior Analyst (FBAN)	Moderate
Long Term Fire Analyst (LTAN)	Moderate
Prescribed Fire Manager 1 (RXM1)	Moderate

Prescribed Fire Manager 2 (RXM2)	Moderate
Prescribed Fire Burn Boss 1 (RXB1)	Moderate
Prescribed Fire Burn Boss 2 (RXB2)	Moderate
Prescribed Fire Burn Boss 3 (RXB3)	Moderate
Ignition Specialist (RXI1)	Moderate
Ignition Specialist (RXI2)	Moderate
Prescribed Fire Crew Member (RXCM)	Moderate
Fire Effects Monitor (FEMO)	Arduous
Technical Specialist (THSP)	Moderate*

If higher physical requirements are needed for a particular project, they will be addressed via a Job Hazard Analysis or as a Forest supplement to this directive.

\*Technical specialists may include:

Resource specialists, archaeologist, line and staff officers, information officers, researchers, etc..

Other positions used in the fire use project must meet fitness standards as defined in FSH 5109.17.

If a fire use project “escapes” and is declared a wildland fire, all personnel must be qualified under FSH 5109.17, to accomplish the appropriate suppression response on the wildland fire.

#### **5145 – FIRE USE REPORTING.**

Prescribed fires and wildland fires managed for resource benefits shall be reported on forms specified under FSM 5147. Refer to FSM 5140.42 for the annual summary of reporting process.

Report any escaped prescribed fires and any escaped wildland fires managed for resource benefits by within 24 hours after escape. Report within 30 days, using the appropriate fire management reporting form, the individual project along with accompanying acreages for those fires that transitioned from prescription to suppression alternatives.

#### **Appendix J. ADEQ Regulations and Forms for Prescribed Fires**



The Hourly Plume Observation Report form is not reproduced here: find it at <http://www.azdeq.gov/environ/air/smoke/download/plumereport.pdf> (10-17-05).

For forms, see also  
<http://www.azdeq.gov/environ/air/smoke/fires.html>

*Effective March 15, 2004*

*The actual Notice of Final Rulemaking is published in the Feb. 6, 2004, Arizona Administrative Register*

## TITLE 18. ENVIRONMENTAL QUALITY

### CHAPTER 2. DEPARTMENT OF ENVIRONMENTAL QUALITY -

#### AIR POLLUTION CONTROL

#### ARTICLE 15. FOREST AND RANGE MANAGEMENT BURNS

##### **R18-2-1501. Definitions**

In addition to the definitions contained in A.R.S. 49-501 and R18-2-101, in this Article:

1. Activity fuels@ means those fuels created by human activities such as thinning or logging.
2. "ADEQ" means the Department of Environmental Quality.
3. "Annual emissions goal" means the annual establishment in cooperation with the F/SLM=s, under R1 8-2-1503(G), of a planned quantifiable value of emissions reduction from prescribed fires and fuels management activities.
4. "Burn plan" means the ADEQ form that includes information on the conditions under which a burn will occur with details of the burn and smoke management prescriptions.
5. "Burn prescription" means, with regard to a burn project, the pre-determined area, fuel, and weather conditions required to attain planned resource management objectives.
6. "Burn project" means an active or planned prescribed burn, including a wildland fire use incident.
7. "Duff" means forest floor material consisting of decomposing needles and other natural materials.
8. "Emission reduction techniques" (ERT) means methods for controlling emissions from prescribed fires to minimize the amount of emission output per unit of area burned.
9. "Federal land manager" (FLM) means any department, agency, or agent of the federal government, including the following:
  - a. United States Forest Service,
  - b. United States Fish and Wildlife Service,
  - c. National Park Service,
  - d. Bureau of Land Management,
  - e. Bureau of Reclamation,
  - f. Department of Defense,

- g. Bureau of Indian Affairs, and
  - h. Natural Resources Conservation Service.
10. “*FISLM*” means a federal land manager or a state land manager.
  11. “Local fire management officer” means a person designated by a F/SLM as responsible for fire management in a local district or area.
  12. “Mop-up” means the act of extinguishing or removing burning material from a prescribed fire to reduce smoke impacts.
  13. “National Wildfire Coordinating Group” means the national inter-agency group of federal and state land managers that shares similar wildfire suppression programs and has established standardized inter-agency training courses and qualifications for fire management positions.
  14. “Non-burning alternatives to fire” means techniques that replace fire for at least five years as a means to treat activity fuels created to achieve a particular land management objective (e.g., reduction of fuel-loading, manipulation of fuels, enhancement of wildlife habitat, and ecosystem restoration). These alternatives are not used in conjunction with fire. Techniques used in conjunction with fire are referred to as emission reduction techniques (ERTs).
  15. “Planned resource management objectives” means public interest goals in support of land management agency objectives including silviculture, wildlife habitat management, grazing enhancement, fire hazard reduction, wilderness management, cultural scene maintenance, weed abatement, watershed rehabilitation, vegetative manipulation, and disease and pest prevention.
  16. “Prescribed burning” means the controlled application of fire to wildland fuels that are in either a natural or modified state, under certain burn and smoke management prescription conditions that have been specified by the land manager in charge of or assisting the burn, to attain planned resource management objectives. Prescribed burning does not include a fire set or permitted by a public officer to provide instruction in fire fighting methods, or construction or residential burning under R1 8-2-602.
  17. “Prescribed fire manager” means a person designated by a F/SLM as responsible for prescribed burning for that land manager.
  18. “Smoke management prescription” means the predetermined meteorological conditions that affect smoke transport and dispersion under which a burn could occur without adversely affecting public health and welfare.
  19. “Smoke management techniques” (SMT) means management and dispersion practices used during a prescribed burn or wildland fire use incident which affect the direction, duration, height, or density of smoke.
  20. “Smoke management unit” means any of the geographic areas defined by ADEQ whose area is based on primary watershed boundaries and whose outline is determined by diurnal windflow patterns that allow smoke to follow predictable drainage patterns. A map of the state divided into 11-the smoke management units is on file with ADEQ.
  21. “State land manager (SLM)” means any department, agency, or political subdivision of the state government including the following:
    - a. State Land Department,
    - b. Department of Transportation,
    - c. Department of Game and Fish, and
    - d. Parks Department.
  22. “Wildfire” means an unplanned wildland fire subject to appropriate control measures. Wildfires include those incidents where suppression may be limited for safety, economic, or resource concerns.
  23. “Wildland fire use” means a wildland fire that is ignited by natural causes, such as lightning, and is managed using the same controls and for the same planned resource management objectives as prescribed burning.

**R18-2-1502. Applicability**

- A. A F/SLM that is conducting or assisting a prescribed burn shall follow the requirements of this Article.
- B. A private or municipal burner with whom ADEQ has entered into a memorandum of agreement shall follow the requirements of this Article.
- C. The provisions of this Article apply to all areas of the state except Indian Trust lands. All federally-managed lands and all state lands, parks, and forests are under the jurisdiction of ADEQ in matters relating to air pollution from prescribed burning.
- D. Notwithstanding subsection (C), ADEQ and any Indian tribe may enter into a memorandum of agreement to implement this Article.
- E. ADEQ and any private or municipal prescribed burner may enter into a memorandum of agreement to implement this Article.

**RI 8-2-1503. Annual Registration, Program Evaluation and Planning**

- A. Each F/SLM shall register annually with ADEQ on a form prescribed by ADEQ, all planned burn projects, including areas planned for wildland fire use.
- B. Each planned year extends from January 1 of the registration year to December 31 of the same year. Each F/SLM shall use best efforts to register before December 31 and no later than January 31 of each year.
- C. A F/SLM shall include the following information on the registration form:
  1. The F/SLM's name, address, and business telephone number;
  2. The name, address, and business telephone number of an air quality representative who will provide technical support to ADEQ for decisions regarding prescribed burning. The same air quality representative may be selected by more than one F/SLM;
  3. All prescribed burn projects and potential wildland fire use areas planned for the next year;
  4. Maximum project and annual acres to be burned, maximum daily acres to be burned, fuel types within project area, and planned use of emission reduction techniques to support the annual emissions goal for each prescribed burn project;
  5. Planned use of any smoke management techniques for each prescribed burn project;
  6. Maximum project and annual acres projected to be burned, maximum daily acres projected to be burned, and a map of the anticipated project area, fuel types and loading within the planned area for an area the F/SLM anticipates for wildland fire use;
  7. A list of all burn projects that were completed during the previous year;
  8. Project area for treatment, treatment type, fuel types to be treated, and activity fuel loading to support the annual emissions goal for areas to be treated using non-burning alternatives to fire; and
  9. The area treated using non-burning alternatives to fire during the previous year including the number of acres, the specific types of alternatives utilized, and the location of these areas.
- D. After consultation with the F/SLM, ADEQ may request additional information for registration of prescribed burns and wildland fire use to support regional coordination of smoke management, annual emission goal setting using ERTs, and non-burning alternatives to fire.
- E. A F/SLM may amend a registration at any time with a written submission to ADEQ.
- F. ADEQ accepts a facsimile or other electronic method as a means of complying with the deadline for registration. If an

electronic means is used, the F/SLM shall deliver the original paper registration form to ADEQ for its records. ADEQ shall acknowledge in writing the receipt of each registration.

- G. ADEQ shall hold a meeting after January 31 and before April 1 of each year between ADEQ and F/SLM:s to evaluate the program and cooperatively establish the annual emission goal. The annual emission goal shall be developed to minimize prescribed fire emissions to the maximum extent feasible using emission reduction techniques and alternatives to burning subject to economic, technical, and safety feasibility criteria, and consistent with land management objectives.
- H. At least once every five years, ADEQ shall request long-term projections of future prescribed fire and wildland fire use activity from the F/SLMs to support planning for visibility impairment and assessment of other air quality concerns by ADEQ.

#### **R18-2-1504. Prescribed Burn Plan**

Each F/SLM planning a prescribed burn shall complete and submit to ADEQ the "Burn Plan" form supplied by ADEQ no later than 14 days before the date on which the F/SLM requests permission to burn. ADEQ shall consider the information supplied on the Burn Plan Form as binding conditions under which the burn shall be conducted. A Burn Plan shall be maintained by ADEQ until notification from the F/SLM of the completion of the burn project. Revisions to the Burn Plan for a burn project shall be submitted in writing no later than 14 days before the date on which the F/SLM requests permission to burn. To facilitate the Daily Burn authorization process under R18-2-1505, the F/SLM shall include on the Burn Plan form:

1. An emergency telephone number that is answered 24 hours a day, seven days a week;
2. Burn prescription;
3. Smoke management prescription;
4. The number of acres to be burned, the quantity and type of fuel, type of burn, and the ignition technique to be used;
5. The land management objective or purpose for the burn such as restoration or maintenance of ecological function and indicators of fire resiliency;
6. A map depicting the potential impact of the smoke unless waived either orally or in writing by ADEQ. The potential impact shall be determined by mapping both the daytime and nighttime smoke path and down-drainage flow for 15 miles from the burn site, with smoke-sensitive areas delineated. The map shall use the appropriate scale to show the impacts of the smoke adequately;
7. Modeling of smoke impacts unless waived either orally or in writing by ADEQ, for burns greater than 250 acres per day, or greater than 50 acres per day if the burn is within 15 miles of a Class I Area, an area that is non-attainment for particulates, a carbon monoxide non-attainment area, or other smoke-sensitive area. In consultation with the FISLM, ADEQ shall provide guidelines on modeling;
8. The name of the official submitting the Burn Plan on behalf of the F/SLM; and
9. After consultation with the F/SLM, any other information to support the Burn Plan needed by ADEQ to assist in the Daily Burn authorization process for smoke management purposes or assessment of contribution to visibility impairment of Class I areas.

#### **R18-2-1505. Prescribed Burn Requests and Authorization**

- A. Each F/SLM planning a prescribed bum, shall complete and submit to ADEQ the "Daily Burn Request" form supplied by ADEQ. The Daily Burn Request form shall include:

1. The contact information of the F/SLM conducting the bum;
2. Each day of the burn;

3. The area to be burned on the day for which the Burn Request is submitted, with reference to the Burn Plan, including size, legal location to the section, and latitude and longitude to the minute;
  4. Projected smoke impacts; and
  5. Any local conditions or circumstances known to the F/SLM that, if conveyed to ADEQ, could impact the Daily Burn authorization process.
- B. After consultation with the F/SLM, ADEQ may request additional information related to the burn, meteorological, smoke dispersion, or air quality conditions to supplement the Daily Burn Request form and to aid in the Daily Burn authorization process.
  - C. The F/SLM shall submit the Daily Burn Request form to ADEQ as expeditiously as practicable, but no later than 2 p.m. of the business day preceding the burn. An original form, a facsimile, or an electronic information transfer are acceptable submittals.
  - D. An F/SLM shall not ignite a prescribed burn without receiving the approval of ADEQ, as follows:
    1. ADEQ shall approve, approve with conditions, or disapprove a burn on the same business day as the Burn Request submittal.
    2. If ADEQ fails to address a Burn Request by 10 p.m. of the business day on which the request is submitted, the Burn Request is approved by default after the burner makes a good faith effort to contact ADEQ to confirm that the Burn Request was received.
    3. ADEQ may communicate its decision by verbal, written, or electronic means. ADEQ shall provide a written or electronic reply if requested by the F/SLM.
  - E. If weather conditions cease to conform to those in the smoke management prescription of either the Burn Plan or an Approval with Conditions, the F/SLM shall take appropriate action to reduce further smoke impacts, ensure safe and appropriate fire control, and notify the public when necessary. After consultation with ADEQ, the smoke management prescription or burn plan may be modified.
  - F. The F/SLM shall ensure that there is appropriate signage and notification to protect public safety on transportation corridors including roadways and airports during a prescribed fire.

#### **R18-2-1506. Smoke Dispersion Evaluation**

ADEQ shall approve, approve with conditions, or disapprove a Daily Burn Request submitted under Ri 8-2-1505, by using the following factors for each smoke management unit:

5. Analysis of the emissions from burns in progress and residual emissions from previous burns on a day-today basis;
6. Analysis of emissions from active wildland fire use incidents, and active multiple-day burns, and consideration of potential long-term emissions estimates;
7. Analysis of the emissions from wildfires greater than 100 acres and consideration of their potential long-term growth;
8. Local burn conditions;
9. Burn prescription and smoke management prescription from the applicable Burn Plan;
10. Existing and predicted local air quality;
11. Local and synoptic meteorological conditions;
12. Type and location of areas to be burned;
13. Protection of the national visibility goal for Class I Areas under 169A(a)(1) of the Act and 40 CFR51.309;

14. Assessment of duration and intensity of smoke emissions to minimize cumulative impacts;
15. Minimization of smoke impacts in Class I Areas, areas that are non-attainment for particulate matter, carbon monoxide non-attainment areas, or other smoke-sensitive areas; and
16. Protection of the National Ambient Air Quality Standards.

**R18-2-1507. Prescribed Burn Accomplishment; Wildfire Reporting**

- A. Each F/SLM conducting a prescribed burn shall complete and submit to ADEQ the "Burn Accomplishment" form supplied by ADEQ. For each burn approval, the F/SLM shall submit a Burn Accomplishment form to ADEQ by 2 p.m. of the business day following the approved burn. The F/SLM shall include the following information on the Burn Accomplishment form:
  1. Any known conditions or circumstances that could impact the Daily Burn decision process;
  2. The date, location, fuel type, fuel loading, and acreage accomplishments;
  3. The ERTs and SMTs described in R18-2-1509 and R18-2-1510, respectively, and may include any further ERTs and SMTs that become available, that the F/SLM used to reduce emissions or manage the smoke from the burn.
- B. The F/SLM shall submit the Burn Accomplishment form as an original form, a facsimile, or an electronic information transfer.
- C. ADEQ shall maintain a record of Burn Requests, Burn Approvals/Conditional Approvals/Denials and Burn Accomplishments for five years.
- D. The F/SLM in whose jurisdiction a wildfire occurs shall make available to ADEQ no later than the day after the activity all required information for wildfire incidents that burned more than 100 acres per day in timber or slash fuels or 300 acres per day in brush or grass fuels. For each day of a wildfire incident that exceeds the daily activity threshold, the F/SLM shall provide the location, an estimate of predominant fuel type and quantity consumed, and an estimate of the area blackened that day.

**R18-2-1508. Wildland Fire Use: Plan, Authorization, Monitoring; Inter-agency Consultation; Status**

**Reporting**

- A. In order for ADEQ to participate in the wildland fire use decision-making process, the F/SLM shall notify ADEQ as soon as practicable of any wildland fire use incident projected to attain or attaining a size of 50 acres of timber fuel or 250 acres of brush or grass fuel.
- B. For each wildland fire use incident that has been declared as such by the F/SLM, the F/SLM shall complete and submit to ADEQ a Wildland Fire Use Burn Plan in a format approved by ADEQ in cooperation with the F/SLM. The F/SLM shall submit the Wildland Fire Use Burn Plan to ADEQ as soon as practicable but no later than 72 hours after the wildland fire use incident is declared or under consideration for such designation. The F/SLM shall include the following information in the Wildland Fire Use Burn Plan:
  1. An emergency telephone number that is answered 24 hours a day, seven days a week;
  2. Anticipated burn prescription;
  3. Anticipated smoke management prescription;

4. The estimated daily number of acres, quantity, and type of fuel to be burned;
  5. The anticipated maximum allowable perimeter or size with map;
  6. Information on the condition of the area to be burned, such as whether it is in maintenance or restoration, its ecological function, and other indicators of fire resiliency;
  7. The anticipated duration of the wildland fire use incident;
  8. The anticipated long-range weather trends for the site;
  9. A map depicting the potential impact of the smoke. The potential impact shall be determined by mapping both the daytime and nighttime smoke path and down-drainage flow for 15 miles from the wildland fire use incident, with smoke-sensitive areas delineated. Mapping is mandatory unless waived either orally or in writing by ADEQ. The map shall use the appropriate scale to show the impacts of the smoke adequately; and
  10. Modeling or monitoring of smoke impacts, if requested by ADEQ after consultation with the F/SLM.
- C.** ADEQ shall approve or disapprove a Wildland Fire Use Burn Plan within three hours of receipt. ADEQ shall consult directly with the requesting F/SLM before disapproving a Wildland Fire Use Burn Plan. If ADEQ fails to address the Wildland Fire Use Burn Plan within the time allotted, the Plan is approved by default under the condition that the F/SLM makes a good faith effort to contact ADEQ to confirm that the Plan was received. Approval by ADEQ of a Wildland Fire Use Burn Plan is binding upon ADEQ for the duration of the wildland fire use incident unless smoke from the incident creates a threat to public health or welfare. If a threat to public health or welfare is created, ADEQ shall consult with the F/SLM regarding the situation and develop a joint action plan for reducing further smoke impacts.
- D.** The F/SLM shall submit a Daily Status Report for each wildland fire use incident to ADEQ for each day of the burn that the fire burns more than 100 acres in timber or slash fuels or 300 acres in brush or grass fuels. The F/SLM shall include a synopsis of smoke behavior, future daily anticipated growth, and location of the activity of the wildland fire use incident in the Daily Status Report.
- E.** The F/SLM shall consult with ADEQ prior to initiating human-made ignition on the wildland fire use incident when greater than 250 acres is anticipated to be burned by the ignition. Emergency human-made ignition on the incident for protection of public or fire-fighter safety does not require consultation with ADEQ regardless of the size of the area to be burned.
- F.** The F/SLM shall ensure that there is appropriate signage and notification to protect public safety on transportation corridors including roadways and airports during a wildland fire use incident.

#### **R18-2-1509. Emission Reduction Techniques**

- A.** Each F/SLM conducting a prescribed burn shall implement as many Emission Reduction Techniques as are feasible subject to economic, technical, and safety feasibility criteria, and land management objectives.
- B.** Emission Reduction Techniques include:
1. Reducing biomass to be burned by use of techniques such as yarding or consolidation of unmerchantable material, multi-product timber sales, or public firewood access, when economically feasible.
  2. Reducing biomass to be burned by fuel exclusion practices such as preventing the fire from consuming dead snags or dead and downed woody material through lining, application of fire-retardant foam, or water;
  3. Using mass ignition techniques such as aerial ignition by helicopter to produce high intensity fires of high fuel density areas such as logging slash decks
  4. Burning only fuels essential to meet resource management objectives;
  5. Minimizing consumption and smoldering by burning under conditions of high fuel moisture of duff and litter;

6. Minimizing fuel consumption and smoldering by burning under conditions of high fuel moisture of large woody fuels;
7. Minimizing soil content when slash piles are constructed by using brush blades on material-moving equipment and by constructing piles under dry soil conditions or by using hand piling methods;
8. Burning fuels in piles;
9. Using a backing fire in grass fuels;
10. Burning fuels with an air curtain destructor, as defined in RI 8-2-101, operated according to manufacturer specifications and meeting applicable state or local opacity requirements;
11. Extinguishing or mopping-up of smoldering fuels;
12. Chunking of piles and other consolidations of burning material to enhance flaming and fuel consumption, and to minimize smoke production;
13. Burning before litter fall;
14. Burning before green-up of fuels;
15. Burning before recently cut large fuels cure in areas with activity; and
16. Burning just before precipitation to reduce fuel smoldering and consumption.

#### **R18-2-1510. Smoke Management Techniques**

- A.** Each F/SLM conducting a prescribed burn shall implement as many Smoke Management Techniques as are feasible subject to economic, technical, and safety feasibility criteria, and land management objectives.
- B.** Smoke management techniques include:
  1. Burning from March 15 through September 15, when meteorological conditions allow for good smoke dispersion;
  2. Igniting burns under good-to-excellent ventilation conditions;
  3. Suspending operations under poor smoke dispersion conditions;
  4. Considering smoke impacts on local community activities and land users;
  5. Burning piles when other burns are not feasible, such as when snow or rain is present;
  6. Using mass ignition techniques such as aerial ignition by helicopter to produce high intensity fires with short duration impacts;
  7. Using all opportunities that meet the burn prescription and all burn locations to spread smoke impacts over a broader time period and geographic area;
  8. Burning during optimum mid-day dispersion hours, with all ignitions in a burn unit completed by 3 p.m. to prevent trapping smoke in inversions or diurnal windflow patterns;
  9. Providing information on the adverse impacts of using green or wet wood as fuel when public firewood access is allowed;
  10. Implementing maintenance burning in a periodic rotation to shorten prescribed fire duration and to reduce excessive fuel accumulations that could result in excessive smoke production in a wildfire; and
  11. Using wildland fire-use strategies to shift smoke into more favorable smoke dispersion seasons.

#### **R18-2- 1511. Monitoring**



- A. ADEQ may require a F/SLM to monitor air quality before or during a prescribed burn or a wildland fire use incident if necessary to assess smoke impacts. Air quality monitoring may be conducted using both federal and non-federal reference method as well as other techniques.
- B. ADEQ may require a F/SLM to monitor weather before or during a prescribed burn or a wildland fire use incident, if necessary to predict or assess smoke impacts. After consultation with the F/SLM, ADEQ may also require the F/SLM to establish burn site or area-representative remote automated weather stations or their equivalent, having telemetry that allows retrieval on a real-time basis by ADEQ. An F/SLM shall give ADEQ notice and an opportunity to comment before making any change to a long-term established remote automated weather station.
- C. A F/SLM shall employ the following types of monitoring, unless waived by ADEQ, for burns greater than 250 acres per day, or greater than 50 acres per day if the burn is within 15 miles of a Class I Area, an area that is non-attainment for particulate matter, a carbon monoxide, or ozone, or other smoke-sensitive area:
  - 1. Smoke plume measurements, using a format supplied by ADEQ; and
  - 2. The release of pilot balloons (PIBALs) at the burn site to verify needed wind speed, direction, and stability. Instead of pilot balloons, a test burn at the burn site may be used for specific prescribed burns on a case-by-case basis as approved by ADEQ, to verify needed wind speed, direction, and stability.
- D. An F/SLM shall make monitoring information required under subsection (C) available to ADEQ on the business day following the burn ignition.
- E. The F/SLM shall keep on file for one year following the burn date any monitoring information required under this Section.

#### **R18-2-1512. Burner Qualifications**

- A. All burn projects shall be conducted by personnel trained in prescribed fire and smoke management techniques as required by the F/SLM in charge of the burn and established by National Wildfire Coordinating Group training qualifications.
- B. A Prescribed Fire Boss or other local Fire Management Officer of the F/SLM having jurisdiction over prescribed burns shall have smoke management training obtained through one of the following:
  - 1. Successful completion of a National Wildfire Coordinating Group or F/SLM-equivalent course addressing smoke management; or
  - 2. Attendance at an ADEQ-approved smoke management workshop.

#### **R18-2-1513. Public Notification and Awareness Program; Regional Coordination**

- A. The Director shall conduct a public education and awareness program in cooperation with F/SLMs and other interested parties to inform the general public of the smoke management program described by this Article. The program shall include smoke impacts from prescribed fires and the role of prescribed fire in natural ecosystems.
- B. ADEQ shall make annual registration, prescribed burn approval, and wildfire and wildland fire use activity information readily available to the public and to facilitate regional coordination efforts and public notification.

**R18-2-1514. Surveillance and Enforcement**

- A. An F/SLM conducting a prescribed burn shall permit ADEQ to enter and inspect burn sites unannounced to verify the accuracy of the Daily Burn Request, Burn Plan, or Accomplishment data as well as matching burn approval with actual conditions, smoke dispersion, and air quality impacts. On-ground site inspection procedures and aerial surveillance shall be coordinated by ADEQ and the F/SLM for safety purposes.
- B. ADEQ may use remote automated weather station data if necessary to verify current and previous meteorological conditions at or near the burn site.
- C. ADEQ may audit burn accomplishment data, smoke dispersion measurements, or weather measurements from previously conducted burns, if necessary to verify conformity with, or deviation from, procedures and authorizations approved by ADEQ.
- D. Deviation from procedures and authorizations approved by ADEQ constitute a violation of this Article. Violations may require containment or mop-up of any active burns and may also require, in the Director's discretion, a five-day moratorium on ignitions by the responsible F/SLM. Violations of this Article are also subject to a civil penalty of not more than \$10,000 per day per violation under A.R.S. 49-463.

**R18-2-1515. Forms; Electronic Copies; Information Transfers**

- A. ADEQ shall make available on paper and in electronically-readable format any form required to be developed by ADEQ and completed by a F/SLM.
- B. After consultation with an F/SLM, ADEQ may require the F/SLM to provide data in a manner that facilitates electronic transfers of information.

Prescribed Fire Burn Plan Form  
APPENDIX N

Updated 11/7/02

Contact Number:   
FORT HUACHUCA PROGRAMMATIC BIOLOGICAL ASSESSMENT

Submit burn plan forms at least two weeks before planned ignition.

Contact Name:

UNIT INFORMATION

TOWNSHIP: (One Per Block)									BURN NAME:	
RANGE: (One Per Block)									BURN NUMBER:	
SECTIONS: (Multiple)									AGENCY:	
COUNTY:								ACRES IN BURN UNIT:		
BURN LAT/LONG:								ACRES DAILY: (Use for smoke modeling)		
PRIMARY SMOKE MANAGEMENT UNIT NUMBER: (1-11)										
ELEVATION: (FT) Provide average elevation.										
UNIT LINED BY: 1) Natural Barriers, 2) Blackline, 3) Wetline / Fireline, 4) Trails / Roads, 5) None										

BURN INFORMATION

PRIMARY BURN TYPE: <b>Select only one type:</b> 1) Broadcast (Natural), 2) Broadcast (Activity Non-Piled), 3) Piles	
BURN PURPOSE: 1) Hazard Reduction, 2) Range Improvement, 3) Wildlife, 4) Ecology, 5) Research, 6) WUI	
FIRING TECHNIQUE: 1) Heading, 2) Backing, 3) Piles / Jackpot	
IGNITION METHOD: 1) Aerial, 2) Hand, 3) Machine	
AVERAGE SLOPE: (%)	
ASPECT(S): Provide predominant aspect(s). (N, NNE, NE, etc.)	
TEMPERATURE: (°F) Provide minimum and maximum values.	
RELATIVE HUMIDITY: (%) Provide minimum and maximum values.	
MIDFLAME WIND SPEED: (MPH) Provide minimum and maximum values.	

SMOKE MANAGEMENT

WIND DIRECTION: Provide a single direction, or a range of favorable directions. (N, NE-SW, etc.)	
REPRESENTATIVE WEATHER STATION: Provide name first, then number.	
BMP'S 1) Permanent Fuel Exclusion 2) Temporary Fuel Exclusion 3) Increase Combustion Efficiency 4) Planned Ignition 3/15-9/15 5) Ignition Before 3:00 p.m. 6) Reducing Fuel Production 7) Maintenance Burn 8) Ignited Under Adequate Ventilation 9) Reducing the Area Burned 10) Igniting Before New Fuels Appear	
PLUME SENSITIVE AREAS WITHIN 15 MILES: Identify below and on smoke trajectory map.	
DIURNAL DRAINAGE SENSITIVE AREAS WITHIN 15 MILES: Identify below and on smoke trajectory map.	

FUELS INFORMATION (BROADCAST BURNING)

PRIMARY FUEL TYPE: 1) Ponderosa 2) Ponderosa / Grass 3) Juniper 4) Mixed Conifer 5) Grass (Select Only One Type) 6) Shrub / Brush (Includes Chaparral, Oak, and Sage) 7) Mixed Conifer / Shrub / Brush	
PRIMARY NFDRS FUEL MODEL: (A-U) Select only one fuel model.	
HARVEST DATE: (If Applicable) mm/yy	
PRIMARY DUFF TYPE: 1) Black (Litter Type), 2) Red (Rotten Log Type)	
<b>SOUND AND ROTTEN (Woody fuels only – Do not include piles)</b>	<b>ROTTEN (Woody fuels only – Do not include piles)</b>
0.0 - 0.25 IN FUELS: (T/A)	>3.0 IN FUELS: (T/A)
0.26 - 1.0 IN FUELS: (T/A)	<b>OTHER (Do not include these fuels in any other category)</b>
1.01 - 3.0 IN FUELS: (T/A)	STUMP 20+ IN FUELS: (T/A)
<b>SOUND (Woody fuels only – Do not include piles)</b>	SHRUB / BRUSH FUELS: (T/A)
3.01 - 9.0 IN FUELS: (T/A)	GRASS / HERB FUELS: (T/A)
9.01 - 20 IN FUELS: (T/A)	AVERAGE LITTER DEPTH: (IN)
>20.0 IN FUELS: (T/A)	AVERAGE DUFF DEPTH: (IN)

FUELS INFORMATION (PILED SLASH)

NUMBER OF PILES PER ACRE: Provide the average number of piles per acre.	
TONS OF PILES PER ACRE: Provide the average fuel loading of piles per acre.	
SOIL IN PILES: (%)	
PRIMARY SPECIES: (>50%) 1) Ponderosa Pine, 2) Douglas Fir, 3) Cottonwood, 4) Aspen, 5) Rotten, 6) None	
PRIMARY SPECIES: (%)	
SECONDARY SPECIES: (<50%) 1) Ponderosa Pine, 2) Douglas Fir, 3) Cottonwood, 4) Aspen, 5) Rotten, 6) None	
SECONDARY SPECIES: (%)	
QUALITY: 1) Clean, 2) Dirty, 3) Really dirty	200
DIMENSIONS: (FT) Provide the average width and height of round piles, as well as the length if elongated.	W H L
PACKING RATIO: 1) Ponderosa Pine <10 IN, 2) Short needle conifer, 3) Logs >10 IN	

US EPA ARCHIVE DOCUMENT

**Daily Burn Accomplishment Form**

Contact Number: \_\_\_\_\_

Updated 03/31/05

Contact Name: \_\_\_\_\_

Please submit accomplishment forms the day following ignition. Submit only one accomplishment for per burn for each ignition date.

**BURN NAME:**

**BURN NUMBER:**

**IGNITION DATE:** (MM/DD/YY)

**ACREAGE TREATED:** Area for which management objective(s) were achieved.

**ACREAGE BURNED:** Area blackened for broadcast burns only, not to exceed the acreage treated.

**ACREAGE ERT(s) USED:** Area in which emission reduction techniques were used.

**BURN LOCATION:** (TT/RR/SS or SS-SS)

**BURN DURATION:** (Hours)

**IGNITION DURATION:** (Minutes) Non-piled Activity fuels only

**DEAD FUEL MOISTURE:** (%) 10 hour

**DEAD FUEL MOISTURE:** (%) 1000 hour

**DUFF FUEL MOISTURE:** (%) (OPTIONAL) Natural fuels only

**FUEL MOISTURE METHOD:** 1) NFDRS 2) Measured 3) Both

**DAYS SINCE LAST RAINFALL:** Non-piled activity fuels only.

**SNOW-OFF DATE:** (MM/YY) Non-piled activity fuels only.

**EMISSION REDUCTION TECHNIQUES:** (Using numbering system from below.)

- |   |                                  |                                   |                             |
|---|----------------------------------|-----------------------------------|-----------------------------|
| 1. Pre-Burn Fuel Removal                  | 2. Mechanical Processing         | 3. Ungulates                      | 4. Burn More Frequently     |
| 5. Aerial / Mass Ignition                 | 6. Rapid Mop-Up                  | 7. Windrow Burning                | 8. Air Curtain Incinerators |
| 9. Burn Before Green Up                   | 10. Backing Fire                 | 11. Maintain fire line intensity  | 12. Isolating Fuels         |
| 13. Concentrating Fuels                   | 14. Chemical Treatment           | 15. Mosaic / Jackpot Burning      | 16. Moist Litter and Duff   |
| 17. Burn before large activity fuels cure | 18. High moisture in large fuels | 19. Under-burn before litter-fall | 20. Piles 21. Other         |

**DIURNAL PLUME CHARACTERISTICS:**

**REMARKS:**

**FUEL INFORMATION (BROADCAST BURNING)**

**PRIMARY FUEL TYPE:** 1)Ponderosa 2)Ponderosa /Grass 3)Juniper 4)Mixed Conifer 5)Grass  
6)Shrub/Brush (Includes Chaparral, Oak, and Sage) 7)Mixed Conifer /Shrub /Brush

**PRIMARY NFDRS FUEL MODEL:** (A-U)

**FIRE REGIME CONDITION CLASS:** (1,2,3)

**HARVEST DATE:** (If Applicable) MM/YY

**PRIMARY DUFF TYPE:** 1) Black (Litter Type), 2) Red (Rotten Log Type)

**SOUND AND ROTTEN (Woody Fuels Only – Do not include piles**

**ROTTEN (Woody fuels only – Do not include piles)**

**0.0 – 0.25 IN FUELS:** (T/A)

**>3.0 IN FUELS:** (T/A)

**0.26 – 1.0 IN FUELS:** (T/A)

**OTHER (Do not include these fuels in any other category)**

**1.01 – 3.0 IN FUELS:** (T/A)

**STUMP 20+ IN FUELS:** (T/A)

**SOUND (Wood fuels only – Do not include piles**

**SHRUB /BRUSH FUELS:** (T/A)

**3.01 – 9.0 IN FUELS:** (T/A)

**GRASS /HERB FUELS:** (T/A)

**9.01 – 20 IN FUELS:** (T/A)

**AVERAGE LITTER DEPTH:** (T/A)

**>20.0 IN FUELS:** (T/A)

**AVERAGE DUFF DEPTH:** (T/A)

**FUELS INFORMATION (PILED SLASH)**

**NUMBER OF PILES PER ACRE:** Provide the average number of piles per acre.

**TONS OF PILES PER ACRE:** Provide the average fuel loading per acre

**SOIL IN PILES:** (%)

**PRIMARY SPECIES:** (>50%) 1) Ponderosa Pine, 2) Douglas Fir, 3) Cottonwood, 4) Aspen, 5) Rotten, 6) Other

**PRIMARY SPECIES:** (%)

**SECONDARY SPECIES:** (<50%) 1) Ponderosa Pine, 2) Douglas Fir, 3) Cottonwood, 4) Aspen, 5) Rotten, 6) Other

**SECONDARY SPECIES:** (%)

**QUALITY:** 1) Clean, 2) Dirty, 3) Real Dirty

**DIMENSIONS:** (FT) Provide the average width and height of round piles, as well as the length if elongated

**W H L**

**PACKING RATIO:** 1) Ponderosa Pine <10 IN, 2) Short needle conifer, 3)Logs >10 IN

US EPA ARCHIVE DOCUMENT

Updated 11/7/02

Today's Date: (MM/DD/YY)
/                  /
Ignition Date: (MM/DD/YY)
/                  /

**Daily Burn Form**

*Submit burn forms by 2:00 p.m. the day before the planned ignition date. Submit one daily burn form per burn for each planned ignition date.*

<b>BURN NAME:</b>	
<b>BURN NUMBER:</b>	
<b>ACRES TO BE TREATED:</b>	
<b>BURN LOCATION: (TT/RR/SS or SS-SS)</b>	/                  /
<b>SMOKE MANAGEMENT UNIT NUMBER: (1-11)</b>	
<b>ARE THE ACRES REQUESTED THIS DATE LINED?</b> (Natural, Blackline, Wetline / Fireline, Trail / Roads) <i>If acres are not lined, maximum area that could burn is _____</i>	Yes <input type="checkbox"/> No <input type="checkbox"/>
<b>MULTIPLE OR CONSECUTIVE DAY BURN?</b>	Yes <input type="checkbox"/> No <input type="checkbox"/>
<b>EXPECTED DAYTIME PLUME BEHAVIOR:</b>	
<b>EXPECTED DIURNAL SMOKE BEHAVIOR:</b>	

US EPA ARCHIVE DOCUMENT

**EXPECTED IMPACT ON SENSITIVE AREA(S) :**

**COMMENTS:** (Description of fuel conditions, fuel consumption, or smoke transport from previous day, etc.)

**Contact Name:**

**Contact Number:**

Arizona Interagency Smoke Management Use Only

**REVIEWED BY:**

**CONDITIONS:**

**ACRES:**

# Annual Prescribed Burn Registration

(Ref. R18-2-1503)

UPDATED 033105

**Contact Person Information:**

Agency:

Name:

Address:

Phone:

Date (MM/DD/YY):

**Smoke Management Techniques**

- |                                     |                                    |                                       |
|-------------------------------------|------------------------------------|---------------------------------------|
| 1. Ignition before 3:00 PM          | 2. Reducing Fuel Production        | 3. Reducing the area burned           |
| 5. Ignition before new fuels appear | 6. Increased Combustion Efficiency | 7. Ignited under adequate ventilation |

**Emission Reduction Techniques**

- |   |                                  |                                   |
|---|----------------------------------|-----------------------------------|
| 1. Pre-Burn Fuel Removal                  | 2. Mechanical Processing         | 3. Ungulates                      |
| 5. Aerial / Mass Ignition                 | 6. Rapid Mop-Up                  | 7. Windrow Burning                |
| 9. Burn Before Green Up                   | 10. Backing Fire                 | 11. Maintain fire line intensity  |
| 13. Concentrating Fuels                   | 14. Chemical Treatment           | 15. Mosaic / Jackpot Burning      |
| 17. Burn before large activity fuels cure | 18. High moisture in large fuels | 19. Under-burn before litter fall |

\*NBA= Non-Burning Alternative, SMT= Smoke Management Technique, ERT= Emission Reduction Technique, WFU= Wildland Fire Use.

Burn Plan #	Project Name	SMU #	Primary Fuel Type	Max Daily Acres	Total Acres for year	ERT	% ERT Acres	SMT	Projected Season	General Location

Page # \_\_\_\_\_

# Annual Prescribed Burn Registration

(Ref. R18-2-1503)

**Contact Information:**

Agency:

Name

Phone:

Date (MM/DD/YY):

\*NBA= Non-Burning Alternative, SMT= Smoke Management Technique, ERT= Emission Reduction Technique, WFU= Wildland Fire Use.

Burn	Project	SMU	Primary	Max	Total	ERT	%	SMT	Projected	General	Status	NBA	WFU
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US EPA ARCHIVE DOCUMENT

Plan #	Name	#	Fuel Type	Daily Acres	Acres for year		ERT Acres		Season	Location	New/Current/Complete	y/n?	y/n?