Mt. Lemmon Wildland-Urban Interface Plan for Forest Health Wildland Fire Management

A cooperative effort between

The Citizens of Mt. Lemmon
Mt. Lemmon Fire District
Trees For Mount Lemmon
Pima County, Arizona
Arizona State Land Department
USDA Forest Service

July 2004

(The Community Wildfire Protection Plan)

ENDORSEMENT

The following agencies and organizations endorse this plan.

Mt. Lemmon Fire District — Date: 8/16/4

Pima County, Arizona — Date: 9-21-04

Arizona State Land Department — Date: 9/21/04

USDA Forest Service - Coronado National Forest — Date: 9/14/04

Trees For Mount Lemmon — Date: 8/16/2004

CONTENTS

INTRODUCTION

The purpose of this plan is to give the communities of Mt. Lemmon, the Mt. Lemmon Fire District, Pima County, the Arizona State Land Department and USDA Forest Service (Forest Service) the information necessary to improve forest health, reduce the potential for disaster and to aid in response to emergencies in the wildland-urban interface atop the Santa Catalina Mountains. **This plan provides a single place to keep all the pertinent information; it is a tool to be used in day-to-day activities as well as for longer range planning and funding requests.**[1] The plan provides a common approach for forest health and wildland fire activities within the Mt. Lemmon wildland-urban interface.

The goals of management are to create a healthy, vigorous forest and simultaneously reduce the potential for a return of catastrophic wildland fire.

Although the risk of fire will never be eliminated, because fire is a natural part of the forests of the Santa Catalina Mountains, the desire is to have communities which are as safe as possible. Actions can be taken that will decrease the likelihood of future major losses from insects and fire as well as provide the agencies with more effective and efficient ways to respond. Summerhaven was on the road to becoming a Firewise Community prior to the Bullock (2002) and Aspen (2003) fires. Unfortunately enough work hadn't been completed to significantly reduce the losses in 2003. It is believed that some structures which had been "firewised" did survive because of the actions taken. An on-going program is needed to instill forest health and Firewise Communities concepts into every home, business and landowner as well as visitors to the mountain. The latest insect damage and the Aspen Fire of 2003 did not recognize property boundaries, therefore management must be a cooperative effort carried out on both private and national forest lands if it is to be successful.

[1] Statements in bold are meant to emphasize important points. Underlined **bold** statements indicate that documents are to be inserted into the plan at that location.

There are several immediate objectives:

-Remove dead trees which are hazardous to community reconstruction and the uses of the open spaces within and around the community.
-Revegetate and reforest the severely burned areas.
-Treat the less severely burned and unburned areas to create a healthy forest and defensible space.
-Educate residents about creating a defensible space and fire resistant construction.
-Treat the fire hazards on the national forest land immediately adjacent to the community to reduce the threat from wildland fire.

Forest health, wildland fire and structure protection are inter-related; almost every activity affects all three. While insect and disease damage to the forest is not commonly thought of as an emergency it contributes to increased fire potential and can be addressed using emergency management techniques. For example, thinning to create defensible space can be designed to eliminate weak, insect-infested or severely mistletoe-infected trees which will result in a healthier and more fire resistant forest. Firewise, sponsored by the National Wildland/Urban Interface Fire Program, is used as the theme for all interface activities on Mt. Lemmon. The Firewise Communities/USA recognition process is one way that the community can measure if they are on track to meeting the goals.

While the Mt. Lemmon Fire District is charged with carrying out wildland fire protection for Summerhaven, the ultimate responsibility for creating a safe community rests with the individual property owner. The Arizona State Land Department provides technical assistance. The Forest Service is a partner because it is responsible for the management of the adjacent national forest lands.

While this current plan has a focus on Summerhaven, the intent of the second phase of planning is to expand the plan to cover all interface areas along the Mt. Lemmon Highway. Because these additional areas are on national forest lands the Forest Service will need to work with the fire district to add the necessary information and actions.

This plan is designed to meet the requirements for Firewise Communities/USA recognition. It is a Community Wildfire Protection Plan as defined by the federal Healthy Forests Restoration Act of 2003 (PL 108-148) and the plan meets the standards of Arizona State Land Department stewardship and fire management planning. It is the "Fire Protection Plan" described in Section 405 of the International Urban-Wildland Interface Code as adopted by Pima County.

The plan provides a brief description of the physical, biological and human environment of the interface. There are sections with information that applies to several phases of emergency management e.g., Action Schedules, organization responsibilities, safety, contact lists and monitoring and evaluation. The action portion of the plan is divided into the standard phases of

emergency management: Preparedness, Mitigation, Response and Recovery (refer to the diagram which follows this section). These sections summarize the actions and activities to achieve the goals and objectives. Each contains prescriptions/descriptions and references needed to carry out the activities. Activity details are generally found in other documents. Lastly, there is a Reference section.

Because a great deal of the Santa Catalina Mountains wildland-urban interface is national forest land the ***Interagency Standards for Fire and Fire Aviation Operations*** *2004*, which is updated annually, has served as the primary, but not the only, reference for this plan. These standards are commonly referred to as the "***Redbook***." While the ***Redbook*** is adopted formally only by the federal agencies, it contains information, guidelines, requirements, tools and techniques used by state and local agencies. Where state and local regulations, policies and guides are silent the information from the ***Redbook*** is used.

The federal and state governments commonly break up emergency management into phases. The wildland fire agencies have adopted an emergency management system to use during the phases. There are many sources for more detailed information about emergency management. The following diagram is meant to give just an overview.

Phases of Emergency Management

Incident Management System

Qualification & Certification

Coordination & Support Systems

Publications

Training

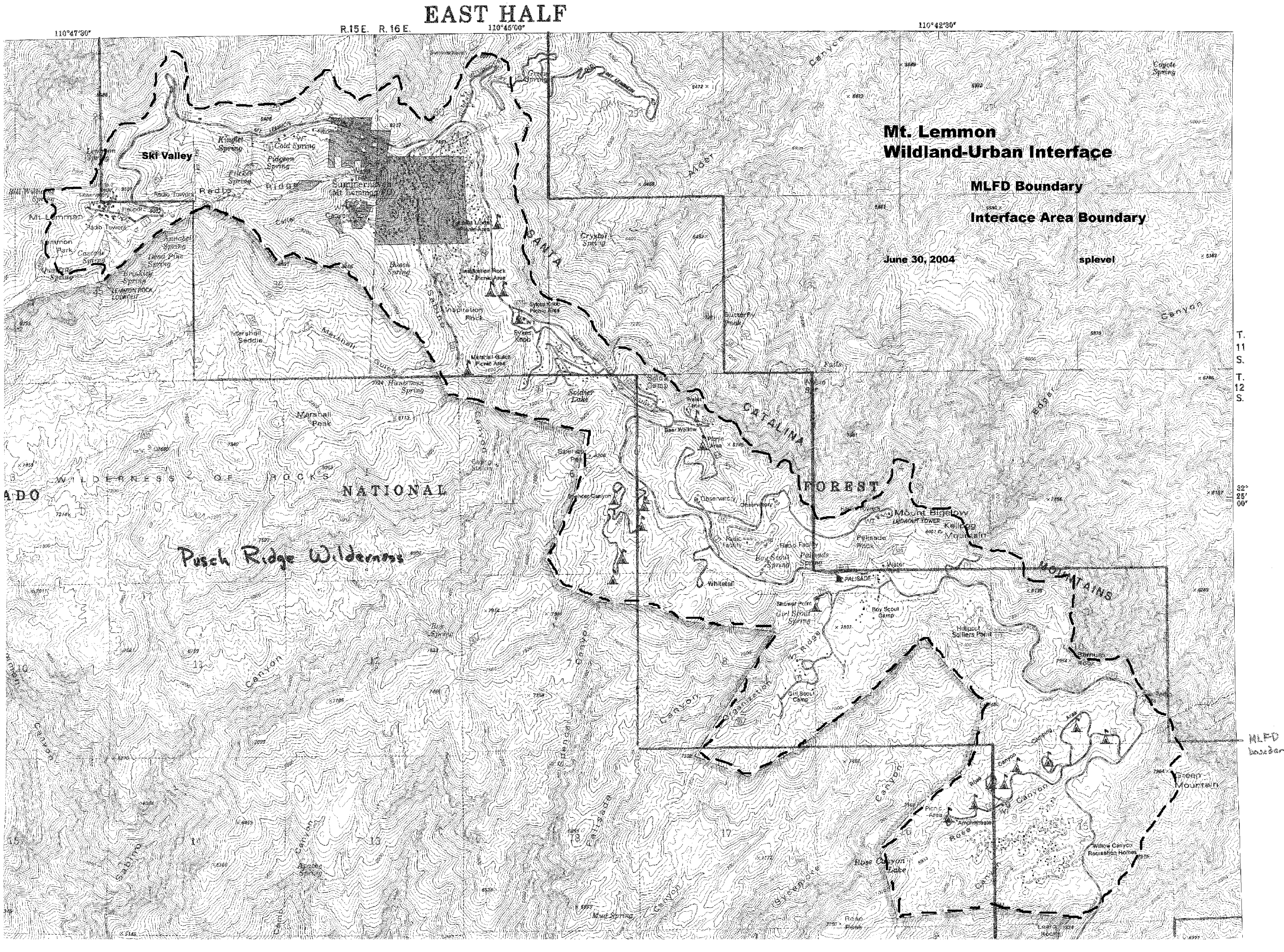
Incident Command System

Supporting Technologies

DESCRIPTION

Location: The Summerhaven community is made up of the private lands atop the Santa Catalina Mountains including the Loma Sabino Pines tract. It is located in Sections 25 and 36, Township 11 South, Range 15 East and in Sections 30 and 31, Township 11 South, Range 16 East, Gila & Salt River Base and Meridian. In this plan "The Village" refers to the business district of Summerhaven. The community is surrounded by Coronado National Forest lands.

The wildland-urban interface along the Mt. Lemmon Highways on national forest land and includes recreation residence tracts (Fern Ridge, Soldier Camp, Bear Wallow, Willow Canyon), organization camps (Organization Ridge), observatories and communications sites(Radar Base/Radio Ridge, Mt. Bigelow) and Forest Service administrative sites (Palisades, Sollers Point). There are also numerous national forest recreation areas along the highway.


EAST HALF
Mt. Lemmon
Wildland-Urban Interface
MLFD Boundary
Interface Area Boundary
June 30, 2004
splevel
Ski Valley
Pusch Ridge Wilderness
MLFD boundary
SANTA
CATALINA
FOREST
MOUNTAINS
NATIONAL
R.15 E. R.16 E.
110°47'30"
110°45'00"
110°42'30"
Mt Lemmon
Inspiration Rock
Marshall Peak
Mount Bigelow
Green Mountain
Rose Canyon Lake
Willow Canyon Recreation Homes

Access: Access is via the Mt. Lemmon Highway, also referred to as the Catalina Highway or the General Hitchcock Highway (the official name), which is nearing completion of reconstruction. It is maintained by Pima County. Interior streets within the Summerhaven are a mix of Pima County, Loma Sabino Pines Association and individual owner responsibility. Currently there is an effort in progress to have Pima County assume responsibility for most streets within the community.

MT. LEMMON ROAD & DRAINAGE SYSTEM

ROAD NAME	FROM - TO	LENGTH (ft.)	LENGTH (mi.)	WIDTH (ft.)	COMMENTS
Mt. Lemmon Highway	Mt. Lemmon Short Rd.-Summerhaven		25.00	28'	paved
Ski Run Road	Mt. Lemmon Hwy.-end		2.00	24'	paved
Sabino Canyon Parkway	Mt. Lemmon Hwy.-Forest Boundary		1.8	24'	paved (narrowest 17') Drainage
Loma Linda Extension	Catalina Hwy-Forest Boundary	3003'	0.54	12'	currently [illegible]
Florence	Loma Linda-end	468'	0.1	19'	
Tempe	Florence-end	560'	0.1	13'	
Ajo	Loma Linda-Middle Sabino	1252'	0.24	11'	
Nogales	Ajo-Casa Grande	261'	0.05	16'	
Casa Grande	Nogales-end	383'	0.07	15'	
Bisbee	Loma Linda-Sabino Canyon	990'	0.19	13'	
Turkey Run	Sabino Canyon-end	2403'	0.45	14'	Drainage
Goat Hill	Sabino Canyon-Tucson	350'	0.07	14'	
Goat Hill	Sabino Canyon-Phoenix	323'	0.06	14'	
Phoenix	Douglass-end	1839'	0.35	11'	
Carter Canyon	Douglass-end	2025'	0.38	16'	Drainage
Tucson	Goat Hill north-end	550'	0.1	17'	
Tucson	Middle Sabino-north end	1176'	0.22	13'	
Ray	Tucson-south end	920'	0.17	14'	
Retreat	Sabino Canyon-Ray	649'	0.12	14'	
Douglass	Sabino Canyon-Carter Canyon	550'	0.1	30'	
		TOTAL MILES:	32.11		

Sources: Pima Co DOT

Ownership and Uses: The Summerhaven community encompasses approximately 350 acres of private land. Most of the land within the community is divided into 741 lots with an average size of 6150 square feet. The Loma Sabino Pines tract (95.7 acres) is made up of 92 individually owned lots on 33.8 acres, approximately 7.0 acres of roads, and approximately 54.9 acres of common area. The roads and the common area are owned by the Loma Sabino Homeowners Association. The common area is to be basically undisturbed except for recreation use, roadways, utilities, and facilities which benefit all lot owners. The tract was part of the Coronado National Forest until the 1995 land exchange. It had been managed for summer home use since the 1950's.

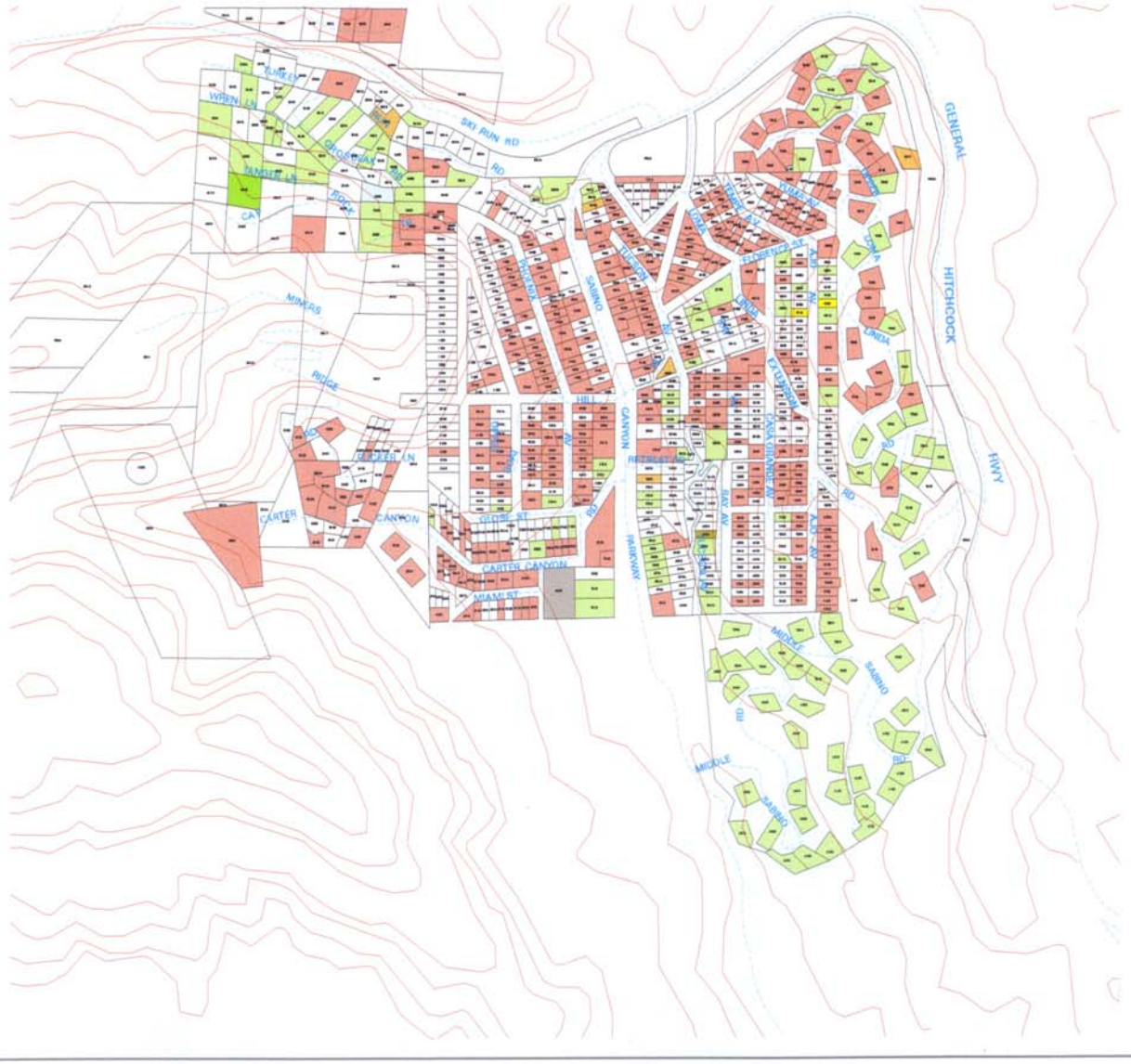
Summerhaven is a mix of year-round residences and vacation homes. There is a business district, The Village, located along Sabino Canyon Parkway.

The population of all interface communities is 900 people based upon Pima County tax parcel information. Prior to the 2003 Aspen Fire there were about 100 year-round residents.

The developments on national forest land, except for recreation areas and administrative sites, are covered by special use permits which require compliance with local ordinance and state law. According to the Coronado National Forest Plan the management direction is to provide a variety of developed recreational opportunities while mitigating impacts on other resources.

Pima County zoning for Summerhaven is ML (residential) and RVC (business or residential). The International Urban-Wildland Interface Code as adopted by Pima County as well as the county's planning and zoning regulations apply to the community. In addition, Section A-23 of the Loma Sabino Pines tract CC&R's describes landscaping restrictions for the common area and the individual lots within that tract. Vegetation removal is allowed for construction clearance, access roads and fire protection. Any other removal of vegetation requires approval of the Board of Directors. Section A-21 describes the required safety, maintenance and clean-up.

Several utility easements for power, telephone and water lines run through Summerhaven which affect tree and stand management.



Summerhaven

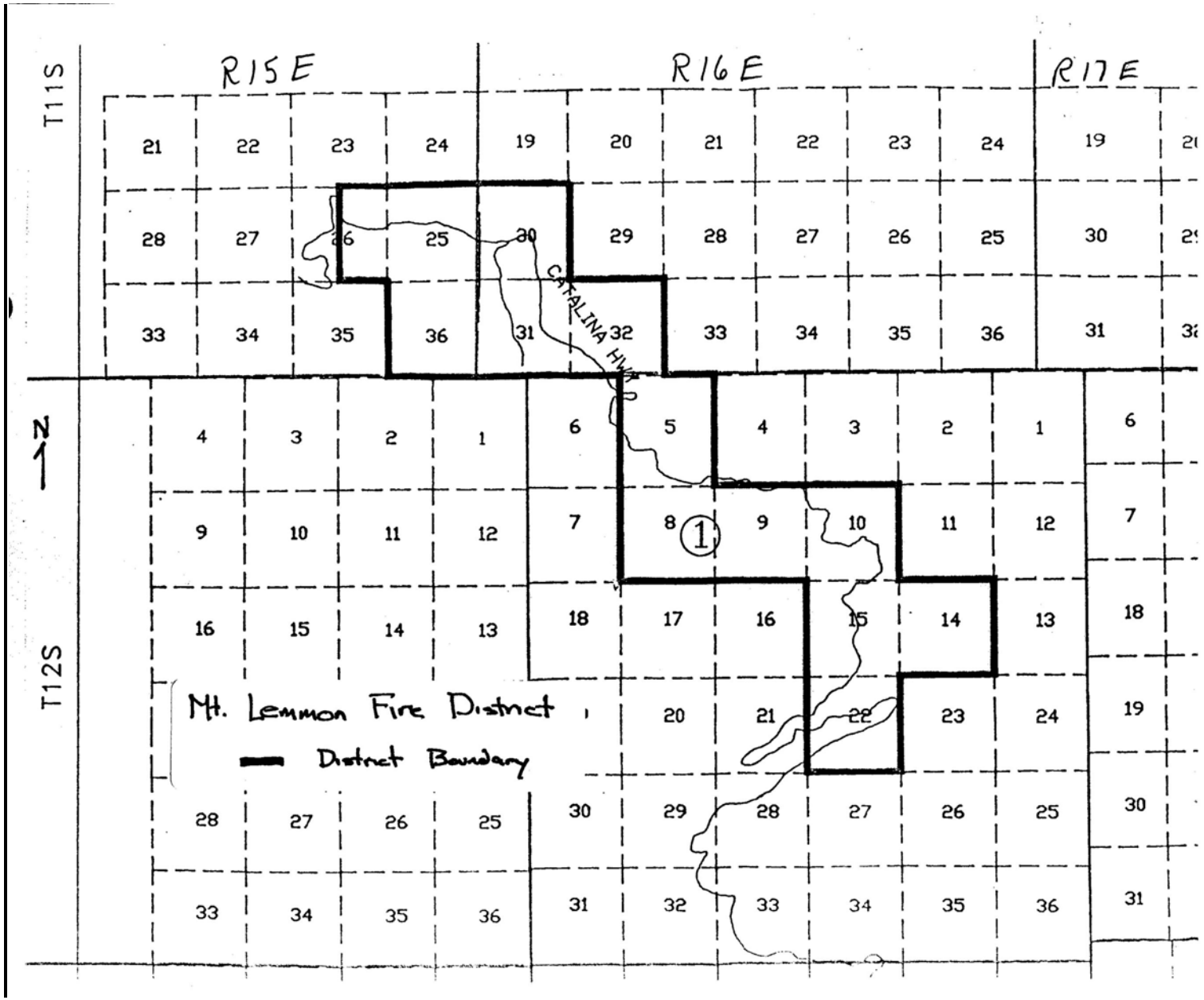
As Of June 30, 2003

- Roads
- Contour Lines
- STANDING
- DESTROYED
- DAMAGED
- 1 DESTROYED 1 STANDING
- DESTROYED WELDER'S FIRE
- DESTROYED WAS 2005 NOTICE
- STANDING MH HU'S ONLY
- SEPTIC ONLY

Pima County Index Map

Scale 1:5400
Scale 1" = 500'

Mt. Lemmon Fire District: The district covers 12.5 square miles which includes most areas on the top of the Santa Catalina Mountains with structures. In addition, there are 8 residences in Willow Canyon tract, 2 residences in Upper Soldier Camp, 10 residences in Soldier Camp, 4 residences on Fern Ridge and the electronic and observatory sites on Mt. Bigelow outside the district boundary. They subscribe to the district's services.


R15E
R16E
R17E
T11S
T12S
N
CATALINA HWY
Mt. Lemmon Fire District
District Boundary
1

Facilities: The Mt. Lemmon Fire District maintains one fire station and administrative headquarters located on the Control Road just north of the junction with the Mt. Lemmon Highway. The site contains the firehouse and a storage building.

The Forest Service has a station at Palisades.

Communications: Communications with the fire department is available by telephone, fax and two-way radio. Emergencies are reported through the "911 System". Incident dispatching is handled by the Drexel Heights Fire District dispatcher.

The two-way radio system: The fire department has one frequency with two repeaters. The department also has access to the Arizona State Land department frequencies and those of the Coronado National Forest.

Refer to the radio frequency guide for the Mt. Lemmon Fire District, Arizona State Land Department and Forest Service for detailed information.

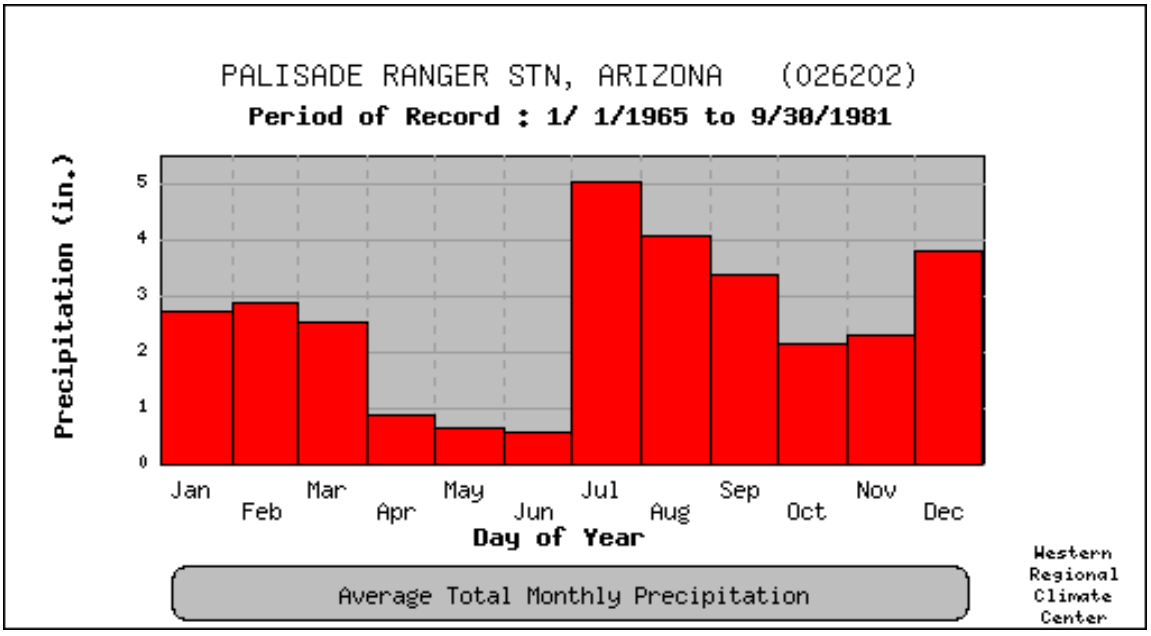
Domestic and Fire Water System: The Mount Lemmon Domestic Water Improvement District, formerly the Mt. Lemmon Cooperative Water Company, supplies water to Summerhaven. They are currently installing larger water lines and additional hydrants which should help with fire suppression efforts.

REPLACE this page with the map showing the utility lines and main (fire) water system.

Cultural Resources: A survey for the 1993 Loma Sabino land exchange showed no cultural resources or caves within the tract. Even though no survey has been done on the remainder of the private land it is safe to assume that no cultural resources exist based upon the survey done for the land exchange.

There are several mines within the immediate vicinity which may have some historic value.

Climate: The climate is temperate with cold winters and warm summers. Precipitation occurs in the winter as snow or rain and as rain during the summer monsoon season. The summer storms are usually brief and very intense. The following chart shows the historic distribution of precipitation at Palisades Ranger Station. A remote area weather Station (RAWS) is located at Sollers Point and can provide current and some historic weather information.



A prolonged drought, which has contributed to the current loss of trees to insects and fire activity, is predicted to continue. Refer to the Southwest Area web site (www.fs.fed.us.us/r3/fire) for regularly updated fire weather and drought prediction information.

Physical Environment: Summerhaven is located in the upper reaches of the Sabino Creek watershed between 7600 and 8000 feet elevation. Slopes vary from less than 15 % (7.5°) to over 80% (40°). Rock outcrops in some parts of the community range in size from a few square feet to almost an acre.

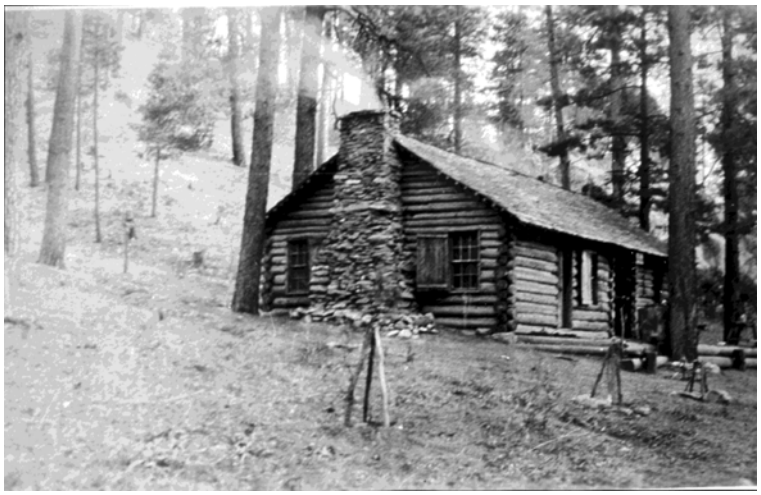
Watershed: Permanent water is found in Sabino Creek and Carter Canyon. There are a few small, seasonal seeps and flowing drainages. There is potential for erosion of bare soil from any water

runoff. Since the 2003 Aspen Fire runoff has increased. The following table from the Burned Area Emergency Response (BAER) report illustrates the increased flows expected for each drainage on the Santa Catalina Mountains. For more detailed information refer to the BAER Team post fire report and the October 2003 evaluation report.

Table 1. Summary for Amendment to Hydrology Report.
Significant Watersheds Burned in the Aspen Fire 2003

Watershed Name	Acres	High Elevation	Low Elevation	Channel Length	Acres Burned High	Acres Burned Low	Unburned	Tc	pre-fire 25-yr 1hr storm runoff	post-fire 25-yr 1 hr storm runoff	relative change
ventana_canyon_east	437	6275	3440	6981	0	434	3	0.17	250	450	2
Carter Canyon	230	9020	7640	6770	186	36	8	0.21	130	600	5
Inspiration Rock	288	8120	7420	5920	58	109	121	0.23	160	300	2
Summerhaven	138	8160	7640	2355	32	100	6	0.15	80	203	3
Marshall Gulch	409	8631	7420	7660	157	61	191	0.26	220	530	2
ventana_canyon_west	2373	6558	3660	11944	0	1222	1151	0.31	1200	1700	1
molino_canyon	4128	7135	3840	13720	1404	1247	1477	0.34	2100	4900	2
Ski Area/Turkey	447	9130	7780	10325	180	134	133	0.35	220	580	3
Soldier Lake	655	8520	7120	11580	12	344	299	0.39	310	460	1
gibbon_springs	1695	5800	4000	15000	72	775	848	0.48	730	1100	2
bird_canyon	1378	6639	4200	16835	105	940	333	0.49	590	1100	2
esperero_canyon	1988	7880	3600	20682	306	1644	38	0.5	840	1900	2
nugget_canyon	1492	7575	4680	23096	543	508	441	0.65	570	1400	2
peppersauce_canyon	2119	6219	4430	22235	0	2119	0	0.75	750	1400	2
stratton_canyon	2895	7560	4350	28700	0	2681	214	0.81	990	1800	2
rattlesnake_canyon	1747	6400	4240	25544	176	597	974	0.82	600	940	2
montrose_canyon	3445	7400	2460	34701	543	508	2394	0.82	1200	1900	2
soldier_canyon	2430	6200	3200	29167	1129	1080	221	0.84	820	2300	3
romero_canyon	5233	8219	2750	56108	2017	2180	1036	1.43	1200	3200	3
canada_del_oro_east	21499	9157	3840	62505	6730	9930	4839	1.63	4500	11000	2
sycamore_dam_ws	8141	7897	5200	61327	2030	4780	1331	2.07	1400	3200	2
sabino_canyon	21424	9157	2680	82115	6034	12806	2584	2.07	3600	6200	2
bear_canyon	10986	7897	3400	85009	2365	6170	2451	2.48	1600	3500	2

Biotic Communities: According to Brown the area in and around Summerhaven is Madrean montane conifer forest (122.3) with both ponderosa pine and mixed conifer forests. In the ponderosa pine forest the dominant species is ponderosa pine (*Pinus ponderosa*) but it also contains some Southwestern white pine (*P. strobiformis*), alligator juniper (*Juniperus deppeana*) and silverleaf oak (*Quercus hypoleucoides*). Many of the ponderosa pine found in the area are the five needle variety (*Pinus ponderosa* var. *arizonica*). Silverleaf oak is present on the dryer west aspects. Prior to the 2003 Aspen Fire the forest structure could be generally classified as having 3 stories: 5 to 20 feet tall, 25 to 40 feet tall and 45 to 70 feet tall with diameters (DBH) measured ranging from 1 to 33.5 inches. There are some large old trees but most of the overstory is smaller second growth. There were very few seedlings due to the closed canopy, the presence of grass cover in open areas and the land uses. Most of the very small trees are probably older i.e., suppressed. Canopy closure in the lightly to moderately burned areas varies from 50 to 75 % based upon ocular estimates of the aerial photographs. Of course, while this description changed drastically for some portions of Summerhaven after the Aspen Fire, it remains valid for most areas that did not have crown fire. The site index, a measure of productivity, appears to be fairly uniform, between 70 and 80, which indicates the site has a good potential for growing trees if there is adequate space for the crowns. The index may be slightly higher in drainage bottoms and on the north end of the community.



Historically the ponderosa pine forest of the Santa Catalina Mountains was more open as evidenced by the photograph of the Huntsman Cabin taken before 1915. This openness was probably due, at least partially, to frequent low intensity fires. Disturbance to the vegetation for roads, home site clearing, fire protection and hazard tree removal has occurred over the most accessible areas.

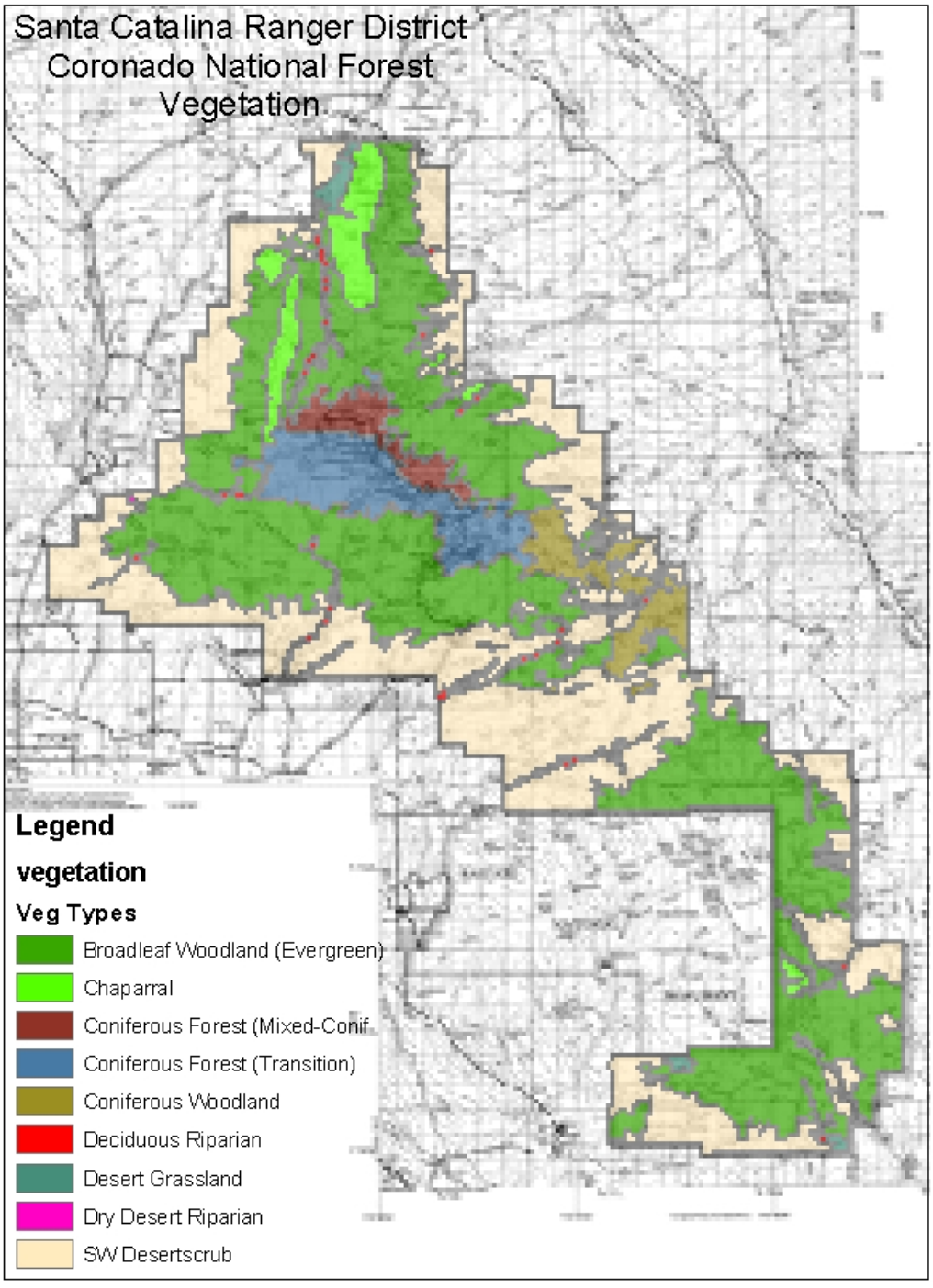
Huntsman Cabin

The mixed conifer forest is located on the moister north and east aspects and contains primarily Douglas-fir (*Pseudotsuga menziesii*) and white fir (*Abies concolor*) with some scattered corkbark fir (*abies lasiocarpa* var. *arizonica*). There are several stands of quaking aspen (*Populus tremuloides*) within the mixed conifer forest, some of which burned during the 2003 Aspen Fire. The presence of aspen is probably due to the much moister site. The pine and mixed conifer forests grade into each other so there is no clear delineation between the two.

The narrow riparian community along Sabino Creek is classified by Brown as interior deciduous riparian woodland and contains Douglas-fir (*Pseudotsuga menziesii*), white fir (*Abies concolor*), ponderosa pine (*Pinus ponderosa*), Southwestern white pine (*P. strobiformis*), bigtooth maple (*Acer grandidentatum*), scattered Rocky Mountain maple (*Acer glabrum*) and Arizona alder (*Alnus oblongifolia*). Brown describes this community as a montane riparian wetland.

The Gooding onion (*Allium Gooddingii*), which occurs to the west of Mt. Lemmon Ski Valley, and the Santa Catalina beardtougue (*Penstemon discolor*), near the Willow Canyon residence tract, are the only sensitive plant species known within the interface.

Since the Aspen Fire (2003) there are two conditions within the ponderosa pine forest, in Summerhaven, the completely burned areas and the partially burned areas. Aspen cuttings were planted within the severely burned areas starting in October 2003. Planting of trees made available by the US Forest Service is scheduled for the monsoon season of 2004. The original intent was to plant in the spring, however, it was decided to delay until more dead tree removal was completed. Ten thousand ponderosa pine seeds were collected in January 2004, extracted and have been germinated at the NRCS Plant Materials Center in Tucson; the germination rate was about 10 percent. These seedlings will be planted in 2004 and 2005; the entire revegetation program is planned to take 5 to 7 years.


Santa Catalina Ranger District
Coronado National Forest
Vegetation
Legend
vegetation
Veg Types
Broadleaf Woodland (Evergreen)
Chaparral
Coniferous Forest (Mixed-Conif
Coniferous Forest (Transition)
Coniferous Woodland
Deciduous Riparian
Desert Grassland
Dry Desert Riparian
SW Desertscrub

In the ponderosa pine forest Southwestern dwarf mistletoe (*Arceuthobium vaginatum* subsp. *cryptopodum*) and bark beetle (*Ips spp.* and *Dendroctonus adjunctus*) activity are naturally occurring. However, the potential exists for the spread of mistletoe and a major increase in bark beetle activity. *Dendroctonus* beetles typically emerge from trees in late September to late November with the peak emergence in mid to late October. They lay eggs in standing live trees. Signs of attack include pitch tubes, boring frass and fading foliage. By about 14 months after the attack the trees begins to drop their needles. Usually by the time that needles change color the beetles are gone. The number of trees killed may vary from a few to many depending upon the health of the trees and weather conditions.

Ips spp. prefer fresh pine debris from construction, logging, firewood cutting or blowdown, however, they will attack smaller trees and the tops of larger trees. The attacks on live trees take place after there is a build-up of populations in the debris. Several generations of *Ips spp.* are produced each year. They may complete one generation in one month in the summer. Adults build distinctive galleries (tunnels) just under the bark which slightly etch the sapwood..

Mistletoe takes longer to kill trees but as more trees become infected the potential for loss increases. In addition, mistletoe infected trees are more susceptible to beetle attack and other damage. If left unchecked both bark beetle and mistletoe occurrences will cause increased loss of individual trees and could result in a significant loss in the stand over portions of the tract.

Numerous birds and small mammals reside in the area. Larger mammals such as white-tailed deer (*Odocoileus virginianus*), coyotes (*Canis latrans*), mountain lion (*Felis concolor*) and black bear (*Ursus americanus*) may visit. The community may be a foraging area for two sensitive birds: northern goshawk (*Accipiter gentilis apache*) and peregrine falcon (*Falco peregrinus anatum*) and one threatened bird: Mexican spotted owl (*Strix occidentalis lucida*), but there are no known nesting or fledgling sites within the community. The orange-crowned warbler (*Vermivora celata*) has no special status but is locally significant.

There may be some downstream effects on the Gila chub (*Gila intermedia*), a sensitive species. The Forest Service is considering possible future introduction of the longfin dace (*Agosia chrysogaster*), which is a sensitive species, and the Gila topminnow (*Poeciliopsis occidentalis occidentalis*), an endangered species.

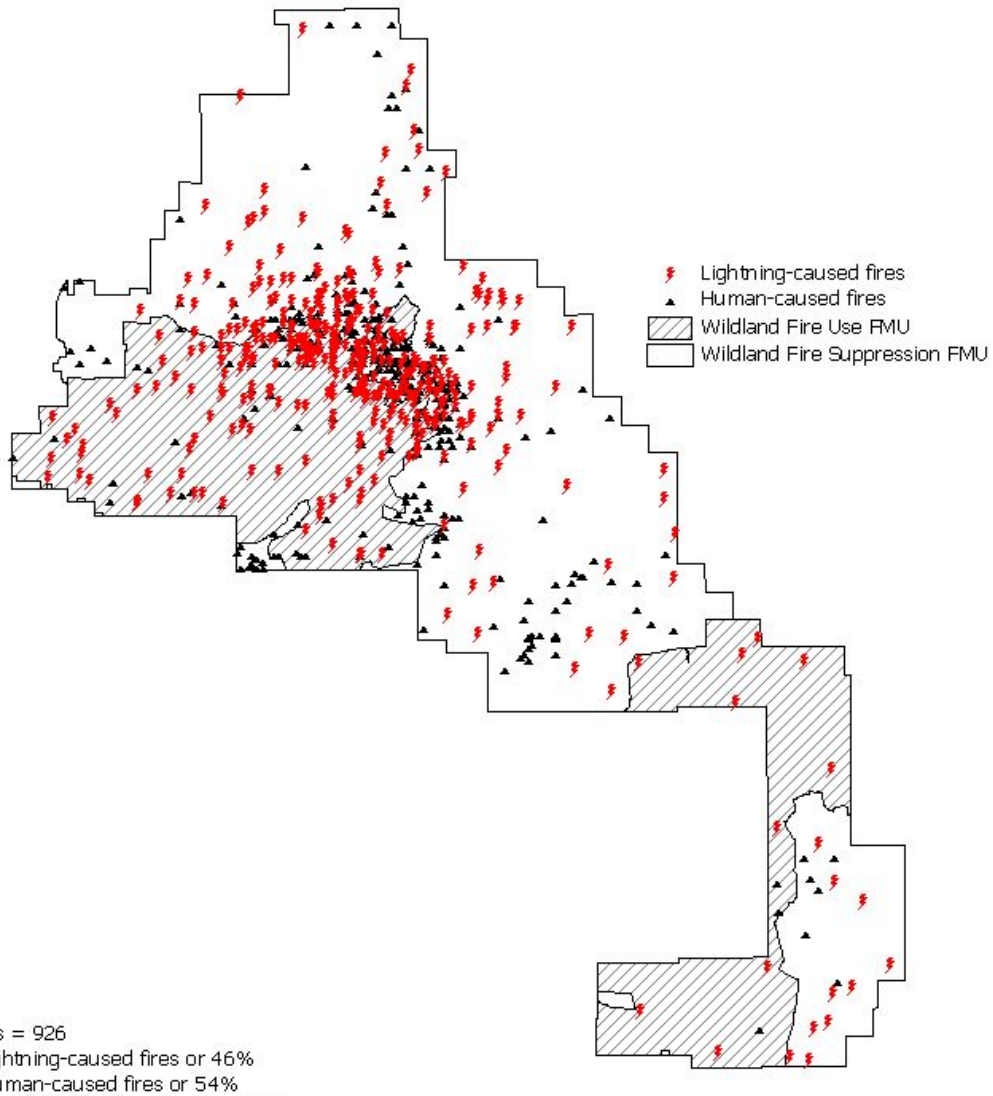
Fire History: The ponderosa pine forests on the Santa Catalina Mountains historically experienced frequent, low intensity fires. However, as development has occurred, fire has generally been excluded allowing increased stand density and fuel loadings. Between 1986 and 1999 54% of fires were human caused. As can be seen on the Fire Occurrence Map most of the lightening and human caused fires are concentrated along the crest of the mountains between Lizard Rock and Mt. Lemmon. The Bullock Fire burned to within a few hundred feet of the Loma Sabino Pines area in 2002. The Aspen Fire burned through the entire community in 2003. In Summerhaven the most intense fire burned from southwest to northeast through Carter Canyon, to the east side of Sabino Creek and then over the ridge toward the fire station. Three hundred fourteen buildings within

Summerhaven were destroyed including almost all of the businesses. In addition, eleven cabins were destroyed on Fern Ridge and nine in Willow Canyon. Costs for the Aspen Fire:

Fire suppression	$16,000,000
Estimated resource damage	33,068,700
Property damage	66,000,000

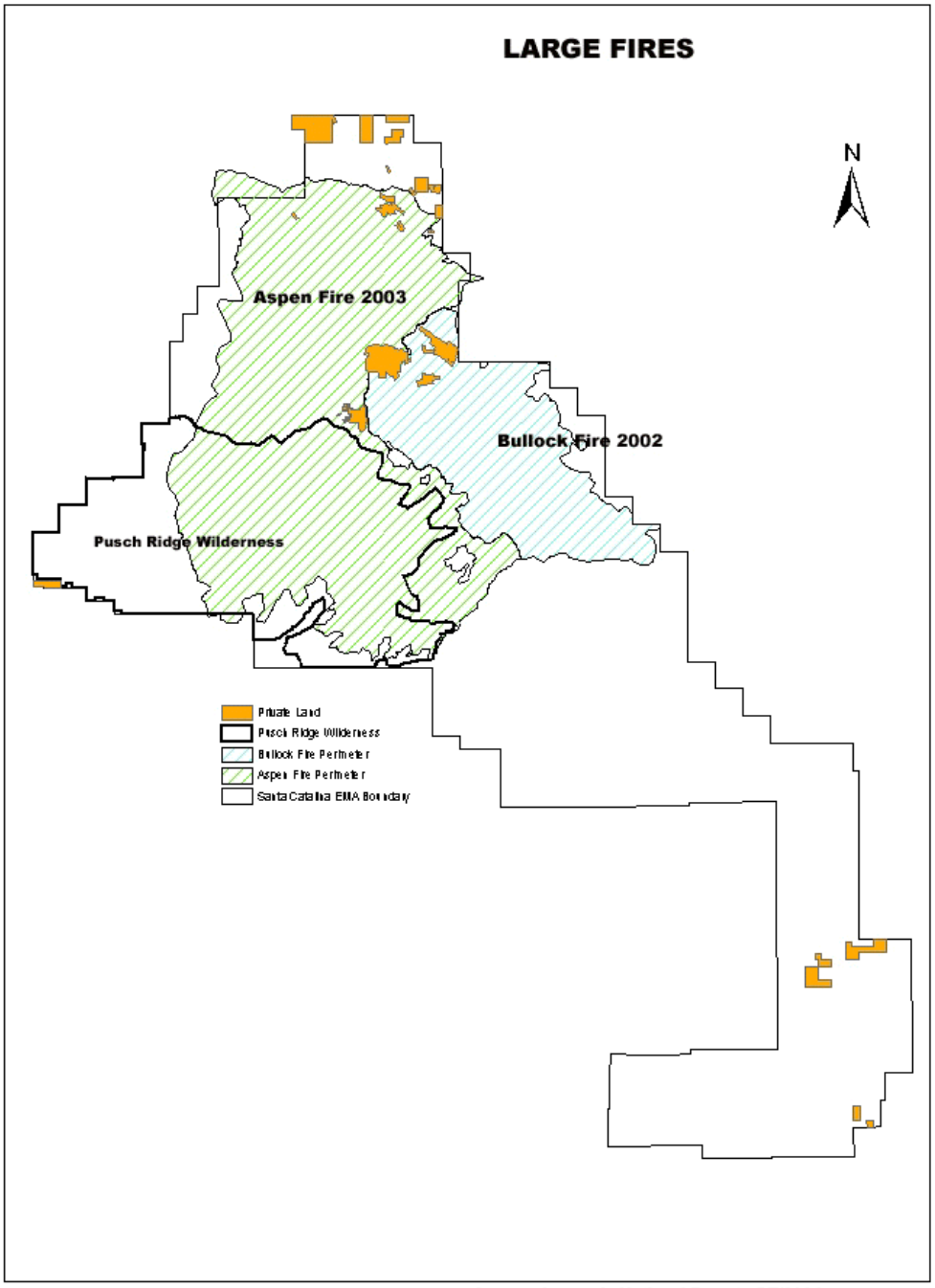
In 1996 a prescribed burn had been completed on the national forest just to the south of the Loma Sabino Pines tract. The purpose was to reduce fuel loading and therefore wildland fire hazard. This area experienced ground fire during the 2003 Aspen Fire.

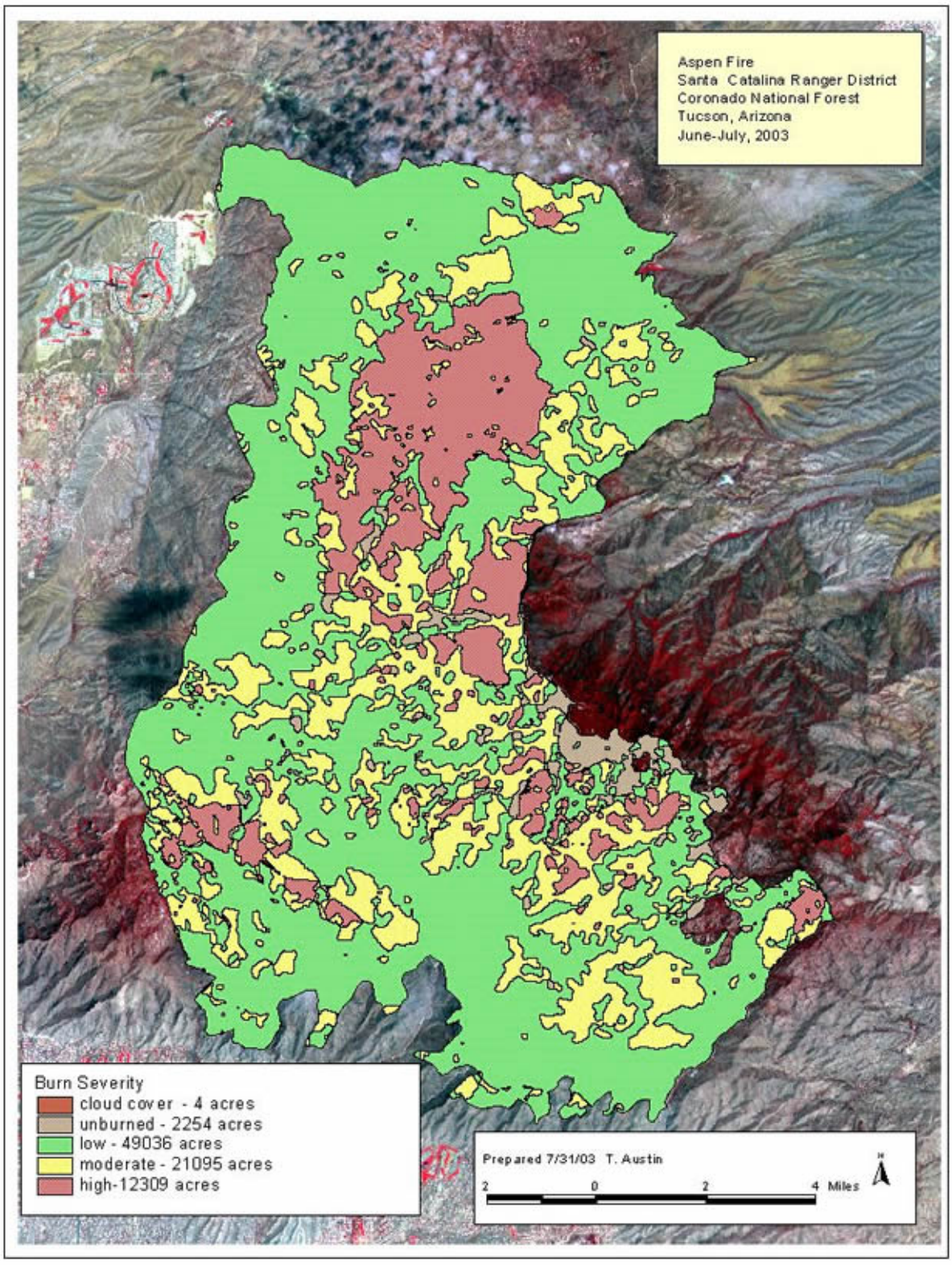
Santa Catalina EMA
Santa Catalina Ranger District
Fire Occurrences

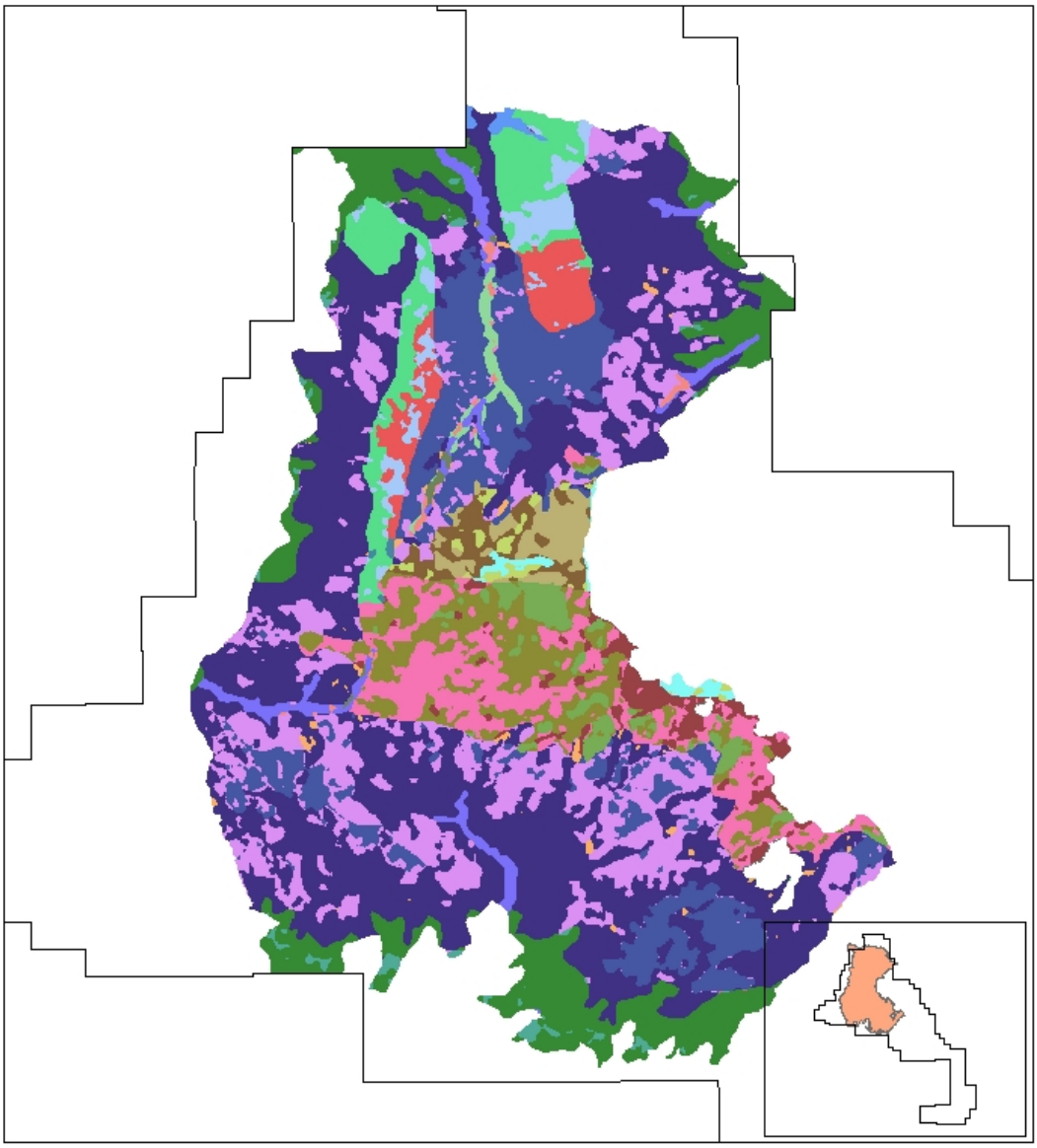


Total Fires = 926
426 lightning-caused fires or 46%
500 human-caused fires or 54%
Total Fires within Wildland Fire Use FMU
210 lightning-caused fires or 66%
110 human-caused fires or 34%
Total Fires within Wildland Fire Suppression FMU
216 lightning-caused fires or 36%
390 human-caused fires or 64%

10/14/02 tla


LARGE FIRES
N
Aspen Fire 2003
Bullock Fire 2002
Pusch Ridge Wilderness
Private Land
Pusch Ridge Wilderness
Bullock Fire Perimeter
Aspen Fire Perimeter
Santa Catalina EMA Boundary
Source: Coronado National Forest 5/7/2004


Aspen Fire
Santa Catalina Ranger District
Coronado National Forest
Tucson, Arizona
June-July, 2003
Burn Severity
cloud cover - 4 acres
unburned - 2254 acres
low - 49036 acres
moderate - 21095 acres
high-12309 acres
Prepared 7/31/03 T. Austin
2 0 2 4 Miles
N



Legend 8/3/04

Santa Catalina Boundary

Aspen Fire

Burn Severity / Veg Type

- cloud cover, Coniferous Forest (transition)
- cloud cover, Broadfleaf Woodland (Evergreen)
- unburned, Broadfleaf Woodland (Evergreen)
- unburned, Coniferous Forest (mixed conifer)
- unburned, Deciduous Forest (spruce fir)
- unburned, Coniferous Forest (transition)
- unburned, Southwestern Desertscrub
- unburned, Chaparral
- low, Coniferous Forest (mixed conifer)
- low, Deciduous Forest (spruce fir)
- low, Coniferous Forest (transition)
- low, Southwestern Desertscrub
- low, Desert Grassland
- low, Chaparral
- low, Broadfleaf Woodland (Evergreen)
- moderate, Coniferous Forest (mixed conifer)
- moderate, Deciduous Forest (spruce fir)
- moderate, Southwestern Desertscrub
- moderate, Desert Grassland
- moderate, Coniferous Forest (transition)
- moderate, Chaparral
- moderate, Broadfleaf Woodland (Evergreen)
- high, Coniferous Forest (mixed conifer)
- high, Deciduous Forest (spruce fir)
- high, Southwestern Desertscrub
- high, Coniferous Forest (transition)
- high, Chaparral
- high, Broadfleaf Woodland (Evergreen)

Fire Regimes: According to Clark and McPherson fire regimes are more a consequence than a cause of plant communities i.e., if the characteristics of a plant community are drastically changed then the fire regime will change. An example is the historic versus current fire regimes in the montane conifer forest. The historic regime was one of frequent low intensity fires while the current regime is infrequent higher intensity fires.

Wright and Bailey, Debano et al. and Abbott describe the characteristics of a fire regime as the typical frequency, seasonality, intensity, severity, duration, extent and effects of fire on an ecosystem. Wells et al describe intensity as the rate of heat energy released per unit time per unit length of fire front. Severity is the product of fire intensity and residence time. Severity is described as 1) low: litter and duff scorched but not altered over the entire depth, 2) moderate: litter and duff charred but underlying soil not visibly altered, or 3) severe: all of the organic layer is consumed and mineral soil structure and color are visibly altered.

MONTANE CONIFER FOREST: 90% of fires occur before the summer monsoon begins i.e., before late June or early July. The fire interval in the ponderosa pine forest before 1880 was 4 to 8 years and fire severity was low. Frequent fires kept fuel accumulations to a minimum and inhibited the growth of less fire resistant species. Since then, infrequent large stand replacing fires have occurred; there has been an increase of shade tolerant species such as Douglas-fir and southwestern white pine. The historic fire interval in the mixed conifer forest was probably about 22 years in cooler, moist sites. Fires would be either light and erratic in wet fuels or intense stand replacing during drought years.

RIPARIAN FOREST: The fire regime for this community is unknown. However, it is probable that very infrequent, low intensity surface fires burned through parts of it; perhaps during periods of drought. Infrequent, spotty, low intensity fire is the desired situation.

Two fire seasons usually occur in southeastern Arizona, the primary one is from April to early July and a usually less severe one in October. Most fires occur in mid-April to July. However, depending upon precipitation, fires have occurred in almost every month.

Mt. Lemmon Wildland-urban Interface Area: The interface area on the top of the Santa Catalina Mountains stretches from the Willow Canyon Residence Tract to the top of Mt. Lemmon. Structures are concentrated in five areas:

-Willow Canyon Residence Tract,
-Sollers Point/Palisades Work Center/Organization Ridge/Mt. Bigelow observatory and electronic sites,
-Soldier Camp/Fern Ridge and Bear Wallow Residence Tracts,
-Summerhaven (which includes the Loma Sabino tract),
-Steward Observatory/Radio Ridge electronics sites/Ski Valley.

INSTRUCTIONS
ACTION SCHEDULE FORM

The "Action Schedule" is a summary list of all planned activities relating to forest health and wildland-urban interface fire for Mt. Lemmon. It is to be used to organize work schedules, coordinate actions of various agencies/organizations and to have a permanent record of accomplishment. It can be used to prepare grant and donation requests as well as Firewise recognition renewal. Action Schedules are included for the PREPAREDNESS, MITIGATION, RESPONSE and RECOVERY phases.

Entries:

ACTIVITY: Provide a brief description of the activity; what is planned or completed. Identify the priority for each activity. Provide enough information so that the activity can be referenced to details that are available elsewhere.

ORGANIZATION: List who planned the activity; also list who carried out the work, if different.

FUNDING: Identify the organization or agency which funded the activity. It could be from regular operating budgets, donations or grants. For grants show the kind and split e.g., 2001 SFA 50-50. Show the amount spent.

PLANNED: Show the size of the activity e.g., number of acres, attendees, copies, etc. Show the planned date(s).

ACCOMPLISHED: Show the actual accomplishment, it may be different from the planned.

INSERT the current Action Schedule forms after this page.

ORGANIZATIONS
Responsibilities and Relationships

The primary participants in wildland-urban interface management on top of the Santa Catalina Mountains are: community members, the Mt. Lemmon Fire District, the Mt. Lemmon Domestic Water Improvement District, Pima County, the US Forest Service (Santa Catalina Ranger District, Coronado National Forest) and the Arizona State Land Department. Visitors and the general public also have a vested interest and should be informed about and involved in decision-making.

MT. LEMMON FIREWISE COMMITTEE

This committee was organized by the residents of Summerhaven and the Mt. Lemmon Fire District to promote development of defensible space within and adjacent to the community. The Arizona State Land Department and the US Forest Service have been active members. This committee coordinates integration of forest health and wildland fire management activities in the wildland-urban interface on top of the Santa Catalina Mountains. While everyone is invited to participate in the committee's work, a core membership has been identified to meet the requirements of various laws and ordinances including the International Urban-Wildland Interface Code as adopted by Pima County, the Healthy Forests Restoration Act and Firewise Communities/USA.

Core members (1 member except as noted):

-Mt. Lemmon Fire District*****: 2 members, 1 District Board and 1 Department representative
-Pima County***** (The Director of Development Services has been designated as the county member of the Firewise Committee and the primary contact for forest health and wildland-urban interface activities.)
-US Forest Service
-Arizona State Land Department*****
-Mt. Lemmon Homeowners Association
-Loma Sabino Homeowners Association
-Coronado National Forest permittee
-Trees for Mount Lemmon
-Residents-at-large: 2 members

*** Under the federal Healthy Forests Restoration Act these organizations must endorse this interface plan (called a Community Wildfire Protection Plan in the act.)**

The committee has many advisors including:

USDA Natural Resources Conservation Service (NRCS)
Pima Natural Resources Conservation District (NRCD)
University of Arizona Cooperative Extension, Arizona Firewise Communities
American Institute of Architects (AIA), Southern Arizona Chapter
Steve R. Plevel, consultant

MT. LEMMON FIRE DISTRICT

The fire district has responsibility for fire actions within the district boundary; the district also provides emergency medical services (EMS). The fire responsibilities include wildland fires on private land, wildland fires on national forest land covered by a signed agreement and structure fires within the district or by subscription (Refer to the PREPAREDNESS section for details.) The fire district also provides administrative support to the Firewise Committee.

INSERT the current district organization chart after this page.

The NeighborWise program, administered by the fire district, was designed as an extension of the Summerhaven Firewise Community efforts. The community is broken into sections and neighborhoods to aid in Preparedness, Mitigation, Response and Recovery activities. Each section and neighborhood has a designated leader to provide avenues for communication about the above activities.

INSERT the current Section/Neighborhood map and the leader list after this page.

MOUNT LEMMON DOMESTIC WATER IMPROVEMENT DISTRICT

The water improvement district, successor to the water coop, provides the water and operates the distribution system for fire suppression as well as domestic use. It also distributes information about forest health and wildland-urban interface activities.

PIMA COUNTY

The county has the primary day-to-day jurisdiction over the citizens, private property and private land on the Santa Catalina Mountains. While every county department has some responsibility on the mountain some are more active on a regular basis.

-The Pima Country Sheriff's Department, Rincon District, is responsible for public safety including evacuation and re-entry during and after wildland fires.
-The Office of Emergency Management and Homeland Security assists in preparedness and coordinates county response to emergencies.
-The Transportation Department manages the Mt. Lemmon Highway and most interior roads within Summerhaven.
-Wastewater Management operates the sewer system.

ARIZONA STATE LAND DEPARTMENT

The mission of the State Land Department is to manage State Trust lands and resources to enhance value and optimize economic return for the Trust beneficiaries, consistent with sound stewardship, conservation, and business management principles supporting socioeconomic goals for citizens here today and generations to come. The agency also manages and provides support for resource conservation programs for the well-being of the public and the State's natural environment.

The Fire Management Division provides for the prevention and suppression of wildfires on state and private lands, located outside incorporated municipalities, through the use of cooperative agreements with local fire departments, other state and federal agencies and persons organized to prevent and suppress wildfires. The division also maintains in-house overhead and firefighting capabilities through the qualifications of its own employees.

In addition, the department houses the Office of the State Forester. Activities of this office include providing technical assistance to private landowners and communities on a variety of forestry topics such as: forest management, urban and community forestry, forest health, etc.

USDA FOREST SERVICE, Coronado National Forest, Santa Catalina Ranger District

The Forest Service cooperates with the Mt. Lemmon Fire District and the Arizona State Land Department on wildland-urban interface activities under signed agreements (Refer to the

PREPAREDNESS section for details.) The Santa Catalina Ranger District, Coronado National Forest, is actively involved with the Mt. Lemmon Fire District and the Arizona State Land Department in planning, preparedness, mitigation, response and recovery activities. They also community assistance to individuals, organizations and agencies involved with improving forest health and wildland-urban interface conditions.

The Forest Service has a responsibility to act on wildland fires on national forest lands or on fires on other lands which pose a threat to the national forest. It may assist in some aspects of structural fire suppression but that responsibility lies with state and/or local governments. "Forest Service officials shall avoid giving the appearance that the agency is prepared to serve as a structure fire suppression organization. Forest Service employees shall limit fire suppression actions to exterior structure protection measures as described in [FSM] Section 5137." Refer to the Redbook.

"Forest Service Manual (FSM)-5137 - Structure fires. Structure fire protection activities include suppression of wildfires that are threatening improvements. Exterior structure protection measures include actions such as foam or water application to exterior surfaces of buildings and surrounding fuels, fuel removal, and burning out around buildings."

"FSM-5137.1 - Structure Fire Protection from Advancing Wildfires. The Forest Service's primary responsibility is to suppress wildfire before it reaches structures. The Forest Service may assist state and local departments in exterior structure fire protection when requested under terms of an approved cooperative agreement."

"FSM-5137.2 - Structure Fire Suppression. Structure fire suppression, which includes exterior and interior actions on burning structures, is the responsibility of state, tribal, or local fire departments."

"FSM-5137.3 - Structure Fire Protection and Suppression for Forest Service Facilities. At those Forest Service administrative sites, outside the jurisdiction of state and local fire departments, limit fire protection measures to prevention, use of fire extinguishers on incipient stage fires (FSH 6709.11, Sec. 6-4c), safe evacuation of personnel, containment by exterior attack, and protection of exposed improvements."

"At Forest Service sites located within the jurisdiction of state and local fire departments, structure fire suppression responsibility must be coordinated with state and local fire departments."

"FSM-5137.4 - Vehicle and Dump Fires. Do not undertake direct attack on vehicle or dump fires on National Forest System lands unless such action is absolutely necessary to protect life or prevent the spread of fire to the wildlands."

INSERT a copy of current agreements with other agencies after this page.

SAFETY

Safety is the number one priority in all interface activities. There are many sources for information about safety in forest health and wildland fire activities including agency handbooks and directives and OSHA.

Forest Health Activities: The Forest Service has prepared Job Hazard analyses for activities such as seed gathering, tree planting, thinning, pruning, fuels treatment and disposal. The most recent can be accessed on the web site: **www.fs.fed.us/r1/people/jha/jha_index_www.htm**

Fire: The goal of the fire safety program is to provide direction and guidance for safe and effective management in all activities. The first priority is fire fighter and public safety. Safety comes first on every fire, every time. Safety is the responsibility of everyone assigned to wildland and prescribed fire activities and must be practiced at all operational levels. For details refer to the ***Redbook***, Fireline Handbook and state and federal requirements. The Southwest Area safety web site is a good reference. **www.fs.fed.us/r3/swasafety**

INSERT a list of current reference materials after this page.

CONTACT LISTS

INSERT the names, addresses, telephone, FAX and e-mail address for individuals, organizations and agencies which are involved with forest health and wildland fire after this page.

MONITORING AND EVALUATION

Each activity will need to be monitored for a period of time after it is completed. Periodic evaluations will help to determine the success of the activity or technique and the need for adjustment to future activities.

The Healthy Forests Restoration Act (HFRA) requires the Forest Service to monitor and evaluate the results of a representative sample of authorized hazardous-fuel-reduction projects and submit a report every 5 years. Projects on the Santa Catalina Mountains may or may not be part of the sample. The Forest Service must report accomplishments for all projects using HFRA authority.

PREPAREDNESS

The preparedness phase of emergency management includes the activities, programs and systems that are used to support and enhance the mitigation, response and recovery phases.

References: NFPA 1144 *Standard for Protection of Life and Property from Wildfire, 2002 Edition*.

Information Management: A single place to store information, a GIS system, is needed. This information needs to be in a format useable by the community, Mt. Lemmon Fire District, Pima County, Arizona State Land Department and the US Forest Service. It must use a common datum and be stored in a common format. One entity should maintain and operate the system. Efforts are currently under way to establish the system.

Planning: This plan provides overall guidance, references, Action Schedules, treatment guidelines and prescriptions. Most activities will have specific project plans. **It is necessary to establish the priority for each activity on the Action Schedules.** This should be a joint effort of the Mt. Lemmon Fire District, Pima county, Arizona State Land Department and Forest Service with input form the Firewise Committee, homeowner associations, organizations and interested individuals.

Copies of this plan will be available at: the Mt. Lemmon Fire Station, Forest Service (Santa Catalina Ranger District), Arizona State Land Department, Pima County (Department of Development Services), Summerhaven (location to be determined) and Bear Canyon Branch Library.

Reviews: This plan should be reviewed and updated annually in February. Revise the plan as new information becomes available. **Revise the activity priority as needed.**

Conduct an annual wildland fire preparedness review. This should be a cooperative effort of the Mt. Lemmon Fire District, Arizona State Land Department and the Forest Service. The review should help these agencies to prepare for the up-coming wildland fire season, identify operational, procedural, personnel, or equipment deficiencies and recommend corrective actions. Refer to the ***Redbook*** for some information.

Access: Annually determine the access situation, e.g., identify roads needing brushing/clearing, inspect turn-arounds on dead-end roads for adequacy, etc.

Signage: Annually inspect road, street and structure signs. Are they visible from both directions of travel and readable both during the day and at night? People can contact the fire district for specifications and to report problems. The fire department will work with the Pima County Department of Transportation to ensure good signage.

Water: Availability of water for fire suppression is critical. Annually, in cooperation with the Water District, determine the availability, identify any problems and decide upon mitigation. **Identify the trigger point when it will become necessary to start hauling water from the Tucson area.**

Develop a "Water Hauling Plan" based on the experience obtained during the 2002 Bullock Fire and 2003 Aspen Fire. Identify closest water sources, shortest and safest routes for hauling, pumpkin/storage locations for engines and helicopters, the plumbing system needed and contingencies if some part of the system fails.

PREPAREDNESS
Assessments

Two types of assessments are needed in order to develop a sound forest health and fire management program. One assessment is of the risk to the interface i.e., those occurrences, actions or activities which could cause a problem.

> Risks: Fire risk is the chance of a fire starting from any cause. Common causes of fire within the wildland-urban interface include lightning, inadequate chimney spark arresters, outdoor cooking fires, charcoal grills, improper disposal of fireplace ashes or charcoal, smoking, power lines, propane tanks, smokers, construction welding and structure fires which spread to the wildland.
>
> Forest health risks include the likelihood that an insect or disease buildup will cause significant environmental or economic damage to a stand or forest.

The second assessment is of the hazards and their severity. This assessment is an important tool of community fire management planning. The purpose is to provide information about what problems exist, identify which problems might be mitigated and provide information about response preparation. It also is an important tool for educating home/land owners.

The primary goal of this assessment is to enable structures to lessen the potential for loss and improve the safety for fire fighters and the public. The assessment will also reduce the potential of a structure fire spreading to the wildland.

Generally there are two levels of hazard severity assessment, the community and the individual structure. These are related but have somewhat different uses.

> Hazards: Fire hazard is a fuel complex defined by kind, arrangement, volume, condition and location, that determines the ease of ignition and/or resistance to control. In addition to the natural woody fuel hazard, other hazards include piles of combustible materials such as building materials and firewood around homes and propane tanks. Some homes constitute a hazard due to their construction i.e., wood siding, shake roofs, numerous overhangs and large unenclosed decks.
>
> Forest health hazard is a set of conditions that make a forest stand vulnerable to significant damage (usually tree mortality) as a result of an insect or disease epidemic.

An initial community fire hazard severity assessment of Summerhaven was completed in September 2003. Updates have been occurring since then on a lot-by-lot basis. Annual inspections of individual lots and common areas will be needed to ensure that adequate maintenance is done. An annual Insect and Disease Aerial Survey is done by the Forest Service.

Knowledge of building construction, fire apparatus capabilities, wildland fuels and wildland and structural fire behavior is critical to adequately conduct an assessment and recommend mitigation. The assessment is not just a numerical exercise; it takes professional knowledge and judgement to assign ratings which best reflect the on-the-ground situation. It is important to make notes on the assessment form to explain the reasons for a specific rating.

References which are invaluable in developing and conducting fire hazard severity assessments include:

- NFPA 1144 Standard for Protection of Life and Property from Wildfire, 2002 Edition.
- Wildland/Urban Interface Fire Hazard Assessment Methodology developed by National Wildland/Urban Interface Fire Protection Program.
- Aids to Determining Fuel Models for Estimating Fire Behavior, Hal E. Anderson. April 1982.
- International Urban-Wildland Interface Code, 2003.
- Firewise Communities Workshop Participant Workbook.

INSERT current Fire Hazard Severity Assessment instructions and blank form after this page.

INSERT original and current fire hazard assessment maps after this page.

PREPAREDNESS
Firewise Communities/USA Recognition

Recognition as a Firewise Community gives people the impetus to maintain and improve their situation. The formal recognition process for Summerhaven was started in February 2004. Because the community had been using the Firewise model since 2001 many of the requirements for recognition are already met. This plan should complete the requirements.

Refer to the Arizona State Land Department's Firewise Communities/USA, Arizona Recognition Guide for details about acquiring and maintaining the recognition.

INSERT the application, acceptance letter, renewal applications and acceptance after this page.

PREPAREDNESS
Funding

Funding for fire and forest health activities can come from a variety of sources. Listed below are some sources currently being used.

Taxes: Property tax - Fire District Assistance Tax. These are collected and allocated by Pima County.

Subscriptions: Owners of structures outside but adjacent to the Mt. Lemmon Fire District may pay an annual subscription fee. The fee is due every June 30.

Grants: Several sources for grants are available to the fire district, homeowners associations or other non-profit organizations such as Trees for Mount Lemmon. Many of the programs are under the National Fire Plan umbrella. Most grants require some amount of cost sharing.

State Fire Assistance (SFA) grants are federal money from the Forest Service allocated through the Arizona State Land Department. These monies can be used for programs which focus on hazard fuel reduction, information and education, and community and homeowner action. These grants are available to homeowner groups and others.

Volunteer Fire Assistance (VFA) and Rural Fire Assistance (RFA) grants focus on training, equipping, organizing rural fire departments and fire prevention. VFA grants are from the Forest Service and RFA from the US Department of Interior. Application is made through the Arizona State Land Department.

Information about the previous three programs is available on-line at **www.azstatefire.org** and **www.fs.fed.us/r4/sfa_grants/sfa_documents.html**.

Economic Action Program (EAP) provides technical and financial assistance to develop and expand markets for traditionally underutilized wood products and to expand the utilization of wood removed during hazardous fuel management activities.

The National Forest Foundation provides two types of grants, Community Assistance Program (CAP) and Matching Awards Program (MAP). Information is available on-line at **www.nationalforestfoundation.org**.

Stewardship contracting: Stewardship contracting is a mechanism where the Forest Service enters into an agreement for services with an agency, organization or individual to meet national forest land management goals and meet local and rural community needs. The value of timber or other forest products is applied as an offset against the cost of services received. The application of this

mechanism needs as it applies to the Mt. Lemmon Wildland-urban Interface area needs to be explored.

Donations: The Mt. Lemmon Fire District accepts donations through their Donations Incentive Program to carry out "firewising" homes and hazardous fuel reduction. This program started in April 2003. The release form is in the MITIGATION section.

Trees for Mount Lemmon, organized under the Coronado Resource Conservation District, is a designated 501c(3) organization and accepts tax deductible donations.

Volunteer Labor: Volunteers are the backbone of the labor force and all agencies and organizations use them to complete projects. The Volunteer Center has been used to coordinate volunteer recruitment and assignment.

INSERT details about how to apply for grants, contracts etc. after this page.

PREPAREDNESS
Training and Certification

The National Wildfire Coordinating Group (NWCG) provides national standards and a certification process for wildland fire fighting and prescribed burning which have been adopted by local, state, and federal agencies in Arizona. These standards are found in Wildland and Prescribed Qualification System Guide, PMS 310-1. Annual certification by the Arizona State Land Department. or a federal agency is required for wildland fire fighters. The certification is issued in the form of a "Red Card." Additional information is available in the ***Redbook***.

The wildland standards are in addition to the standards required for structure fire fighting (State Fire Marshal) and emergency medical services (Arizona Department of Health Services).

MITIGATION

Mitigation is action taken to prevent or reduce the severity of threats to human health or the environment. These actions are taken before an epidemic or emergency to lessen the effects. In the case of forest health and wildland fire there is no way to prevent all incidents, the goal is to minimize the impact.

Forest health, defensible space and fuel hazard treatment guidelines/prescriptions are provide based upon the best available information. Access and water availability are critical to fire suppression and must be in place prior to any incident; minimum specifications are provided. An information, education and prevention program will help reduce the risks and the hazards which contribute to threats to human health and the environment.

MITIGATION
Guidelines and Prescriptions

The following guidelines and prescriptions are to aid agencies, organizations and individuals in creating a healthy forest cover and a Firewise community.

The **Forest Treatment Prescriptions** are designed to meet forest health and Firewise goals. There is a prescription for each of the biotic communities, i.e., for the ponderosa pine forest, the mixed conifer forest and the riparian forest.

The **Treatment for Insect Infestations** provides information about how to recognize an infestation and suggested treatments.

Defensible Space Guidelines are found in the following handouts. A copy may be obtained from the Mt. Lemmon Fire District.

-*"It Can't Happen To My Home!",* Mt. Lemmon Fire District.
-*Building A FIREWISE Community On Mt. Lemmon,* Mt. Lemmon Fire District.
-*Will It Survive Embers,* Mt. Lemmon Fire District.
-*Creating Wildfire-Defensible Spaces for Your Home and Property,* Arizona Firewise Communities publication AZ1290.
-*Homeowners' "Inside and Out" Wildfire Checklist,* Arizona Firewise Communities publication AZ1288.
-*Living With Fire,* Southwest Area Coordinating Group.
-*Pine Needle Raking Practice,* Arizona State Land Department.
-*Fire-Resistant Landscaping,* Arizona Firewise Communities publication AZ1291.

INSERT current prescriptions after this page.

INSERT copies of relevant publications after the prescriptions.

MITIGATION
Access

The desirable minimum specifications are:

-Width: 20 feet.
-Height clearance: 13.5 feet.
-Grade: maximum of 10 percent.
-Driveway length: maximum of 150 feet.
-Turnaround: At least 10 feet by 30 feet. Located at the end of any street or driveway more than 150 feet long.

Water System

The desirable minimum specifications are:

(To be written.)

MITIGATION
Information, Education and Prevention

The purpose of the information, education and prevention program is to gather and share information about recovery (reforestation and erosion control), create a healthy forest and prevent catastrophic wildland fire as well as to promote public safety. The target audiences are landowners, residents, designers, contractors, organizations and visitors . It is important to contact people as they move into the community. The primary providers will be the Mt. Lemmon Fire District, Arizona State Land Department, Forest Service and Trees for Mount Lemmon.

The Arizona State Land Department, the Mt. Lemmon Fire District, and the Forest Service provide prevention information and conduct preventions activities. The Firewise program provides the basis and overall theme for wildland-urban interface fire prevention activities. Existing agency fire prevention programs will be used as a vehicle to inform and educate. The fire district needs to develop a combined structure and wildland fire prevention effort within the interface. Trees For Mount Lemmon and the Forest Service will lead forest restoration and health efforts. The Arizona Firewise Communities program at the University of Arizona Cooperative Extension is a major source of assistance in developing and implementing information and education activities.

Some activities will occur year-round while others will focus on fire season, planting seasons, etc. People must be contacted where they live and where they visit. Methods will vary with the target audience, time of year, message to be presented and location for presenting the message. It is critical to make sure that the messages being presented are consistent.

Refer to the MITIGATION ACTION SCHEDULE for a complete list of projects and activities currently scheduled.

Messages: The messages to be presented are:

-Creating a healthy forest requires some action. The burned area needs to be revegetated. The unburned or partially burned needs to be thinned and have the fuel loading reduced.
-The forest will recover but it will take time.
-Wildland fire is an integral component of all the biotic communities in the interface.
-Be careful with fire, an escaped fire at the wrong time could be catastrophic.

Some of the methods to be used in informing and educating include:

Personal Contact:

Conduct an annual Firewise workshop to inform people. The workshop should address: the basics for new residents, a refresher for current residents and new information available.

Conduct periodic meetings and workshops to inform people about specific items.

NeighborWise Program: Neighborhood leaders make periodic contacts with the landowners within their neighborhood to share the latest forest health and Firewise information.

Publications:

Current newsletters being distributed include:

- the Mt. Lemmon Echoes published monthly by the Mt. Lemmon Homeowners' Association; mailed to members.
-the Loma Sabino Homeowners' Newsletter periodically sent to association members.
-the Willow Canyon Homeowners' Newsletter periodically sent to homeowners within the Willow Canyon Recreation Residence tract.
-News From the Mountain published by Rose Mary Hinsch; mailed to interested people and posted on the "mtlemmoncabin" web site.

Brochures being published by the Mt. Lemmon Fire District are:

-It Can't Happen To My Home! Are You Sure!
-Will It Survive Embers

Web sites which provide information about the recovery, forest health and wildland fire, with links to other forest health and wildland fire sites, are:

-Mt. Lemmon Community: **www.mtlemmoncabin.com** (this site is also accessed through www.summerhavenfire.com).
-Pima County: **www.aspenfirercovery.org**.
-Trees for Mount Lemmon: **www.treesformountlemmon**.
-Forest Service: **www.fs.fed.us/r3/fire/, www.fs.fed.us/r3/coronado/scrd/**.
-Firewise: **www.firewise.org/, www.firewise.org/communities/, www.firewise.org/usa/**.

Signs: A variety of permanent and temporary/seasonal signs can be used.

INSERT copies of examples of current publications after this page for reference.

RESPONSE

Response includes those immediate activities and programs which address the short term effects at the on-set of an emergency or disaster. It includes efforts to minimize the risk created by the emergency by protecting people, property and the environment and the efforts to return the situation to normal pre-emergency conditions.

Response details are described in standard agency operating procedures and agreements between the Mt. Lemmon Fire District, the Arizona State Land Department and the Forest Service. Refer to these documents for specifics. Refer to the ORGANIZATIONS section for copies of agreements.

INSERT list of current applicable documents after this page.

RESPONSE
Response Resources

Organizations involved in response to wildland fires within the Mt. Lemmon Wildland-Urban Interface Area include:

-Mt. Lemmon Fire District
-Forest Service (based at Palisades Work Center)
-Pima County Sheriff's Department
-Pima County Office of Emergency Management and Homeland Security
-Pima County, various departments

Resources: The following lists includes only those resources available for initial attack on Mt. Lemmon. Resources needed for extended attack will be requested through the Arizona State Land Department and the Southeast Zone.

INSERT lists of initial attack resources after this page.

RESPONSE
Detection and Reporting

Fire: Fires will normally be reported through the 911 system. There is a 911 phone outside the fire station. Some fires may be reported through the Southeast Zone Coordination Center from Lemmon Rock Lookout. A report can be made to the on-duty personnel at the fire station.

A standard reporting procedure for the public is posted at the fire station 911 phone and has been distributed to residences and businesses. The 911 call goes to the Pima County Sheriff's Department, then to Drexel Heights fire dispatcher, then to the Mt. Lemmon Fire District. The Southeast Zone needs to be notified if a fire is on national forest land; normally this will be done by the Drexel Heights fire dispatcher.

Notify the Pima County Office of Emergency Management of any fire with potential to damage multiple structures, require evacuation and/or county assistance.

Forest Health Problems: Annual detection flights are made of the state by the Forest Service. Results are reported to the Arizona State Land Department.

INSERT copies of Mt. Lemmon Fire District emergency reporting procedure sheets after this page.

RESPONSE
Response Activities

Only response activities for wildland fire are covered here. Refer to the MITIGATION section for response to insects and diseases.

Incident Management System: The NWCG Incident Command System is used by all the agencies responsible for wildland fire management within the Mt. Lemmon Wildland-Urban Interface Area. The Mt. Lemmon Fire District is organized to respond to EMS, structure fire and wildland fire incidents. In cooperation with the Arizona State Land Department a "structure protection organization" that can be melded into a large fire incident should be developed.

In the event of an incident close coordination is necessary between the Forest Service, Arizona State Land Department, Pima County Sheriff's Department, Pima County Office of Emergency and Homeland Security and other Pima County agencies.

Support for fire incidents is obtained through the Arizona State Land Department, Southeast Zone Coordination Center and the Pima County Office of Emergency Management and Homeland Security.

Wildland Fire Situation Analysis: The Mt. Lemmon Fire District, with the assistance of the Arizona State Land Department and the Forest Service will prepare a generic WFSA for the community so it will be prepared to work closely with the Forest Service in the event of a common threat.

Appropriate Management Response: The appropriate management response to a wildland fire will depend upon risk to fire fighters, risk to public health and safety, land and resource management objectives, weather, fuel conditions, threats and values to be protected, availability of resources, and cost efficiencies. **The Mt. Lemmon Fire District Structure Protection Plan describes the structure triage process.**

Wildland fires within and immediately adjacent to the community will be suppressed as quickly as possible.

Evacuation: The Pima County Sheriff's Department has the legal responsibility for evacuation. Refer to the Evacuation Plan which is reviewed annually. Due to the remoteness of the community Mt. Lemmon Fire District may initiate evacuation. Forest Service and Steward Observatory personnel may also be involved. Notification will be through the siren system and door-to-door contacts.

Once evacuation is complete provide information to residents and landowners about available support including shelter locations, process for receiving information and re-entry procedure will be provided.

Information Dissemination: Because of recent experience during the Bullock and Aspen Fires, the community needs to be prepared to designate an Information Officer (IOF) for any wildland fire. The Tucson media, community landowners, residents and people in Tucson will be interested in every incident. Any insect or disease out-breaks which kill groups of trees may draw similar attention.

Weather: Check the fire weather forecast at least daily. Adjust staffing accordingly.

Continuity of Operations: The fire district needs to be prepared to continue operations in the event the fire station is unavailable.

INSERT a copy of forms and checklists used in initial attack after this page.

RECOVERY

The recovery phase of emergency management includes those long-term activities and programs beyond the initial crisis period of an emergency or disaster designed to return all systems to normal status or to reconstitute these systems to a new condition that is less vulnerable. The work done during recovery is closely linked to mitigation activities.

The goal for the Mt. Lemmon Wildland-Urban Interface Area is to create a healthy forest which is less prone to catastrophic wildland fire.

After any fire the need for rehabilitation should be assessed. After larger fires on national forest land a Burned Area Emergency Response (BAER) Team will complete the assessment. The focus of this assessment is on the need to prevent immediate damage to life, property or resources. Work can then be done to mitigate these immediate needs. There will also be a need to monitor and evaluate the effectiveness of treatments. The work done during and after the Aspen Fire provides a good recovery process model to follow.

Clean-up/Hazard Tree Removal: The Forest Service can remove hazard trees on national forest land. Pima County is responsible for road rights-of-way and county facilities. They can assist on private land with immediate needs. Private land owners are responsible for clean-up on their property, however, the Mt. Lemmon Fire District has developed several programs to assist.

Revegetation and Erosion Control: The USDA National Resources Conservation Service (NRCS) and Pima County Flood Control District will provide advice and assistance for emergency rehabilitation activities such as grass seeding and soil erosion control. There are several structural measures which can be used for erosion control in addition to revegetation. The agencies may provide some funding for immediate work, however, longer term activities will require other sources of funding.

Reforestation: Trees for Mount Lemmon and the Forest Service have developed lists of native tree, shrub and other species which are recommended as well as those which are invasives and should be avoided. The Firewise program recommends using non-flammable species if possible. Trees for Mount Lemmon will provide free trees to private landowners; a workshop about proper planting technique and plant care will be required of everyone wanting plants.

Reconstruction: Pima County has the lead responsibility for ensuring that reconstruction of structures and roads meet current standards and that any reconstruction will not cause an increased potential for loss from future fires.

INSERT copies of current publications about short term and long term recovery activities after this page. A copy of the publications can be obtained from the Mt. Lemmon Fire District.

ACRONYMS

ASLD	Arizona State Land Department
BA	Basal Area-standard forestry measurement of stand density
BLM	Bureau of Land Management, USDI
CWPP	Community Wildfire Protection Plan
DBH	Diameter Breast Height-standard forestry measurement of tree diameter at 4.5 feet above the ground
GIS	Geographic Information System
HFRA	Healthy Forests Restoration Act (Public Law 108-148)
IA	Initial Attack (on a fire)
ML	Mt. Lemmon
MLFD	Mt. Lemmon Fire District
NWCG	National Wildfire Coordinating Group
PCSD	Pima County Sheriff's Department
T4ML	Trees for Mount Lemmon
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USFS	United States Forest Service, USDA
WUI	Wildland-Urban Interface

Definitions

Appropriate Management Response - Specific actions taken in response to a wildland fire to implement protection and fire use objectives.

Aerial Fuels - All live and dead vegetation in the forest canopy or above surface fuels, including tree branches, twigs and cones, snags, moss, and high brush.

Aerial Ignition - Ignition of fuels by dropping incendiary devices or materials from aircraft.

Air Tanker - A fixed-wing aircraft equipped to drop fire retardants or suppressants.

Agency - Any federal, state, or county government organization participating with jurisdictional responsibilities.

Aramid - The generic name for a high-strength, flame-resistant synthetic fabric used in the shirts and jeans of firefighters. Nomex, a brand name for aramid fabric, is the term commonly used by firefighters.

Backfire - A fire set along the inner edge of a fireline to consume the fuel in the path of a wildfire and/or change the direction of force of the fire's convection column.

Blow-up - A sudden increase in fire intensity or rate of spread, which strong enough to prevent direct control or to upset control plans. Blow-ups are often accompanied by violent convection and may have other characteristics of a firestorm. (See Flare-up.)

Brush - A collective term that refers to stands of vegetation dominated by shrubby, woody plants, or low growing trees, usually of a type undesirable for livestock or timber management.

Burn Out - Setting fire inside a control line to widen it or consume fuel between the edge of the fire and the control line.

Burning Conditions - The state of the combined factors of the environment that affect fire behavior in a specified fuel type.

Burning Index -An estimate of the potential difficulty of fire containment as it relates to the flame length at the most rapidly spreading portion of a fire's perimeter.

Burning Period - That part of each 24-hour period when fires spread most rapidly, typically from 10:00 a.m. to sundown.

Campfire - As used to classify the cause of a wildland fire, a fire that was started for cooking or warming that spreads sufficiently from its source to require action by a fire control agency.

Closure - Legal restriction, but not necessarily elimination of specified activities such as smoking, camping, or entry that might cause fires in a given area.

Cold Front - The leading edge of a relatively cold air mass that displaces warmer air. The heavier cold air may cause some of the warm air to be lifted. If the lifted air contains enough moisture, the result may be cloudiness, precipitation, and thunderstorms. If both air masses are dry, no clouds may form. Following the passage of a cold front in the Northern Hemisphere, westerly or northwesterly winds of 15 to 30 or more miles per hour often continue for 12 to 24 hours.

Command Staff - The command staff consists of the information officer, safety officer and liaison officer. They report directly to the incident commander and may have assistants.

Complex - Two or more individual incidents located in the same general area, which are assigned to a single incident commander or unified command.

Confine - Confinement is a wildland fire management strategy employed as an appropriate management response where a fire perimeter is managed by a combination of direct and indirect actions and use of natural topographic features, fuel and weather factors.

Contain a fire - A fuel break around the fire has been completed. This break may include natural barriers or manually and/or mechanically constructed line.

Control a fire - The complete extinguishment of a fire, including spot fires. Fireline has been strengthened so that flare-ups from within the perimeter of the fire will not break through this line.

Control Line - All built or natural fire barriers and treated fire edge used to control a fire.

Cooperating Agency - An agency supplying assistance other than direct suppression, rescue, support, or service functions to the incident control effort; e.g., Red Cross, law enforcement agency, telephone company, etc.

Coordination Center: A facility from which resources are directly assigned to an incident. And, coordination between agencies occurs.

Creeping Fire - Fire burning with a low flame and spreading slowly.

Crew Boss - A person who supervises between 16 to 21 firefighters and is responsible for their performance, safety, and welfare.

Crown Fire (Crowning) - The movement of fire through the crowns of trees or shrubs more or less independently of the surface fire.

Curing - Drying and browning of herbaceous vegetation or slash.

Dead Fuels - Fuels with no living tissue in which moisture content is governed almost entirely by atmospheric moisture (relative humidity and precipitation), dry-bulb temperature, and solar radiation.

Debris Burning - A fire spreading from any fire originally set for the purpose of clearing land or for rubbish, garbage, range, stubble, or meadow burning.

Defensible Space - An area either natural or made by humans where material capable of causing a fire to spread has been treated, cleared, reduced, or changed to act as a barrier between an advancing wildland fire and the loss to life, property, or resources. In practice, "defensible space" is defined as an area a minimum of 30 feet around a structure that is cleared of flammable brush or vegetation.

Direct Attack - Any treatment of burning fuel, such as by wetting, smothering, or chemically quenching the fire or by physically separating burning from unburned fuel.

Dispatch - The implementation of a command decision to move a resource or resources from one place to another.

Dispatcher - A person employed who receives reports of discovery and status of fires, confirms their locations, takes action promptly to provide people and equipment likely to be needed for control in first attack, and sends them to the proper place.

Division - Divisions are used to divide an incident into geographical areas of operation. Divisions are established when the number of resources exceeds the span-of-control of the operations chief. A division is located with the Incident Command System organization between the branch and the task force/strike team.

Drip Torch - Hand-held device for igniting fires by dripping flaming liquid fuel on the materials to be burned; consists of a fuel fount, burner arm, and igniter. Fuel used is generally a mixture of diesel and gasoline.

Drought Index - A number representing net effect of evaporation, transpiration, and precipitation in producing cumulative moisture depletion in deep duff or upper soil layers.

Dry Lightning Storm - Thunderstorm in which negligible precipitation reaches the ground. Also called a dry storm.

Duff - The layer of decomposing organic materials lying below the litter layer of freshly fallen twigs, needles, and leaves and immediately above the mineral soil.

Energy Release Component (ERC) - The computed total heat released per unit area (British thermal units per square foot) within the fire front at the head of a moving fire.

Engine - Any ground vehicle providing specified levels of pumping, water and hose capacity.

Engine Crew - Firefighters assigned to an engine. The Fireline Handbook defines the minimum crew makeup by engine type.

Equilibrium Moisture Content - Moisture content that a fuel particle will attain if exposed for an infinite period in an environment of specified constant temperature and humidity. When a fuel particle reaches equilibrium moisture content, net exchange of moisture between it and the environment is zero.

Escape Route - A preplanned and understood route firefighters take to move to a safety zone or other low-risk area, such as an already burned area, previously constructed safety area, a meadow that won't burn, natural rocky area that is large enough to take refuge without being burned. When escape routes deviate from a defined physical path, they should be clearly marked (flagged).

Escaped Fire - A fire, which has exceeded or is expected to exceed initial attack capabilities or prescription.

Extended Attack Incident - A wildland fire that has not been contained or controlled by initial attack forces and for which more firefighting resources are arriving, en route, or being ordered by the initial attack incident commander.

Extreme Fire Behavior - "Extreme" implies a level of fire behavior characteristics that ordinarily precludes methods of direct control action. One of more of the following is usually involved: high rate of spread, prolific crowning and/or spotting, presence of fire whirls, strong convection column. Predictability is difficult because such fires often exercise some degree of influence on their environment and behaves erratically, sometimes dangerously.

Fire-Adapted Ecosystem - Ecosystems exhibiting successional evolution and plant associations that are both tolerant of and dependent upon the occurrence of frequent, low-intensity fires. Under historical cycles of fire occurrence, these systems are stable and sustainable.

Fire Behavior - The manner in which a fire reacts to the influences of fuel, weather and topography.

Fire Behavior Forecast - Prediction of probable fire behavior, usually prepared by a Fire Behavior Officer, in support of fire suppression or prescribed burning operations.

Fire Behavior Specialist - A person responsible to the Planning Section Chief for establishing a weather data collection system and for developing fire behavior predictions based on fire history,

fuel, weather and topography.

Fire Cache - A supply of fire tools and equipment assembled in planned quantities or standard units at a strategic point for exclusive use in fire suppression.

Fire Crew - An organized group of firefighters under the leadership of a crew leader or other designated official.

Fire Cycle - The historical or desired range (frequency) of fire disturbances over time necessary to the stability and sustainability of a given ecosystem. Synonymous with "Recurrence Interval" and "Return Interval."

Fire Intensity - A general term relating to the heat energy released by a fire.

Fire Line - A linear fire barrier that is scraped or dug to mineral soil.

Fire Management Plan (FMP) - A strategic plan that defines a program to manage wildland and prescribed fires and documents the Fire Management Program in the approved land use plan. The plan is supplemented by operational plans such as preparedness plans, preplanned dispatch plans, prescribed fire plans, and prevention plans.

Fire Regime - The total pattern of fires in vegetation, over time, characteristic of an ecosystem. Variables, which lead to the formation of a “natural” fire regime, include ignition sources (human, lightning), fire intensity and behavior, size of burn, recurrence (or return) intervals and ecological effects. An "altered" fire regime is different from the "natural" regime due to fuel and vegetation changes (which could have been caused by long-term changes in climate or human activities, including fire exclusion) and likewise displays a distinct pattern of fire intensity, behavior, size, recurrence and ecological effects.

Fire Season - 1) Period(s) of the year during which wildland fires are likely to occur, spread, and affect resource values sufficient to warrant organized fire management activities. 2) A legally enacted time during which burning activities are regulated by state or local authority.

Fire Shelter - An aluminized tent offering protection by means of reflecting radiant heat and providing a volume of breathable air in a fire entrapment situation. Fire shelters should only be used in life-threatening situations, as a last resort.

Fire Shelter Deployment - The removing of a fire shelter from its case and using it as protection against fire.

Fire Use - The combination of wildland fire use and prescribed fire application to meet resource objectives.

Fire Use Module (Prescribed Fire Module) - A team of skilled and mobile personnel dedicated primarily to prescribed fire management. These are national and interagency resources, available throughout the prescribed fire season, that can ignite, hold and monitor prescribed fires.

Fire Weather - Weather conditions that influence fire ignition, behavior and suppression.

Firefighting Resources - All people and major items of equipment that can or potentially could be assigned to fires.

Flame Length - The distance between the flame tip and the midpoint of the flame depth at the base of the flame (generally the ground surface); an indicator of fire intensity.

Fuel Bed - An array of fuels usually constructed with specific loading, depth and particle size to meet experimental requirements; also, commonly used to describe the fuel composition in natural settings.

Fuel Loading - The amount of fuel present expressed quantitatively in terms of weight of fuel per unit area.

Fuel Model - Simulated fuel complex (or combination of vegetation types) for which all fuel descriptors required for the solution of a mathematical rate of spread model have been specified.

Fuel Moisture (Fuel Moisture Content) - The quantity of moisture in fuel expressed as a percentage of the weight when thoroughly dried at 212 degrees Fahrenheit.

Fuel Reduction - Manipulation, including combustion, or removal of fuels to reduce the likelihood of ignition and/or to lessen potential damage and resistance to control.

Fuels Treatment - Manipulation or reduction of the amount and/or configuration of vegetation to meet Forest protection and management objectives while preserving and enhancing environmental quality.

Fuel Type - An identifiable association of fuel elements of a distinctive plant species, form, size, arrangement, or other characteristics that will cause a predictable rate of fire spread or difficulty of control under specified weather conditions.

Fusee: A colored flare designed as a railway warning device and widely used to ignite suppression and prescription fires.

Geographic Area - A political boundary designated by the wildland fire protection agencies, where these agencies work together in the coordination and effective utilization

Ground Fuel - All combustible materials below the surface litter, including duff, tree or shrub roots, punchy wood, peat, and sawdust, that normally support a glowing combustion without

flame.

Haines Index - An atmospheric index used to indicate the potential for wildfire growth by measuring the stability and dryness of the air over a fire.

Hand Line - A fireline built with hand tools.

Hazard Reduction - Any treatment of a hazard that reduces the threat of ignition and fire intensity or rate of spread.

Helitack - The use of helicopters to transport crews, equipment, and fire retardants or suppressants to the fire line during the initial stages of a fire.

Helitack Crew - A group of firefighters trained in the technical and logistical use of helicopters for fire suppression.

Holding Actions - Planned actions required to achieve wildland prescribed fire management objectives. These actions have specific implementation timeframes for fire use actions but can have less sensitive implementation demands for suppression actions.

Holding Resources - Firefighting personnel and equipment assigned to do all required fire suppression work following fireline construction but generally not including extensive mop-up.

Hose Lay - Arrangement of connected lengths of fire hose and accessories on the ground, beginning at the first pumping unit and ending at the point of water delivery.

Hotshot Crew - A highly trained fire crew used mainly to build fireline by hand.

Incident - A human-caused or natural occurrence, such as wildland fire, that requires emergency service action to prevent or reduce the loss of life or damage to property or natural resources.

Incident Action Plan (IAP) - Contains objectives reflecting the overall incident strategy and specific tactical actions and supporting information for the next operational period. The plan may be oral or written. When written, the plan may have a number of attachments, including: incident objectives, organization assignment list, division assignment, incident radio communication plan, medical plan, traffic plan, safety plan, and incident map.

Incident Command Post (ICP) - Location at which primary command functions are executed. The ICP may be co-located with the incident base or other incident facilities.

Incident Command System (ICS) - The combination of facilities, equipment, personnel, procedure and communications operating within a common organizational structure, with responsibility for the management of assigned resources to effectively accomplish stated

objectives pertaining to an incident.

Incident Commander - Individual responsible for the management of all incident operations at the incident site.

Incident Management Team - The incident commander and appropriate general or command staff personnel assigned to manage an incident.

Incident Objectives - Statements of guidance and direction necessary for selection of appropriate strategy(ies), and the tactical direction of resources. Incident objectives are based on realistic expectations of what can be accomplished when all allocated resources have been effectively deployed.

Initial Attack - The actions taken by the first resources to arrive at a wildfire to protect lives and property, and prevent further extension of the fire.

Job Hazard Analysis - The analysis of a project is completed by staff to identify hazards to employees and the public. It identifies hazards, corrective actions and the required safety equipment to ensure public and employee safety.

Keech Byram Drought Index (KBDI): Commonly-used drought index adapted for fire management applications, with a numerical range from 0 (no moisture deficiency) to 800 (maximum drought).

Ladder Fuels - Fuels which provide vertical continuity between strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease. They help initiate and assure the continuation of crowning.

Light (Fine) Fuels - Fast-drying fuels, generally with a comparatively high surface area-to-volume ratio, which are less than 1/4-inch in diameter and have a timelag of one hour or less. These fuels readily ignite and are rapidly consumed by fire when dry.

Lightning Activity Level (LAL) - A number, on a scale of 1 to 6, that reflects frequency and character of cloud-to-ground lightning. The scale is exponential, based on powers of 2 (i.e., LAL 3 indicates twice the lightning of LAL 2).
Line Scout: A firefighter who determines the location of a fire line.

Live Fuels - Living plants, such as trees, grasses, and shrubs, in which the seasonal moisture content cycle is controlled largely by internal physiological mechanisms, rather than by external weather influences.

Micro-Remote Environmental Monitoring System (Micro-REMS) - Mobile weather monitoring station. A Micro-REMS usually accompanies an incident meteorologist and ATMU to

an incident.

Mineral Soil - Soil layers below the predominantly organic horizons; soil with little combustible material.

Mobilization - The process and procedures used by all organizations, federal, state and local for activating, assembling, and transporting all resources that have been requested to respond to or support an incident.

Modular Airborne Firefighting System (MAFFS) - A manufactured unit consisting of five interconnecting tanks, a control pallet, and a nozzle pallet, with a capacity of 3,000 gallons, designed to be rapidly mounted inside an unmodified C-130 (Hercules) cargo aircraft for use in dropping retardant on wildland fires.

Mop-up - To make a fire safe or reduce residual smoke after the fire has been controlled by extinguishing or removing burning material along or near the control line, felling snags, or moving logs so they won't roll downhill.

Multi-Agency Coordination (MAC) - A generalized term which describes the functions and activities of representatives of involved agencies and/or jurisdictions who come together to make decisions regarding the prioritizing of incidents, and the sharing and use of critical resources. The MAC organization is not a part of the on-scene ICS and is not involved in developing incident strategy or tactics.

Mutual Aid Agreement – A written agreement between agencies and/or jurisdictions in which they agree to assist one another upon request, by furnishing personnel and equipment.

National Environmental Policy Act (NEPA) - NEPA is the basic national law for protection of the environment, passed by Congress in 1969. It sets policy and procedures for environmental protection, and authorizes Environmental Impact Statements and Environmental Assessments to be used as analytical tools to help federal managers make decisions.

National Fire Danger Rating System (NFDRS) - A uniform fire danger rating system that focuses on the environmental factors that control the moisture content of fuels.

National Wildfire Coordinating Group - A group formed under the direction of the Secretaries of Agriculture and the Interior and comprised of representatives of the U.S. Forest Service, Bureau of Land Management, Bureau of Indian Affairs, National Park Service, U.S. Fish and Wildlife Service and Association of State Foresters. The group's purpose is to facilitate coordination and effectiveness of wildland fire activities and provide a forum to discuss, recommend action, or resolve issues and problems of substantive nature. NWCG is the certifying body for all courses in the National Fire Curriculum.

Nomex ® - Trade name for a fire resistant synthetic material used in the manufacturing of flight suits and pants and shirts used by firefighters (see Aramid).

Normal Fire Season - 1) A season when weather, fire danger, and number and distribution of fires are about average. 2) Period of the year that normally comprises the fire season.

Operations Branch Director - Person under the direction of the operations section chief who is responsible for implementing that portion of the incident action plan appropriate to the branch.

Operational Period - The period of time scheduled for execution of a given set of tactical actions as specified in the Incident Action Plan. Operational periods can be of various lengths, although usually not more than 24 hours.

Overhead - People assigned to supervisory positions, including incident commanders, command staff, general staff, directors, supervisors, and unit leaders.

Pack Test - Used to determine the aerobic capacity of fire suppression and support personnel and assign physical fitness scores. The test consists of walking a specified distance, with or without a weighted pack, in a predetermined period of time, with altitude corrections.
Peak Fire Season - That period of the fire season during which fires are expected to ignite most readily, to burn with greater than average intensity, and to create damages at an unacceptable level.

Personnel Protective Equipment (PPE) - All firefighting personnel must be equipped with proper equipment and clothing in order to mitigate the risk of injury from, or exposure to, hazardous conditions encountered while working. PPE includes, but is not limited to: 8-inch high-laced leather boots with lug soles, fire shelter, hard hat with chin strap, goggles, ear plugs, aramid shirts and trousers, leather gloves and individual first aid kits.

Preparedness - Condition or degree of being ready to cope with a potential fire situation

Prescribed Fire - Any fire ignited by management actions to meet specific objectives. Prior to ignition, a written, approved prescribed fire plan must exist and NEPA requirements must be met.

Prescribed Fire Plan (Burn Plan) - This document provides the prescribed fire burn boss information needed to implement an individual prescribed fire project.

Prescription - Measurable criteria that define conditions under which a prescribed fire may be ignited, guide selection of appropriate management responses, and indicate other required actions. Prescription criteria may include safety, economic, public health, environmental, geographic, administrative, social, or legal considerations.

Prevention - Activities directed at reducing the incidence of fires, including public education, law enforcement, personal contact, and reduction of fuel hazards.

Project Fire - A fire of such size or complexity that a large organization and prolonged activity is required to suppress it.

Pulaski - A combination chopping and trenching tool, which combines a single-bitted axe-blade with a narrow adze-like trenching blade fitted to a straight handle. Useful for grubbing or trenching in duff and matted roots. Well-balanced for chopping.

Rappelling - Technique of landing specifically trained firefighters from hovering helicopters; involves sliding down ropes with the aid of friction-producing devices.

Rate of Spread - The relative activity of a fire in extending its horizontal dimensions. It is expressed as a rate of increase of the total perimeter of the fire, as rate of forward spread of the fire front, or as rate of increase in area, depending on the intended use of the information. Usually it is expressed in chains or acres per hour for a specific period in the fire's history.

Reburn - The burning of an area that has been previously burned but that contains flammable fuel that ignites when burning conditions are more favorable; an area that has reburned.

Red Card - Fire qualification card issued to fire rated persons showing their training needs and their qualifications to fill specified fire suppression and support positions in a large fire suppression or incident organization.

Red Flag Warning - Term used by fire weather forecasters to alert forecast users to an ongoing or imminent critical fire weather pattern.

Rehabilitation - The activities necessary to repair damage or disturbance caused by wildland fires or the fire suppression activity.

Relative Humidity (Rh) - The ratio of the amount of moisture in the air, to the maximum amount of moisture that air would contain if it were saturated. The ratio of the actual vapor pressure to the saturated vapor pressure.

Remote Automatic Weather Station (RAWS) - An apparatus that automatically acquires, processes, and stores local weather data for later transmission to the GOES Satellite, from which the data is re-transmitted to an earth-receiving station for use in the National Fire Danger Rating System.

Resources - 1) Personnel, equipment, services and supplies available, or potentially available, for assignment to incidents. 2) The natural resources of an area, such as timber, crass, watershed values, recreation values, and wildlife habitat.

Resource Management Plan (RMP): A document prepared by field office staff with public

participation and approved by field office managers that provides general guidance and direction for land management activities at a field office. The RMP identifies the need for fire in a particular area and for a specific benefit.

Resource Order - An order placed for firefighting or support resources.

Retardant - A substance or chemical agent, which reduced the flammability of combustibles.

Safety Zone - An area cleared of flammable materials used for escape in the event the line is outflanked or in case a spot fire causes fuels outside the control line to render the line unsafe. In firing operations, crews progress so as to maintain a safety zone close at hand allowing the fuels inside the control line to be consumed before going ahead. Safety zones may also be constructed as integral parts of fuel breaks; they are greatly enlarged areas, which can be used with relative safety by firefighters and their equipment in the event of a blowup in the vicinity.

Scratch Line - An unfinished preliminary fire line hastily established or built as an emergency measure to check the spread of fire.

Severity Funding - Funds provided to increase wildland fire suppression response capability necessitated by abnormal weather patterns, extended drought, or other events causing abnormal increase in the fire potential and/or danger.

Single Resource - An individual, a piece of equipment and its personnel complement, or a crew or team of individuals with an identified work supervisor that can be used on an incident.

Size-up – A term used to evaluate a fire to determine a course of action for fire suppression.

Slash - Debris left after logging, pruning, thinning or brush cutting; includes logs, chips, bark, branches, stumps and broken understory trees or brush.

Sling Load - Any cargo carried beneath a helicopter and attached by a lead line and swivel.

Slop-over - A fire edge that crosses a control line or natural barrier intended to contain the fire.

Smokejumper - A firefighter who travels to fires by aircraft and parachute.

Smoke Management - Application of fire intensities and meteorological processes to minimize degradation of air quality during prescribed fires.

Smoldering Fire - A fire burning without flame and barely spreading.

Snag - A standing dead tree or part of a dead tree from which at least the smaller branches have fallen.

Spark Arrester - A device installed in a chimney, flue, or exhaust pipe to stop the emission of sparks and burning fragments.

Spot Fire - A fire ignited outside the perimeter of the main fire by flying sparks or embers.

Spot Weather Forecast - A special forecast issued to fit the time, topography, and weather of each specific fire. These forecasts are issued upon request of the user agency and are more detailed, timely, and specific than zone forecasts.

Spotting - Behavior of a fire producing sparks or embers that are carried by the wind and start new fires beyond the zone of direct ignition by the main fire.

Staging Area - Locations set up at an incident where resources can be placed while

Strategy - The science and art of command as applied to the overall planning and conduct of an incident.

Suppression - All the work of extinguishing or containing a fire, beginning with its discovery.

Surface Fuels - Loose surface litter on the soil surface, normally consisting of fallen leaves or needles, twigs, bark, cones, and small branches that have not yet decayed enough to lose their identity; also grasses, forbs, low and medium shrubs, tree seedlings, heavier branchwood, downed logs, and stumps interspersed with or partially replacing the litter.

Tactics - Deploying and directing resources on an incident to accomplish the objectives designated by strategy.

Temporary Flight Restrictions (TFR) - A restriction requested by an agency and put into effect by the Federal Aviation Administration in the vicinity of an incident, which restricts the operation of nonessential aircraft in the airspace around that incident.

Terra Torch ® - Device for throwing a stream of flaming liquid, used to facilitate rapid ignition during burn out operations on a wildland fire or during a prescribed fire operation.

Test Fire - A small fire ignited within the planned burn unit to determine the characteristic of the prescribed fire, such as fire behavior, detection performance and control measures.

Timelag - Time needed under specified conditions for a fuel particle to lose about 63 percent of the difference between its initial moisture content and its equilibrium moisture content. If conditions remain unchanged, a fuel will reach 95 percent of its equilibrium moisture content after four timelag periods.

Torching - The ignition and flare-up of a tree or small group of trees, usually from bottom to top.

Type - The capability of a firefighting resource in comparison to another type. Type 1 usually means a greater capability due to power, size, or capacity.

Uncontrolled Fire - Any fire which threatens to destroy life, property, or natural resources.

Underburn - A fire that consumes surface fuels but not trees or shrubs. (See Surface Fuels.)

Water Tender - A ground vehicle capable of transporting specified quantities of water.

Weather Information and Management System (WIMS) - An interactive computer system designed to accommodate the weather information needs of all federal and state natural resource management agencies. Provides timely access to weather forecasts, current and historical weather data, the National Fire Danger Rating System (NFDRS), and the National Interagency Fire Management Integrated Database (NIFMID).

Wet Line - A line of water, or water and chemical retardant, sprayed along the ground, that serves as a temporary control line from which to ignite or stop a low-intensity fire.

Wildland Fire - Any non-structure fire, other than prescribed fire, that occurs in the wildland.

Wildland Fire Implementation Plan (WFIP) - A progressively developed assessment and operational management plan that documents the analysis and selection of strategies and describes the appropriate management response for a wildland fire being managed for resource benefits.

Wildland Fire Situation Analysis (WFSA) - A decision-making process for wildland fires that evaluates alternative management strategies against selected safety, environmental, social, economic, political, and resource management objectives.

Wildland Fire Use – The management of naturally ignited wildland fires to accomplish specific prestated resource management objectives in predefined geographic areas.

Wildland/Urban Interface - Wildland areas adjacent to habitations and high-value improvements. These are areas of urban development and concentrated human activity (including developed recreation sites) that is located within or adjacent to otherwise undeveloped wildlands.

REFERENCES

Abbott, L.A. 1998. The ecological role of fire in southeastern Arizona oak woodland ecosystems. The Nature Conservancy, Tucson, AZ.

Allen, Larry S. 1996. Ecological role of fire in the Madrean Province. Pages 5 through 10 in Effects of fire on Madrean Province ecosystems. USDA Forest Service General Technical Report RM-GTR 289. Rocky Mountain Forest and Range Experiment Station. Ft. Collins, CO.

Anderson, Hal E. 1982. Aids to determining fuel models for estimating fire behavior. General Technical Report INT-122. USDA, Forest Service, Intermountain Forest and Range Experiment Station. Ogden, UT.

Arizona State Land Department. 1997. Fire suppression and prescribed fire policy. Fire Management Policy Memo No. 9. Phoenix, AZ.

Arizona State Land Department. January 2004. Firewise Communities/USA-Arizona Recognition Guide.

Brown, David E., ed. 1994. Biotic communities: southwestern United States and northwestern Mexico. University of Utah Press. Salt Lake City, UT.

Brown, David E. and Charles H. Lowe. 1980, 1994. Biotic communities of the southwest (map). University of Utah Press. Salt Lake City, UT.

Brown, J.K. and J.K. Smith, eds. 2000. Wildland fire in ecosystems: effects of fire on flora. General Technical Report RMRS-GTR-42-vol. 2. USDA Forest Service, Rocky Mountain Research Station. Ogden, UT.

Caprio, Anthony C., and Malcolm J. Zwolinski. 1994. Fire and vegetation in a Madrean oak woodland, Santa Catalina Mountains, Southeastern Arizona. Pages 389-398 in Biodiversity and management of Madrean Archipelago: The sky islands of southwestern United States and northwestern Mexico. USDA Forest Service General Technical Report RM-GTR-264. Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.

Clark, J.S. 1990. Landscape interactions among nitrogen, species composition, and long-term fire frequency. Biogeochemistry 11:1-22.

Cohen, Jack D. August 2003. An examination of the Summerhaven, Arizona home destruction related to the local wildland fire behavior during the June 2003 Aspen Fire. RMRS-Missoula Fire Sciences Laboratory.

Danzer, S., C. Baisan and T. Swetnam. 1996. The influence of fire and land-use history on stand dynamics in the Huachuca Mountains of southeastern Arizona. In: Effects of fire on Madrean Province ecosystems. USDA Forest Service, RM-GTR-289, Ft. Collins, CO.

DeBano, Leonard F., and Daniel G. Neary. 1996. Effects of fire on riparian systems. Pages 69-76 in proceedings of the symposium on effects of fire on Madrean province ecosystems. USDA Forest Service General Technical Report RM-GTR-289. Rocky Mountain Forest and Range Experiment Station. Fort Collins, CO.

DeBano, L.F., D.G. Neary and P.F. Ffolliott, Eds. 1998. Fire's effect on Ecosystems. John Wiley and Sons, Inc., New York.

National Fire Danger Rating System. 1978. Fuel models of the southwest.

NFPA. NFPA 1144 Standard for protection of life and property from wildfire, 2002 Edition.

NWCG. March 2004. Fireline Handbook. NFES 0065.

NWCG. January 2004. Incident Response Pocket Guide. NFES 1077.

Pima County, Arizona. 2004. Fire on the mountain: the Aspen Fire. Tucson, AZ.

State of Arizona. February 2004. The report of the govenor's Arizona forest health oversight council. Phoenix, AZ.

Southwest Coordinating Group. 2004 (revised annually). Southwest Areas Mobilization Guide.

Swetnam, Thomas W. and Christopher H. Baisan. 1996. Fire histories of montane forests in the Madrean borderlands. In proceedings of the symposium on effects of fire on Madrean province ecosystems. USDA Forest Service General Tech Report RMGTR-289. Rocky Mountain Forest and Range Experiment Station. Ft. Collins, CO.

Swetnam, Thomas W., and Christopher H. Baisan. 1996b. Historical fire regime patterns in the southwestern United States since AD 1700. Pages II -32 in fire effects in southwestern forests: proceedings of the second La Mesa fire symposium. USDA Forest Service General Technical Report RM-GTR-286. Rocky Mountain Forest and Range Experiment Station. Fort Collins, CO.

USDA Forest Service. 1986. Coronado National Forest plan, as changed and amended. Tucson, AZ.

USDA Forest Service. 1993. Environmental assessment, Loma-Sabino land exchange. Coronado National Forest. Tucson, AZ.

USDA Forest Service. 2003. Coronado National Forest: 2003 fire management plan. Tucson, AZ.

USDA, USDI. Wildland and Prescribed Fire Management Policy: Implementation Procedures Reference Guide.

USDA, USDI. 1995. Federal wildland fire management policy and program review. Washington, D.C.

USDA, USDI. 2004 (Revised annually). Interagency Standards for Fire and Fire Aviation Operations (the Redbook). NFES 2724.

Wells, C.G., R.E. Campbell, L.F. DeBano, C.E. Lewis, R.L. Fredriksen, E.C. Franklin, R.C. Froelich and P.H. Dunn, Eds. 1979. Effects of fire on soil: state-of-the knowledge review. USDA Forest Service, WO-GTR-7, Washington D.C.

Wright, H.A. and A.W. Bailey. 1982. Fire Ecology: United States and southern Canada. John Wiley & Sons, New York.

WEB SITES

Arizona Department of Environmental Quality-Air Quality Division-Smoke Management Program. **www.adeq.state.az.us/environ/air/assess/smp.html**

Fire regimes and condition classes. **www.frcc.gov**

Firewise Communities. **www.firewise.org/communities**

Firewise Communities/Arizona. **www.ag.arizona.edu/extension/firewise/**

National Fire Plan. **www.fireplan.gov**

Southwest Area Wildland Fire Operations. **www.fs.fed.us/r3/fire**

Predictive Services: Fire Intelligence, Fire Weather, Fire Outlook.
Fire Information: Restrictions
Fire Management: Aviation Management (sunrise-sunset tables), Dispatch (Pocket Card), Safety, Training