

Tonto National Monument Fire Management Plan

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I. INTRODUCTION

A. Purpose of and Need for the Plan

National Park Service policy requires that each park area with vegetation capable of sustaining fire will prepare a fire management plan to guide its fire management program (Director's Order-18, 1998). Tonto National Monument protects 1,120 acres of the Sonoran Desert. Five different plant communities are represented reflecting the diversity of the setting between the Mazatzal Mountains and the Salt River basin. Vegetation typical of the Upper Sonoran life zone flourishes and can be characterized as succulent desert.

The monument also protects sixty-five archeological sites. Protection of these sites for their ethnologic, scientific, and educational interest was the primary purpose for establishing the monument in 1907. These archeological sites are considered to be contributing properties of the Tonto National Monument National Register District and the entire monument is listed on the National Register of Historic Places. For the most part, these resources represent the remains of maize agriculturists associated with the Gila and Roosevelt phases commonly referred to as the Salado culture (ca. AD 1000-1450).

Tonto National Monument has developed this Wildland Fire Management Plan (FMP) to guide its wildland fire program. The FMP defines the levels of protection needed to ensure safety for park visitors and employees, protect facilities and cultural and natural resources, and restore and perpetuate natural processes and cultural landscapes. The plan contains guidance for all areas of the fire program including wildland fire prevention, suppression, safety, education, research, and interagency cooperation.

Recommendations listed in the park's General Management Plan (2003), Natural and Cultural Resources Management Plan (1996), and compliance documents (2002) were used to prepare this plan. The FMP advocates aggressive wildland fire suppression until research has been obtained that would provide park managers with the decision-making information needed for possible reintroduction of fire into the ecosystem. Suppression operations will quickly respond to wildland fires and achieve effective control to protect human life and property with the least amount of damage to the park's natural and cultural resources.

The paramount considerations of the park's wildland fire management program will be:

1. Provide public, employee, and firefighter safety.
2. Control and suppress, as quickly as possible, all fires using the appropriate suppression response considering the protection of natural and cultural resources.
3. Maintain an active fire prevention and defensible space program to reduce the incidence and threat of wildfire.
4. Rehabilitate areas disturbed by wildland fire and suppression actions.
5. Maintain fire management agreements with adjacent land management agencies and local fire departments.
6. Initiate a research program that will better define the role of fire within the park.
7. Maintain a public information and interpretation program encouraging visitor and community understanding and support of fire management activities.

B. Policies

The Fire Management Plan is a detailed program of action to carry out wildland fire management policies as defined in Director's Order 18 and: (1) Federal Wildland Fire Management Policy and Program Review; (2) Managing Impacts of Wildfires on Communities and the Environment, and Protecting People and Sustaining Resources in Fire Adapted Ecosystems – A Cohesive Strategy (USDOI/USDA); and (3) A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan.

C. NEPA/NHPA Compliance

The FMP meets National Environmental Policy Act and the National Historic Preservation Act requirements. An environmental assessment/assessment of effect (EA/AEF) for the plan was prepared in

2002. The EA/AEF evaluated two alternatives and assessed the impacts attributed to each. The EA/AEF was reviewed by the surrounding Tonto National Forest, area tribes, the State Historic Preservation Office, Arizona departments' of Environmental Quality and Game and Fish, and the public. This led to the preparation of the decision notice - Finding of No Significant Impact (Appendix D) signed by the Regional Director in February 2003.

D. Authorities

The authorities for implementing this fire management plan are contained in 16 U.S.C. Sec. 1-4, the *National Parks and Recreation Act of 1978*; DO/RM-18 *Wildland Fire Management* (management policy and cooperative support agreements); the *Department of the Interior and Related Agencies Appropriation Act of 1990*, 31 U.S.C. 665 (E)(1)(B) and Section 102 of the *General Provisions of the Department of Interior Annual Appropriations Bill* (fire program funding); the *Interagency Incident Business Management Handbook* (fire program administration); and DO/RM-20 *Federal Assistance and Interagency Agreements* (agreements with other bureaus, agencies, governments, and private companies).

II. RELATIONSHIP TO LAND MANAGEMENT PLANNING and FIRE POLICY

A. NPS Management Policies

NPS Management Policies (NPS, 2001) concerning fire management states:

“Naturally ignited fire is a process that is part of many of the natural systems that are being sustained in parks. Human-ignited fires often cause the unnatural destruction of park natural resources. Wildland fire may contribute to or hinder the achievement of park management objectives. Therefore, park fire management programs will be designed to meet park resource management objectives while ensuring that firefighter and public safety are not compromised.”

“Each park with vegetation capable of burning will prepare a fire management plan and will address the need for adequate funding and staffing to support its fire management program. The plan will be designed to guide a program that responds to the park’s natural and cultural resource objectives; provides for safety considerations for park visitors, employees, neighbors, and developed facilities; and addresses potential impacts to public and private property adjacent to the park. An environmental assessment developed in support of the plan will consider the effects on air quality, water quality, health and safety, and natural and cultural resource management objectives. Preparation of the plan and environmental assessment will include collaboration with adjacent communities, interest groups, state and federal agencies, and tribal governments.”

“All fires burning in natural or landscaped vegetation in parks will be classified as either wildland fires or prescribed fires. All wildland fires will be effectively managed through application of the appropriate strategic and tactical management options. These options will be selected after comprehensive consideration of the resource values to be protected, firefighter and public safety, and costs. Prescribed fires are those fires ignited by park managers to achieve resource management and fuel treatment objectives. Prescribed fire activities will include monitoring programs that record fire behavior, smoke behavior, fire decisions, and fire effects to provide information on whether specific objectives are met. All parks will use a systematic decision-making process to determine the most appropriate management strategies for all unplanned ignitions, and for any prescribed fires that are no longer meeting resource management objectives.”

B. Enabling Legislation

Tonto National Monument was established by Presidential Proclamation No. 787 on December 19, 1907, to protect “...two prehistoric ruins of ancient cliff dwellings...of great ethnologic, scientific and educational interest...and one section of land upon which same are located”. Park boundaries were significantly expanded by Presidential Proclamation No. 2203 on April 1, 1937. This second proclamation recognizes both “...prehistoric ruins and ancient cliff dwellings...” and adds to the park 480 acres of adjacent National Forest lands, “...which are required for [their] proper care, management and protection”. Both proclamations expressly warn against unauthorized appropriation, injury, or destruction of park features and against settlement on these reserved lands.

Cultural resources of the park, as identified in a 1985 survey (Tagg), include 65 archeological sites. Most are Salado sites (AD 1000-1450), contemporaneous with the two prominent cliff dwellings known as the Upper and Lower Cliff Dwellings. There is also evidence of Archaic period (about 8,000 BC – 1 AD), Apache or Yavapai (about 1500 AD), and historic Euro-American (about 1900 AD) occupations.

Sonoran desert vegetation flourishes in the park, characterized by saguaro cactus, jojoba, palo verde, mesquite, and cholla. Chaparral and riparian communities are also present. The abundance of vegetation and animal life provided an unusually large variety of food and building resources, and accounts, at least in part, for the diverse characteristics of the prehistoric cultures in the area.

C. General Management Plan Mission Goals

The overall direction for managing the park's resources is described in its General Management Plan. More specifically, the desired future condition for vegetation and wildlife is to protect and preserve native plant and animal life as an integral part of the natural ecosystem. The goals that pertain to fire management are:

1. Prepare research to understand the basin-wide fire history and ecology.
2. Protect habitat of threatened and endangered species.
3. Monitor native and non-native species to the point that changes in population trends or characteristics can be identified and/or managed.
4. Comply with the Clean Air Act and document air quality conditions for Tonto Basin.
5. Comply with the Clean Water Act.
6. Maintain integrity of archeological resources.
7. Base the management of cultural landscapes on a sound understanding of the resources themselves and their formation processes through time.
8. Include information on the protection and preservation of resources in interpretive messages.
9. Partner with local, county, state, and federal agencies to share resources and experiences.

D. Resources Management Plan Objectives

The following objectives of the Natural and Cultural Resources Management Plan (RMP 1996) will be accomplished through the implementation of the fire plan.

1. Develop and conduct a comprehensive fire management program.
2. Preserve and protect prehistoric, historic, and natural resources, including cliff dwellings and museum collection.
3. Restore and preserve ecological processes in a manner that perpetuates native species and communities and suppresses non-native species, while taking into account cultural resource values.
4. Protect watersheds, surface and groundwater, water rights, and water-related attributes.
5. Coordinate planning with government agencies, community groups, corporations, and individuals to protect the integrity of the cultural and natural environment within and surrounding the park, and to ensure sharing of information.

E. Objectives

The Fire Management Plan will help meet the objectives of the general and resources management plans by –

1. Providing overall fire management program direction.
2. Documenting the current role of fire within Tonto National Monument.
3. Describing the short and long-term fire management strategies that will be used to manage the fire environment within Tonto National Monument.
4. Discussing the potential, but yet unrealized, natural role of fire in the area and to define the long term processes for reintroducing fire into the ecosystem dynamics of the park.
5. Outlining fire mobilization procedures.
6. Defining an integrated fire management organization for the park and responsibilities within the organization.

III. WILDLAND FIRE MANAGEMENT STRATEGIES

A. General Management Considerations

All wildland fires will be aggressively suppressed in a prompt, safe, and cost-effective manner to produce a fast, efficient action with minimum damage to resources. Since the Fire Management Plan does not differentiate between human- and lightning-caused fire, all ignitions will be suppressed using the appropriate suppression response.

B. Wildland Fire Management Goals

The overall goals for wildland fire management are to promote a fire prevention program and to ensure suppression response capable of meeting expected wildland fire complexity. Specific park fire management goals are:

1. Protect human life and property within the park.
2. Employ strategies to suppress all wildland fires within park boundaries that minimize costs and resource damage consistent with values at risk.
3. Stabilize and prevent further degradation of natural and cultural resources lost in and/or damaged by impacts of wildland fires and/or fire management activities.
4. Restore and rehabilitate facilities lost or damaged by fire and/or suppression activities.
5. Maintain general agreements with Tonto National Forest and Tonto Basin Fire District.
6. Educate employees and the public about the scope and effect of wildland fire management, including resource protection, prevention, hazard/risk assessment, mitigation and rehabilitation, and fire's role in ecosystem management.
7. Manage wildland fire incidents in accordance with accepted interagency standards, using appropriate management strategies and tactics, and maximize efficiencies realized through interagency coordination and cooperation.
8. Encourage research to advance understanding of fire behavior, effects, ecology, and management.
9. Integrate fire management with all other aspects of park management.
10. Maintain the highest standards of professional and technical expertise in planning and safely implementing an effective wildland fire management program.

C. Wildland Fire Management Options

The wildland fire management program options for Tonto National Monument are suppression and mechanical fuel reduction. Because of the lack of Sonoran desert fire ecology information, park managers will not utilize fire as a fuels management or restoration agent at this time. Therefore, the park will implement a program of fire suppression and limited fuel reduction through mechanical treatment. Fuel reduction will occur in the administrative areas to protect park facilities, employees, and visitors and in the riparian area to protect this unique habitat. Because the park does not have separate dominant management objectives and strategies for different areas of the park, no separate fire management units or zones have been defined.

D. Description of Wildland Fire Management Strategies by Fire Management Unit

Because all wildland fires that occur in the park will be suppressed, no separate fire management units have been established. Allowing wildland fires to burn in the park for resource objectives is not a viable option due to the cultural preservation mandate of the park, valuable archeological resources, the negative effect of fire on cacti, the limited distance to park boundaries, and the high rates of spread associated with grassland fuels. Aggressive fire fighting techniques will be used to suppress wildland fires at a minimum size using the appropriate suppression response that reduces impacts to natural and cultural resources.

1. Management Objectives

Suppress all fires regardless of whether they are human- or lightning-caused.

2. Management Constraints

- a. No lives will be lost; no major injuries will occur.

- b. No unacceptable impacts will occur to cultural resources. The location of these sites will be included in documents such as line officers briefing statements and pre-attack plans. A cultural resource advisor from the monument must be attached to the incident management organizations.
- c. No structures will be lost or substantially destroyed.
- d. Chemical retardants will not be routinely used. Foam agents may be utilized.
- e. Heavy equipment may be used only if approved by the superintendent, the fire is life threatening, and a designated resource advisor accompanies the equipment.
- f. Sensitive areas or species will be protected from suppression activities. These areas will be included in documents such as line officers briefing statements and pre-attack plans. A natural resource advisor from the monument must be attached to the incident management organizations.
- g. Only a small percentage of the park is accessible to vehicles. Fires burning in the “backcountry” can only be attacked by hand crews, hose lays, and from the air. Off road vehicle use may be permitted on a case-by-case basis and will be pre-approved by a park resource advisor.
- h. State Route 188 bisects the northern section of the park. This highway is a major thoroughfare between Globe, Roosevelt, and Payson. Out-of-control fires sweeping across the highway could disrupt traffic and endanger travelers. State and/or county law enforcement agencies will be notified of all fire incidents that involve use of the highway.

3.

Fire History

Very little is known about historical fire occurrence and the natural fire cycle in the Sonoran Desert. The natural frequency of lightning fires is estimated to be once every 250-300 years.

However, the two decades occurring from 1964 to 1984 have witnessed a dramatic rise in the number and size of wildfires. This sudden change is most likely due to changes in the load and composition of annual fuel. Stricter control and management of cattle grazing on public lands in the 1970s, for example, has allowed landscapes to begin recovering, leading to a natural increase in plant biomass. This recovery process has initiated competitive regeneration between native and non-native annuals introduced during revegetation of grazing lands, in which the non-natives are believed to be displacing the natives and providing a more continuous and combustible fuel source. This is strongly the case with red brome, which is widespread throughout the Arizona Upland. Its dense stands of dried stems and erect seed heads are capable of carrying wildfire more effectively than native plant species.

The rise in fire activity may also be because of the higher-than-normal winter precipitation due to El Nino events. This has resulted in greater native and non-native winter annuals, providing an increased fuel load for the summer fire season.

Concern has been raised regarding the effects of fire on desert areas, but not much literature is available. Keeley et al. (1981) noted that repeat fires in the chaparral favored non-native plants such as red brome (*Bromus rubens*), filaree (*Erodium cicutarium*), and others over native annuals, which were quickly eliminated. The native annuals were apparently unable to compete with the dense stand of non-natives produced by frequent fires. Analyses in the last two decades have shown that most desert perennials do not resprout after fire (Swantek et al. 1999). For populations that do recover, several years are necessary for pre-fire densities to return; longer-lived species like saguaros may take hundreds of years.

Rogers and Steele (1980) reported high percentages of mortality for many desert trees and shrubs in two man-caused fires north and east of Phoenix. Rogers (1985) suggested his study indicated that saguaros could be virtually eliminated by a sequence of fires at intervals of less than thirty years because saguaros require thirty years to reach reproductive maturity (Steenbergh and Lowe 1977) and need shade-producing perennials under which the seedlings get established (Turner et al. 1966). “A pair of fires, separated by an interval of a few years, can result in the local extinction of many desert species, including saguaros (Rogers and Steele 1980, Rogers 1985).” Sufficient recovery between fires, therefore, is essential to ensure long-term survival of populations. Recurring fire within this period may remove fire-intolerant perennials such as saguaros and other cacti, and ultimately lead to localized extinctions.

The ecological voids left by the decimation of these species may then be colonized by species that survive or resprout after fire or seed through wind dispersal from nearby grasslands, resulting in a dominance shift

to fire-tolerant species. Relatively few studies in the past fifteen years have reviewed fire occurrences and determined short-term effects of fire on plant species in the Arizona Upland. Consequently, the question to suppress or not suppress desert fires remains a difficult one to answer, since fire effects remain unclear and increased fire may lead to the removal of the very species that define the community structure.

Fire history studies are usually based upon tree ring chronologies. Such an analysis is not possible throughout much of the park due to an absence of suitable tree species. A study of the modern fire history and fire impacts on desert plants of Tonto National Monument was conducted in 1990-1991 (Phillips). Records from 1947 to 2002 indicate that a total of fourteen wildfires have occurred within the monument. Twelve of these fires occurred in the twenty-year period from 1964 to 1984. Lightning accounted for all of the ignitions. The arid early summer is a crucial time; the five largest fires started between mid-May and July. Most of the late July and August fires burned a small number of hectares because control was aided by rainfall.

The largest fire, the 218-hectare Schultz fire, occurred in 1964 (Figure 3). Since then, the southern portion of the park has repeatedly burned altering the vegetative composition and structure so that the settlement community is no longer present. Comparison photos indicate that the post settlement community was the rich Palo Verde-Mixed Cacti Series of the Arizona Upland - Sonoran Desertscrub as seen elsewhere in the park today. At the time of the study, this area appeared to have considerable incursion of grasses and perennial herbs and shrubs, changing the composition to the Mixed Grass-Scrub series. Fire occurrence data collected within the park from this point forward will be used to update this information.

4.

Fire Weather

Tonto National Monument experiences moderate weather patterns typical of southwestern Arizona, hot summers and mild winters with cold periods. Temperatures range from 110 to 20 degrees F. From May through September, the daily high temperatures range from the low 70s to around 110°F. During the past five years, the hottest day on record was 111 degrees in 1998. The average daily lows during the summer range from the low 50s to the mid 80s. Daytime temperatures during the winter average about 58 degrees with extreme temperatures ranging from the mid 20s to the low 70s. The predominant winds are from the south or east during the summer and west during the winter. High winds of 30-50 mph during summer storm activity are not uncommon.

Snow may blanket portions of the area, but not remain for more than a day or two on exposed soils. Annual precipitation averages about fifteen inches with extremes ranging from a low of six inches in 2002 to a high of thirty-one inches in 1992 and 1993. Moisture is received in two distinct rainy seasons, during the summer monsoon season in July and August and again in late winter to early spring from November to April. In April, winter precipitation ends and drought persists through May and June. In July, moist air from the Gulf of Mexico or the Gulf of California flows into southern Arizona due to dissemination of the high pressure system present in May and June. Unlike the short and sporadic bursts of these summer storms, winter rains tend to be longer in duration. Locally heavy summer monsoon thunderstorms or longer-lasting widespread winter frontal systems can cause sheet flooding or flash flooding.

5.

Fire Season.

Currently there is inadequate historical fire activity in the park to establish a fire season through the FIREPRO analysis. The park's fire season tends to match the Southwest's average fire season, which is approximately May 15 to October 1. These dates may be modified to adjust to early or late spring and winter depending on the overall Southwest weather patterns.

6.

Fuel Types.

Prior to the establishment of the park, the entire Tonto Basin was drastically overgrazed from the late 1870s into the 1910s. Grazing caused deterioration of the historic scene and initiated a change in vegetative communities. Studies of past fires and non-native plants have been conducted. Comparisons with old photographs show that some species of succulents and shrubs have disappeared locally. Non-native species accompanying human use of the area have invaded the park with varying degrees of impact to native flora and possibly fauna. Non-native plants include grasses along State Route 188, and grasses and flora that accompanied grazing activities.

Vegetative zones can be divided into two fuel types. Associated National Fire Danger Rating System (NFDRS) and Fire Behavior Fuel Models (FBFM) are used for fire behavior predictions (Anderson 1982, Deeming et. al. 1978). The following table lists the park's fuel types and models.

Table 1: Summary of Fire

Behavior Potential.

Summary of fire behavior potential by NFDRS and Fire Behavior Fuel Model in both normal and extreme fire years.			
NFDRS and Fire Behavior Fuel Model	Fire Behavior - Normal Year	Fire Behavior – Extreme Year	Representative Rates of Spread and Flame Length
F/6 (Brush Group)	Active burning with torching and isolated crown fire activity.	Aggressive burning in all fuel levels, including wind driven independent crown fire; possible long range spotting; stand replacing fire.	Rate of spread = 32 chains/ph Flame length = 6 feet
L/1 (Grass Group)	Surface fire spreads rapidly through fine fuels.	Surface fire spreads very rapidly and aggressively through fine fuels.	Rate of spread = 78 chains/ph Flame length = 4 feet

Note: Defaults applied to all fuel models represented in the above table equal: wind speed of 5 mph, fuel moisture content of 8%, and live fuel moisture content of 100%.

7. Potential Fire Behavior.

Wildland fires in grasslands can be expected to exhibit rapid rates of spread under the influence of wind and topography. Containment should not be a significant problem when existing barriers are utilized to control the head of the fire. Grass fires occurring in the vicinity of the park's administrative areas can be expected to slow or stop at roadsides and trails. Grassland fires reaching the base of the hills should exhibit greatly increased rates of spread and flame lengths unless slowed or stopped by rock outcroppings and/or the lack of fine fuels.

Fires burning in the more heavily vegetative areas will, for the most part, stay on the ground and spread at a low to moderate rate, with occasional torching and intense fire behavior in isolated fuel concentrations. Uncontrollable wildland fire behavior in shrub fuels on level ground can be expected only under severe conditions. Rates of spread and burning intensities may be higher on the steeper slopes.

Precipitation totals and temperature ranges can significantly change fuel characteristics and alter fire behavior throughout the year. Generally, fuels will dry as spring temperatures increase and precipitation decreases prior to the beginning of the summer monsoon season (April – June). Winter annual plants dry in dense stands to form fine fuels capable of carrying wildfire. Often no rains occur during these months and temperatures increase to dry perennial vegetation to tinder as well. Lightning from monsoon thunderstorms can ignite these fuels, initiating the summer fire season. Throughout August, storms persist; usually higher elevations become saturated with moisture and fire activity is minimized. Once the monsoon season concludes in late August, the vegetation dries out again and remaining storms may spark a few fall fires. The drying of fuels will again occur in the fall (September-November) before the beginning of the winter rainy season.

Fuel characteristics will vary from one year to the next and may not follow the general pattern listed above. In years of abnormally high winter precipitation, winter annuals, both native and exotic, experience a boost in productivity. This increased biomass may join fragmented fuels such as trees and shrubs and increase the chance of a spreading wildfire. Two consecutive wet winters such as during El Nino years

support an even more dramatic rise in fire activity. The first wet winter leads to high production of seed reserves that take advantage of the following season of abundant moisture and produce a denser stand of annuals than a single moist winter.

8. Fire Effects by Fuel Types.

Understanding the effects of fire on fuel loads, plant and animal communities, and ecosystem processes is essential to the park's fire program. A program utilizing permanent transects will be initiated to determine fire effects on fuel loads and vegetation, and to monitor conditions of these resources over time in areas that are burned. This will be an on-going program, which will include inventories of conditions before fires and monitoring periodically following them. Fire behavior and weather will be monitored during each fire so that fire effects can be evaluated in terms of observed burning conditions and fire behavior.

Fires within grass fuel models are generally of low to moderate intensity and of short duration. Fire intensity is generally sufficient to consume all herbaceous surface fuels, kill shrubs, and scorch trees where present. Once ignited, grasses can readily involve larger fuels, such as branches, fallen and standing trees.

Fires within desert scrub vegetation are generally restricted to surface fuels, consuming litter and reducing reproduction. Under most conditions at low wind speeds, such fires are of low intensity and short duration. However, fire will carry through the shrub layer with the support of moderate or higher winds. Fire effects include the removal of surface fuels, occasional scorching of trees, and the reduction of young woody reproduction. Larger trees (greater than 6" dbh) are susceptible to basal fire injury, but generally do not reduce in diameter growth unless the crown is appreciably damaged. Damage to the cambium of larger trees is directly related to the season of fire occurrence, intensity, duration of heat, bark thickness, and frequency of burning. Trees are generally less susceptible to fire injury during the dormant season. Seedlings and saplings are readily killed by fire.

Under unusual conditions, surface fires may torch out and occasionally crown where ladder fuels exist. The extent of such fire behavior is rather limited. Under these conditions fire intensity may be sufficient enough to consume the organic matter to mineral soil. Such conditions occur only during periods of severe and frequent drought. Under very dry conditions, fire in pockets of dense large fuels can produce enough heat to have measurable effects on the soil. Soil particles in the top inch of soil may fuse decreasing soil wettability, increasing susceptibility to erosion, and causing subsequent nutrient and moisture stress on vegetation. These effects are variable, and changes in soil structure rarely reach more than two inches beneath the surface. Frequent reburns may accelerate soil creep or slump.

Small saguaros less than six to thirteen feet tall with large amounts of fuel at the plant base generally do not survive fires. Larger saguaros may survive with limited damage immediately after fires, but because of the lag time between time of injury by fire and time of death, postfire mortality may increase. Barrel cactus plants more than one foot tall are rarely killed by fire since only their spines are combustible. However, plants less than that height may suffer up to 75 percent mortality as a direct result of fire damage to the apical meristem, or a combination of fire damage to the meristem and damage from herbivory. The effects of fire on cacti, succulents, special status species, and other notable plants can be found in Phillips report or on the Fire Effects Information System.

Wildlife abundance and diversity depends on the quality and distribution of suitable habitat. Some mammals depend on recently burned areas for food. Predators, depending on food from consumers, may be favored by fire's reduction of "hiding habitat" for prey. Many primary consumers favor some level of succession after fire for food or breeding habitat. White-tailed deer frequent shrub fields that follow a large fire. Increased berry yields after fire favor birds. The effect of fire can encourage diversity, vigor, and distribution in wildlife populations depending on the intensity of a fire.

9. Values to Be Protected.

The enclaves of park facilities, archeological sites, and the surrounding Tonto National Forest will receive priority consideration in fire control planning efforts. In all cases, the primary concerns of fire suppression personnel shall be the safety, and if needed, the evacuation of all individuals not involved in the

suppression effort.

More extensive descriptions of the park's environment can be found in the following documents:

Final General Management Plan/Environmental Impact Statement (NPS, 2003)
Cultural and Natural Resources Management Plan (NPS, 1996)
Soil Survey of Tonto National Monument (Lindsay, 1994)
Statement for Management (NPS, 1989)
Tonto National Monument, An Archeological Survey (Tagg, 1985)

IV. WILDLAND FIRE MANAGEMENT PROGRAM COMPONENTS

A. General Implementation Procedures

Because all wildland fires will be suppressed, the requirement for a decision checklist as part of the Stage I analysis has already been met.

B. Preparedness Actions

Preparedness is the work accomplished prior to the fire season to ensure that the appropriate response and readiness, as directed by the Fire Management Plan, can be carried out. When periods of high fire danger occur outside the normal fire season dates, the appropriate action will be taken at that time. Preparedness activities include – planning, inspections, fuel reduction, personnel qualifications, training, and equipment inventory, acquisition, and maintenance. The objective of the preparedness effort is to have a well-trained and equipped fire management organization capable of supporting cooperators with fire suppression activities within the park. Preparedness activities are outlined in Reference Manual 18 and are covered by normal park operating and FIREPRO funds.

The following actions will be taken to ensure adequate fire preparedness:

1. Fire Prevention Activities

An active fire prevention program will be conducted in conjunction with other agencies to protect human life and property and prevent damage to cultural and natural resources and physical facilities. The fire prevention program will consist of public education, regulatory enforcement, equipment and safety inspections, and fuel reduction activities. Since the possibility of a fire spreading onto the monument from surrounding lands exists, close cooperation with Tonto National Forest will be an integral part of the prevention effort.

The need to involve the public in fire prevention activities extends farther than the park level; it promotes an environmental ethic and an awareness of the potential impacts of wildfire by users of the National Park System. Support for the park's fire program will be accomplished by public awareness programs and field programs. Prevention activities may include: press releases, attending Tonto National Forest and Tonto Basin Fire Department meetings, preparing fire awareness displays, and increasing patrols during the fire season. Fire safety and awareness messages will be incorporated into visitor contacts and interpretive programs and posted on bulletin boards.

It is essential that employees be well informed about fire prevention and the objectives of the park's fire management program. Further, employees must be kept informed about changes in existing conditions throughout the fire season. Trained employees need to inform the public of the potential severity of human-caused wildland fires and how to prevent them.

Fire inspections of all building exteriors and the firebreak around the residential area will be made annually prior to the beginning of the fire season. All burnable fuel will be removed from around each building. The firebreak and fence lines around each residence will be kept clear of vegetation.

During periods of high or extreme fire danger, fire prevention messages will be included in all interpretive programs. Emergency restrictions regarding camp stoves, smoking, or area closures may become necessary. Such restrictions, when imposed, will be coordinated with and coincide with restrictions

implemented by other state and federal agencies.

2. Training

Departmental policy requires that all personnel engaged in suppression and planned ignition fire duties meet the standards set by the National Wildfire Coordinating Group (NWCG). The National Park Service wildland fire qualification system meets or exceeds all NWCG standards. The park will conform strictly to the requirements of the NPS wildland fire management qualification and certification system, which outlines minimum training, experience, and physical fitness requirements. All personnel involved in wildland fire suppression will meet NWCG standards. NPS wildland fire training is based upon criteria specified within the training curriculum approved by NWCG. This curriculum is supportive of positions described within NWCG 310-1, *Wildland Fire Qualification Guide* and NWCG *Prescribed Fire Job Qualification Guide*. Red cards will be mandatory for all personnel engaged in fire suppression duties. All personnel involved in fire management operations will have their qualifications, training, and experience entered into the NPS Fire Qualifications System. Records will be updated annually. Interested permanent employees may be afforded training as time and funds allow, which includes meeting the NPS physical fitness standards for fire line duty. Efforts will also be made to qualify people for assignment to local fire overhead teams or single resource assignments on interagency fires in order to contribute to the overall mission of the NPS, to demonstrate our commitment to the inter-agency fire community, and to develop employee experience and skills.

3. Equipment and Supplies

The park's fire cache is located within the maintenance yard. The fire cache contains hand tools, firefighter line packs, personal protective equipment, backpack pumps, and hoses and appliances. Fire equipment will be maintained in serviceable condition and in constant readiness. Equipment will not be used for purposes other than fire prevention and suppression. Defective, unsafe, or worn out items will be repaired/replaced. The chief ranger is responsible for inventorying (Appendix F), supplying, and stocking cache items prior to the onset of the fire season.

4. Step-up Staffing Plan

The step-up plan is a documented procedure designed to direct incremental preparedness actions taken by park personnel in response to increasing fire danger. These actions are delineated by "staffing classes". The five staffing classes, or stages, are ranked utilizing the burning index (BI) of the National Fire Danger Rating System. Because a rapid rate of spread can occur even at a low burning index in grasses, the grass fuel model "L" is used as the basis for staffing classes. Staffing classes IV and V are the days which, according to historical weather data, constitute the worst 10% of fire danger days within the park, or the 90th and 97th percentile respectively, of the BI's computed from the data. Each class includes the actions in the above (lower number) staffing class.

Staffing Class I, Burning Index 0-4 - No activity necessary. Normal eight-hour tours of duty with no change in routine operations. Red-carded employees are available to respond and take necessary action on any fire reported.

Staffing Class II, Burning Index 5-10 - Normal eight-hour tours of duty. Fire equipment and supplies serviced and readied for use.

Staffing Class III, Burning Index 11-22 - Normal eight-hour tours of duty. Preparedness overtime authorized during special events and holidays. Red-carded personnel have fire tools and personal protective equipment immediately available in their work vehicles or at their work site. Interpretive programs may carry fire awareness message. A lightning activity level (LAL) of 4-6 will move this class up to Staffing Class IV. Communications will be established with local interagency dispatch center.

Staffing Class IV, Burning Index 23-27 - Ensure red-carded personnel are available.

Increase patrols of visitor use areas. Firefighters will have fire packs on hand while on duty. Hand tools and bladder bags will be placed in vehicles. Lieu days and leave may be canceled for key management personnel and red-carded firefighters. Preparedness overtime authorized. Saguaro NP FMO is notified. Activities are coordinated with interagency partners in an effort to provide consistent information to the

public and park neighbors. When county/state/federal officials prohibit fires and/or smoking, signs will be posted in the visitor center and on bulletin boards. Interpretive programs will carry fire awareness message. A lightning activity level (LAL) of 4-6 will move this class up to Staffing Class V. Aerial detection flights with interagency partners will be coordinated to insure park overflights.

Staffing Class V, Burning Index 28+

- All activities in staffing class IV

are continued. Restrictions and closures of park areas may be deemed necessary. Staff is reminded about park evacuation procedures.

NOTE: DURING HOLIDAYS AND SPECIAL EVENTS, ADD ONE STAFFING CLASS.

5. Pre-attack Plan

The pre-attack plan is a comprehensive compilation of essential fire management information (Appendix H). The pre-attack plan is a quick reference guide to be used as incidents occur and contains sensitive resource information on locations of cultural sites and endangered species. The plan also includes evaluations of structures to ensure that their values (and hazards) are taken into consideration during fire suppression activities. Criteria and procedures for evacuations and closures will also be addressed. This plan should be reviewed annually prior to the fire season and revised as necessary.

B. Wildland Fire Suppression

1. Fire Detection

Detection efforts will consist primarily of foot and vehicle patrols by park employees. The park also relies on fire reports from visitors, neighbors, and other agencies. Private and commercial pilots on aerial overflights may also alert the park to “smokes”. Adjacent federal partners carry out aerial detection flights during high fire danger periods. They will notify the park about fires in Tonto National Forest that could be a potential threat to the park.

Detection shall include a determination of the fire cause. Human-caused fires require an investigation and report by law enforcement personnel. Fire investigators are available through interagency dispatch. For serious human-caused fires and those involving loss of life, a qualified arson investigator will be requested.

2. Communications

All fires will be reported to the superintendent and/or chief ranger and resource management specialist. They will maintain a communications log of the fire and begin a fire report. All fires will be reported to the Saguaro FMO for input into the Shared Applications Computer System (SACS) including the daily situation report to the National Interagency Fire Center (NIFC). **Major** fires will be reported to the NPS fire director at NIFC in Boise, Idaho via the Intermountain Region Fire Management Officer according to NPS CY2001 Incident Reporting Procedures. Fires will also be reported to the exhibit specialist so that the cultural resource advisor can participate in suppression activities.

Initial attack assistance will be requested from Tonto National Forest and/or Tonto Basin Fire District. The superintendent or his/her designee (or Incident Commander) will request outside resources, if needed, through the 24-hour Arizona Central West Zone dispatch center. For any fire requiring extended attack or a Type I or II Incident Management Team, the IMR FMO will be notified. The superintendent will prepare a Delegation of Authority (Appendix I) for all extended attack, T1 and T2 Incident Commanders.

All wildland fires will be managed with the appropriate suppression response using the Incident Command System (ICS). For any suppression activity, the park will provide direction to the suppression organization for resources protection, public safety, and suppression impacts. The NPS agency representative will work closely with the command staff.

3. Fire Attack Strategy

Primary strategy on small fires will be direct attack with handtools. Fires will be suppressed using preexisting natural and artificial barriers. Fire behavior and available resources may modify this strategy. Fires beyond the capacity of handtools will be managed utilizing engines where road access is available.

Use of constructed lines should be avoided unless needed to protect structures and archeological sites. Off-road vehicles may be utilized to save lives, buildings, and cultural resources and to insure that the fire will not cross NPS boundaries. Fresh water sources are not locally abundant. However, portable pumps and complex hose lays ("wetlines") can be used in lieu of, or to supplement, constructed firelines. The use of structural fire fighting trucks and crews may assist in the rapid application of water to roadside fuels. However, the use of crews not trained in wildland firefighting should be avoided. Employing retardant drops will be considered when their use might allow local forces to contain the fire within the park.

The Incident Commander will select the suppression strategy that will be most cost effective, cause the least amount of visual and physical environmental impact, and most importantly, provide the greatest margin of safety to firefighters, park staff, and park users.

Incident commanders operating anywhere within the park must regularly coordinate and consult the park's resource advisors, who will be available on every incident. Suppression strategies and techniques should be chosen so as not to impact cultural resources and endangered species habitat, both flora and fauna, that are threatened by fire.

As in any NPS area, the proper selection of suppression techniques is a critical issue. The superintendent reserves the right to deploy mechanized equipment or use site disturbance suppression techniques anywhere in the park, since none of the park acreage is designated wilderness. The authority to use such techniques will be granted to the Incident Commander (IC) on a case-by-case basis. Use of these techniques among NPS initial attack personnel at the park will be approved through the normal chain of command.

Where wildland fires cross roads, the burned area adjacent to the road/highway should be mopped up before the road reopens to prevent smoke from obscuring traffic. Because of the small size of the park, all fires will be mopped-up 100% unless damage to cultural resources would occur, then the perimeters will be mopped up and the fire constantly monitored.

In the event of a major fire or multi-fire situation, the superintendent will set priorities for use of available staffing. Fires with the highest potential to damage facilities or resources will be attacked first and every effort will be made to place initial attack crews on wildfires in the shortest amount of time possible.

Public safety will require coordination between the IC, superintendent, and chief ranger. Notices should be posted to warn visitors, trails may be closed, traffic control will be necessary where smoke crosses roads, etc.

4. Minimum Impact Suppression Tactics

Minimum impact suppression tactics will be employed to protect natural and cultural resources on all NPS lands. Natural and artificial barriers will be used as much as possible for containment. If necessary, fire line construction will be conducted in such a way as to minimize long-term cultural and environmental impacts.

Vehicle access to normally closed areas of the park will be made using existing primitive roads when possible. When off-road travel is determined to be necessary, vehicle access will be made only after documented archeological sites have been marked for avoidance. No vegetation will be cleared for helispots.

Heavy equipment such as crawlers, tractors, dozers, or graders will not be used in the park unless their use is necessary to prevent a fire from escaping the park or destroying government buildings and cultural resources. Any use of such equipment will be specifically approved on a case-by-case basis by the superintendent, or designated acting, and that decision documented on the Delegation of Authority valid at that time.

No live trees will be felled unless they present a "clear and present" danger to firefighters or are carrying the fire across park boundaries.

Sites impacted by fire suppression activities or by the fire will be rehabilitated as necessary, based on an approved course of action for each site.

5. Extended Attack Operations

If a fire threatens to exceed the initial attack capabilities of the park and local cooperating agencies, the Incident Commander (IC) will request a Type 3 organization or an Interagency Fire Management Overhead Team from the Central Arizona Zone dispatcher (602-225-5355). The amount and type of assistance needed will depend on the present and expected complexity of the fire situation. These needs will be identified by completing the Fire Complexity Assessment Analysis (Reference Manual 18) as the fire escapes initial attack.

The transition to an overhead team will be executed in accordance with procedures established in Reference Manual 18, Chapter Nine. Overhead on large wildfires will be organized according to the NWCG Fireline and NIIMS (National Interagency Incident Management System). No fire incident management team or incoming Incident Commander may officially assume responsibility and authority or expend funds without first receiving a signed Delegation of Authority (Appendix I) from the superintendent or his/her officially designated alternate. A WFSA must also be completed.

The incoming Incident Commander will authorize the suppression strategy and tactics according to his authority given in the Delegation of Authority. Use of track vehicles, explosives, and aerial retardant drops must require pre-authorization by the superintendent or designee before being employed by the IC. Status updates of extended attack fires will be reported daily to the Saguaro NP and Intermountain Region FMOs.

6. Fire Investigation

Fire management personnel will attempt to locate and protect the probable point of origin and record pertinent information required to determine fire cause. They will be alert for possible evidence, protect the scene, and report findings to the fireline supervisor.

Prompt and efficient investigation of all suspicious fires will be carried out. However, fire management personnel should not question suspects or pursue the fire investigation unless they are currently law enforcement qualified. Information obtained will be documented on a Case Incident Report (Form 10-343). Evidence discovered will be left in place and protected until an investigator can collect it properly. Personnel and services of other agencies may be utilized to investigate wildland fire arson or fire incidents involving damage to property or injuries.

7. Records and Reports

The resource management specialist will complete Individual Fire Reports (DI-1202) for all fires. Records of all fire reports will be consecutively numbered and entered into the Wildland Fire Management Computer System by the Saguaro FMO. Fire account numbers will be requested from the Saguaro FMO as soon as fire costs are incurred. Each report will include a brief narrative stating the cause of the fire, the action taken, and fire location. A permanent record of all fires will be kept in the park. Reports will be completed for both fires within the park and for assistance rendered by the park to cooperating fire agencies. An annual fire summary report will be prepared which will contain the number of fires by type, acres burned by fuel type, cost summary, personnel utilized, hours of aircraft used, and fire effects.

C. Wildland Fire Use

Allowing the use of wildland fires for resource benefit is an inappropriate strategy at this time due to the cultural preservation mandate of the park, the limited distance to park boundaries, the very high rate of spread associated with grassland fuels, and the limited knowledge of fires' effects on desert ecosystems.

D. Prescribed Fire

While fire has long been recognized as one of the important environmental factors affecting such ecosystems as mixed conifer forests and chaparral, in general, less attention has been given to fire in arid ecosystems. This is due in part to a lack of economic resources at risk, limited number of areas with

sufficient fuels to support fires, and the paucity of dateable evidence, such as scars on tree rings, for establishing fire histories. Because of the lack of Sonoran desert fire ecology information, fire will not be restored to its natural ecological or cultural role at this time. As more information is obtained on fire's natural role in this environment, prescribed fire will be considered for restoring effects.

1. Debris Burning

Fire may be used to dispose of various types of debris generated from resource management or maintenance activities, such as hazardous and fireline vegetation removal, according to the guidelines established in Wildland Fire Management Reference Manual 18, Chapter 10, Fuels Management. All such activities and all new debris burning projects will be reviewed by a fire management officer, or appointed staff person, having wildland fire knowledge. If after consultation with the fire management officer, it is determined that a debris disposal burn will meet all of the following conditions then it may be conducted with debris disposal guidelines.

- a. Is conducted in a cleared area.
- b. Has virtually no chance to exceed the perimeter of the non-wildland environment.
- c. Will not damage surrounding natural or cultural resources.
- d. Does not present a safety threat to crewmembers.
- e. Will not require curtailment during the burning operation.
- f. Will not require a prescribed fire burn boss or fire-qualified personnel to implement.
- g. Requires no follow-up monitoring to evaluate environmental impacts.

Otherwise, it will constitute a prescribed fire and must comply with all requirements for that type of activity.

Debris burns will be conducted in accordance with ADEQ's and Tonto Basin Fire District's open burning regulations.

Debris fires may be conducted by persons without wildland fire qualifications as long as: personnel wear personal protective equipment, qualified personnel are available to respond to an escaped fire, appropriate agencies are notified of the burn, and a safety and evacuation plan is implemented in case of injuries or other emergencies.

2. Air Quality/ Smoke Management

Tonto NM is a Class II air quality area. The park will comply with all federal, state, and local laws and regulations, namely the U.S. Clean Air Act (42 USC 7401 et. seq.) and the Arizona Administrative Code on guidelines for open burning (A.A.C. R18-2-602), prior to any slash pile burning. If the state suspends burning because of poor air quality, the park will not ignite any fuels. Park staff will also contact Tonto Basin Fire District to check local burning conditions or restrictions. Once permission to burn has been obtained from the Arizona Department of Environmental Quality (ADEQ) and Tonto Basin Fire District, park staff will then notify the Gila County Sheriff's office of the planned burn to reduce false alarms if the fire is spotted and reported.

The park will manage smoke from burn piles. Wildland fires (acreage and fuel types burned) will be reported to ADEQ so that they can track smoke emissions. The influence of smoke on health and safety and the visual resources will be considered and kept to a minimum. It may be necessary to extinguish fires through appropriate suppression action when smoke affects a sensitive area or creates a significant public response. Complaints regarding smoke will be documented and communicated to the chief ranger and superintendent. The amount of smoke will be kept to a minimum and controlled by the following methods:

- a. Pile burning will occur outside of heavy tourism periods, if possible.
- b. Burning will be done during seasons characterized by meteorological conditions that allow for good smoke dispersion, especially March 15 through September 15.

- c. Burning will be done during optimum mid-day dispersion hours, with all burn pile ignitions completed by 3:00 p.m. to prevent trapping smoke in inversions or diurnal windflow patterns.
- d. Burning will not be done when winds will direct concentrated smoke towards key vistas and sensitive areas such as the visitor center, cliff dwellings, entrance road, residential area, and State Route 188.
- e. Small changes in wind direction during the burn may be acceptable, if the impact does not disrupt traffic on State Route 188 and the park road.
- f. Burning will not be done when the smoke is not expected to significantly disperse within approximately eight hours of ignition and fully disperse by 12:00 a.m. the next morning. This does not include residual smoke in the immediate burn area.
- g. Smoldering fuels will be reignited so that the fuels will burn with flaming rather than glowing combustion. Piles will be “re-arranged” as they burn down to encourage hot burning and more complete combustion.
- h. Smoldering heavy fuels will be mopped up until conditions improve for smoke dispersion, at which time the fire may be reignited.
- i. Fire lines will be constructed or fuels doused to halt the fire front until reignition is possible under prescribed dispersal conditions.

3. Smoke Management Objectives

- a. Smoke should not obscure visibility on the entrance road and State Route 188.
- b. Smoke should not noticeably intrude into the main cultural scene (north towards Roosevelt Lake and south towards the cliff dwellings).
- c. Smoke should not be a nuisance to park residences and Windy Hill campers. As a measure of this objective, the odor of smoke will not remain more than two consecutive nights.

4. Smoke Monitoring

Park staff should be stationed at the key vistas and sensitive areas mentioned above during burning and until the smoke dissipates. Park staff should monitor and measure the degree to which the stated objectives have been met or violated. Violations will be immediately reported to the “pile burn” team, who will employ smoke management methods listed above. Park monitors will also record the presence or absence of the prescribed conditions for smoke management.

E. Non-Fire Fuel Applications

Director’s Order 18 directs parks to identify, manage, and reduce where appropriate, accumulations of hazardous fuels. Mechanical treatment will be used to clear vegetation away from structures to reduce spread potential and increase defense space. A twelve-foot wide fuel break around the park’s residential area will be maintained. If it is determined that dense vegetation outside the fuel break and within fifty yards of the residences did not meet fire protection objectives, vegetation will be thinned strategically while maintaining a natural appearance. Additionally, vegetation will be trimmed back from the exterior fences that surround the residences as well as from around the maintenance facility and visitor center. Most of the vegetation will be cut with hand tools. Only large limbs will require the use of a chain saw and any grass will be cut with weed eaters.

Table 2. Five-year Fuel Plan

State	Region	Alpha	WUI or HF	Fiscal Year	Project Name	Activity Type	Treat Type	NEPA	Target Acres
AZ	IMR	TONT	WUI	FY02	Developed	Treatment	Manual	FMP EA	5

					Areas			02/06/03	
AZ	IMR	TONT	WUI	FY07	Developed Areas	Treatment	Manual	FMP EA 02/06/03	5

Dead and down trees and piles of woody debris will be manually cleared from the small ¼-acre riparian area, if needed. The wood will be gathered by hand (chainsaws may be required) and loaded on to nearby mechanized equipment for removal. This action will only occur when the build-up of debris has been determined to be a fire hazard to the riparian area. Not all woody debris will be removed, some will be left to decompose and contribute nutrients to the organic soil.

After additional compliance with NEPA and NHPA is obtained, mechanical treatment will be used to clear certain vegetation away from archeological sites to reduce the potential for subsurface “root-burns” into pristine prehistoric fabric and/or to preserve important integrity characteristics that would be impacted by fire.

The cut vegetation and woody debris associated with this program will be primarily used in park restoration projects. Once these projects are completed, excess debris will either be hauled to an off-site landfill or pile-burned within the park in existing cleared areas.

F. Emergency Rehabilitation and Restoration

When suppression action is taken, rehabilitation is appropriate. The most effective rehabilitation measure is prevention of impacts through careful planning and the use of minimum impact suppression techniques. Rehabilitation will be directed toward minimizing or eliminating the effects of the suppression effort and reducing the potential hazards caused by the fire. Rehabilitation should be initiated prior to complete demobilization. Both long- and short-range rehabilitation plans may be necessary.

1. Long-term Rehabilitation Plan

These plans are usually prepared by a team of interdisciplinary rehabilitation specialists, are recommended by the park superintendent, evaluated by the Intermountain Region fire ecologist, and implemented by the park staff over a period of months or even years following the fire. Such plans generally involve major expenditures of funds and are written after large project fires that have impacted the natural environment in a manner that jeopardizes the future integrity of this environment and/or has consumed human development.

2. Short-term Rehabilitation Plan

These plans are written by the incident management team in collaboration with the park resource manager, approved by the superintendent, and implemented by the incident overhead team and the demobilization patrol and mop-up personnel. Such plans describe the “short term fixes” required to immediately stabilize a fire impacted area as a prerequisite to the natural healing process or to restore the visual quality of site disturbance activities taken during the suppression effort.

If emergency rehabilitation measures are needed or if rehabilitation is needed to reduce the effects of a wildland fire then the park can request appropriate funding through the Burned Area Rehabilitation (BAR) fund. The BAR fund is administered by the Intermountain Region fire ecologist/fire management officer under national policy guidelines.

A typical short-term rehabilitation plan prepared by the resource manager should address the following:

- a. All firelines will be rehabilitated by recontouring berms or cuts, back filling, raking, scattering surface debris over the fireline to reduce erosion and stimulate revegetation, and relocating rocks (if removal in any area has been significant).
- b. Revegetation will be used to mitigate impacts in areas subject to public use and observation. If revegetation or seeding is necessary, only native plant species will be utilized. The resource management specialist will be consulted for approval of the species chosen.

- c. Construction of water bars and/or check dams should occur in those areas where erosion is expected to be a problem.
- d. All stumps will be flush cut to within four to six inches of the ground. Cut vegetative materials will be placed in random or natural positions. Felled and bucked material will be positioned so as to be least noticeable to visitors and camouflaged where possible.
- e. All flagging, equipment, and litter will be removed.
- f. Camping/staging areas will be completely restored by raking, seeding, and scattering debris over the bare areas.
- g. More extensive rehabilitation or revegetation to restore sensitive impacted areas will be planned when necessary.

V. ORGANIZATIONAL AND BUDGETARY PARAMETERS

A. Organizational Structure

This section discusses areas of responsibility for implementation of the fire management program by park position and the budget needed for this operation. The purpose is to clearly define areas of responsibility, provide clear direction and accountability, and further the development of a responsive fire management program.

1. Superintendent. The fire management program is under the overall supervision of the superintendent according to departmental and park service policy, fire management guidelines (DO-18), and all relevant laws and regulations. The superintendent is responsible for developing the park's fire management plan and ensuring that supplies, equipment, and qualified personnel are available to meet the goals of this plan. The superintendent also coordinates fire program activities with other agencies or landowners. Technical duties and accompanying responsibilities are delegated to other staff members.

2. Resource Management Specialist (RMS). The resource management specialist ensures the coordination of the fire management program with resource management programs. The RMS is responsible for overall coordination and rehabilitation of burned areas. The RMS develops and/or reviews fire plans. The RMS completes fire reports and other associated documents in a timely manner. The RMS advises project fire overhead and Incident Commanders on potential suppression impacts to natural and cultural resources. The RMS maintains specific knowledge regarding the locations of endangered and/or threatened flora and fauna populations and archeological sites.

3. Chief Ranger. The chief ranger is responsible for overall coordination, direction, and supervision of wildland fire prevention, preparedness, suppression, and demobilization. The chief ranger ensures fire equipment readiness during the fire season, oversees initial attack fire operations, and within delegated authority, arranges for additional equipment and support as needed. The chief ranger monitors fire danger conditions, implements step-up plan activities, and recommends appropriate use restrictions.

The chief ranger serves as the park's investigative and public information officer during on-going fires. The chief ranger investigates the cause of the fire, notifies superiors, and prepares Case Incident Reports.

The chief ranger provides interpretive services and literature designed to inform the public of the park's fire management program, fire's role in the park's ecosystem, and the operations of the NPS fire management organization. The chief ranger provides fire-training opportunities to park personnel to maintain predetermined fire qualification skills. The chief ranger prepares, reviews, and revises cooperative agreements with interagency cooperators and maintains liaison with them through annual meetings to review agreements.

4. Fire Management Officer. The fire management officer (FMO), located at Saguaro National Park, will advise the park in its wildland fire operations per the Interpark agreement. The FMO, in consultation with the RMS, is responsible for the continual development, refinement, and implementation of the fire

management program including funding assistance and hazardous fuel reduction.

5. Administrative Officer. The administrative officer provides emergency personnel, procurement, and fiscal assistance during on-going fires.

B. FIREPRO Funding

No FIREPRO funding is used for the park positions listed above. The park requests NPS Hazardous Fuels funding for implementation of the fuel reduction program.

C. Interagency Coordination

The park benefits from the interagency cooperation with Tonto National Forest and Tonto Basin Fire District (Appendix G). These relationships are fundamental to the success of the park's fire program and must continue to receive emphasis. In general, both agencies provide initial attack on park wildland fires. The lack of qualified fire personnel within the park makes an extended attack capability impractical. Interagency overhead teams may be called to manage or assist the park with fires, which have escaped initial attack. An incident dispatch center located in Phoenix, Arizona will coordinate mobilization efforts of all agencies in central Arizona. An interagency agreement between the Bureau of Land Management, Bureau of Indian Affairs, U.S. Fish and Wildlife Service, U.S. Forest Service, and the National Park Service coordinates agency cooperation on a national level.

VI. MONITORING and EVALUATION

Monitoring will be a part of all wildland fires conducted in the park, if possible. Monitoring wildland fires will be appropriate and potentially valuable in mapping and documenting the growth of the fire. Measuring on-site weather and fuel loading will provide the park with expected fire behavior information. Monitoring will help to define the effectiveness of the fire management program by assessing fire effects and firefighting activities on natural and cultural resources.

VII. FIRE RESEARCH

The initiation of a fire research program is a critical element to direct the park's future fire management program. Its primary objective is to provide information for making fire management decisions. Fire research will be coordinated through the resource management specialist. Needed fire research projects are:

A. Fire Danger and Potential

This is a management oriented, "hands-on" research, which will be gradually accomplished indirectly, through the implementation of this plan. Ideally, there must be a continued effort to gather fire weather and occurrence data within the park and based upon a continuous analysis of this data, refine the burning indexes and subsequent step-up plan to better reflect the state of readiness appropriate of the fire program complexities at the park.

B. Fire Behavior and Effects

Fire behavior and effects research will be conducted on soils, vegetation, and plant successional processes. Past heavy grazing use and its effects on present ecosystem dynamics has raised many questions related to fuel accumulations, ignition frequencies and thus, fire behavior. Possible effects of fire and firefighting activities on cultural resources must also be evaluated. Research findings will be analyzed and used in the decision making process for future fire management programs.

C. Fire Ecology

Information about fire history and ecology is lacking to truly comprehend the role of fire in this desert ecosystem. Limited research has been done in Sonoran desert communities so there is an incomplete data bank to draw upon. Site specific research is needed to determine fire's natural role and frequency in the park.

The findings of a 1992 fire history study showed a dramatic increase of wildfire occurrence (twelve fires in a twenty-year period) over the estimated natural frequency (one fire in a 300-year period). The increased occurrence has given the advantage to non-native grass, which rapidly regenerates and spreads, over fire intolerant native grasses, forbs, shrubs, cacti, and trees. These flammable non-native grasses accelerate ignition and spread of subsequent fires. Additional research would give an understanding of the detrimental effects of too frequent fires in this ecosystem. The effects are little known in this vegetation type.

D. Additional Research

As the park's fire management plan is implemented and tested, additional research will inevitably be identified for such purposes as defining prescriptions, improving the understanding of fire behavior and fire effects, refining monitoring protocols, defining fire return cycles, describing fuel dynamics, describing the impacts on cultural resources, and other information needed for operational fire and resource management projects.

VIII. PUBLIC SAFETY

A. Safety Issues and Concerns

Public and employee safety is the first priority in every fire management activity. The topographic relief, limited surface water, limited access routes, and confined developed areas combine to create hazardous situations under extreme fire behavior.

The highest risk area is the headquarters/visitor center and maintenance facility/housing areas. The single entrance road for entry and exit present potential problems from fire, smoke, and other hazards associated with evacuation of people in their vehicles. The one-mile entrance road ends at the visitor center. Entrapment is possible with no means of vehicular escape. Vehicles could be cutoff or exposed to heat while trying to escape to the state highway. It is paramount that all visitors and employees are evacuated from the park when any potential fire danger threatens.

Visitors hiking to and from the cliff dwellings may also be at risk from wildland fires because all wildland fires in the park have started by lightning strikes on or near hilltops where the cliff dwellings are located.

Smoke is a potential hazard to visitors especially when obscuring roadways. Appropriate warning signs will be placed along roadways where visibility is affected and the Gila County Sheriff's Department will be notified.

B. Safety Procedures

The park will implement a notification system to inform visitors of all fire activity through normal communication channels. A fire activity report will be updated, as significant changes occur, to inform park personnel of potential fire threat. Special precautionary steps will be taken to ensure the safety of park visitors during a fire. Park visitors will be informed of fire locations and safety precautions to be taken. One or more employees will be assigned the task of keeping all visitors a safe distance from the fire. The superintendent may close all or a portion of the park including roads and trails when wildland fires pose an imminent threat to public safety. Local residents will be personally informed in advance of fire activity taking place in the park, including location, rate, and direction of spread. The Gila County Sheriff's Department and Department of Public Safety will also be notified of wildland fire locations. Their assistance may be required if local residents need to be evacuated or State Route 188 closed.

IX. PUBLIC INFORMATION AND EDUCATION

Educating the public on the value of fire as a natural process is important to increasing public understanding and support for Tonto National Monument's and the National Park Service's fire management program. A fire management program in a desert ecosystem, which historically has little or no history of fire, can be a difficult concept to grasp. Nevertheless, the interpretive division, in coordination with resource management staff, has the primary responsibility for providing this education. The park will use the most appropriate and effective means to explain the overall fire management program. This may

include supplemental handouts, signing, personal contacts, or media releases. When deemed necessary, interpretive presentations will address the fire management program and explain the role of fire in the environment.

The public information program will be developed as follows:

- A. Concepts of the natural wildland fire program will be incorporated, as appropriate, in visitor contacts, publications and exhibits, interpretive talks and walks, and environmental education programs at schools and civic clubs.
- B. After fires have burned through an area, appropriate interpretive materials will be prepared and distributed to all visitors entering or viewing these areas.
- C. News releases will be distributed to the media as appropriate when noteworthy fires occur in the park. This will also provide an opportunity to disseminate information about the fire program policy and philosophy.
- D. The public information outlets to neighboring and cooperating agencies and NPS offices will be provided with all fire management information.
- E. The fire management program will be discussed with all employees and residents.

X. PROTECTION of SENSITIVE RESOURCES

A. Archeological/Cultural/Historic Resources

The entire park is listed on the National Register of Historic Places. The park contains cultural resources: sixty-five archeological sites and historic resources: Mission 66-visitor center and six archeological sites on the List of Classified Structures. The extremely dry microclimate of the cliff dwelling caves permitted the survival of large numbers of organic artifacts, such as cotton textiles, cordage, and basketry. These items have become an important part of the park's collection and are displayed in the visitor center museum. Protection of these areas is of paramount importance in the event of a fire and planning strategies will ensure that adequate firefighting resources are available and positioned to safeguard them.

Actions to prevent or mitigate negative impacts

Fire intensity, duration of heat, heat penetration into the soil, and the use of mechanized equipment for suppression are the primary sources of damage to archeological resources (Table 2). To minimize damage from fire suppression activities, fire managers will employ the following strategies:

1. A resource advisor will participate in briefings for overhead and crewmembers.
2. Resource base maps showing archeological site locations will be given to incident commanders on the firelines during wildland fires.
3. Archeological sites will be marked and monitored during suppression through mop-up and rehabilitation.
4. Mechanized equipment, when used, will be monitored through all aspects of fire suppression and rehabilitation and prevented from destroying archeological and cultural sites.
5. Historic buildings (visitor center) will receive the highest priority for protection from fire.
6. After the fire, archeologists will survey the burned area to record any additional cultural sites, features, or artifacts.

Table 3: Cultural Resources at Risk Identification/Treatment Matrix

Historic Context	Resource Type	Elements	Risk Conditions or Activities	Management Objective	Treatments or Prescriptions
Prehistoric Salado (1150-1450)	Surface archeological sites	ceramic/lithic scatters stone alignments/walls subsurface features pollen/plant/bone fragment ornaments	ground disturbance erosion heat intensity/duration fire	features/items remain in situ, protect combustibles from fire	remove/reduce fuels around LCS sites, plan treatments to reduce erosion, mark and monitor arch sites during suppression activities
	Cliff dwellings	ceramic/lithic scatters adobe covered stone walls subsurface features pollen/plant/bone fragment charcoal wood supports/ceilings	ground disturbance erosion heat intensity/duration water fire	features/items remain in situ, protect combustibles from fire, prevent loss of fabric from water	cover ceilings with fire shelter fabric, monitor during suppression activities
Apache/Yavapai	Wickiup rings	fire-cracked rocks ceramic/lithic scatter charred plant material charcoal	ground disturbance erosion heat intensity/duration fire	features/items remain in situ, protect combustibles from fire	remove/reduce fuels around LCS sites, plan treatments to reduce erosion, mark and monitor sites during suppression activities
Euro-American	Dumps	tin cans glass wire cartridges nails/nuts and bolts	ground disturbance erosion heat intensity/duration	features/items remain in situ	
	Structures	transmission towers roads culverts cattle guards	ground disturbance erosion heat intensity/duration	features/items remain in situ	
Modern era	Mission-66 visitor center and museum collection	structure artifacts	fire water	protect combustibles from fire, prevent water damage	

B. Natural Resources or Features

Of special concern are federally listed species that require protection under the Endangered Species Act and its amendments as well as state protected species. Only the bald eagle, Mexican spotted owl, and yellow-billed cuckoo have been documented in the monument. Ferruginous pygmy owl habitat (large saguaros or trees with diameters greater than six inches) may occur in the monument. To date, none of these species' habitats or nesting and perching sites have been located or mapped. What effects, if any, past fires have had on the occurrence of these species is unknown.

Because of their diversity and important habitat component, riparian areas are especially critical to the arid southwest. Riparian habitats are highly productive ecosystems that have been greatly reduced in extent and complexity by groundwater overdrafts, overgrazing, streambed channelization, surface water flow alterations, impoundments, mining, and development. They also supported prehistoric and historic land occupation and uses. Fire that consumes the park's riparian habitat vegetation will have adverse impacts on this rich resource.

Rogers and Steele (1980) reported high percentages of mortality for many desert trees and shrubs in man-caused fires north and east of Phoenix. Rogers (1985) suggests that saguaros (*Carnegieia gigantea*) could be virtually eliminated by a sequence of fires at intervals of less than thirty years because saguaros require thirty years to reach reproductive maturity (Steenbergh and Lowe 1977) and needs shade-producing perennials under which the seedlings become established (Turner et al. 1966).

Actions to prevent or mitigate negative impacts

1. Mechanized equipment, when used, will be monitored through all aspects of fire suppression and rehabilitation and prevented from destroying as much vegetation as possible.
2. Saguaros, other cacti, and the riparian area will receive the highest priority for protection from fire.

C. Developments, Infrastructure, Improvements

The developments, infrastructure, and improvements that require special consideration are the visitor center, residences, and maintenance facility. Visitors, employees, or both occupy these buildings. The park's visitor center is open every day from 8:00 a.m. to 5:00 p.m. except December 25. Not only is the visitor center a public building, but it also serves as the park's administrative facility. All administrative records are stored in office computers, file cabinets, and cupboards. Within the visitor center is the museum. Fires or efforts made to suppress fires could easily damage artifacts in exhibit cases. All four residences are potentially occupied year-round depending on staff levels. The number of employees at the maintenance facility and its hours of operation vary on staff levels and season. It is of the utmost urgency to protect people in these buildings.

Actions to prevent or mitigate negative impacts

1. Base maps showing structure locations will be given to incident commanders on the firelines during wildland fires.
2. Public buildings (visitor center) and those housing employees (residences, maintenance shop) will receive the highest priority for protection from fire.
3. All buildings will be evacuated as soon as the situation warrants.
4. If possible, power to the buildings will be turned off prior to evacuation.
5. As time permits, the buildings will be protected from wildfire by removing debris around them, constructing firelines, laying wet lines, etc.

XI. FIRE CRITIQUES AND ANNUAL PLAN REVIEW

All wildland fires and fire-related incidents will be reviewed within thirty days after the fire has been declared out. All reviews will be conducted as constructive critiques aimed at determining the facts related to the specific fire or fire management program. They will identify commendable actions, techniques and decisions as well as areas that need improvement. The superintendent or his/her designated representative will

conduct the review. The superintendent will appoint other qualified persons including the resource management specialist, chief ranger, and Saguaro National Park FMO to be a part of the review. An interagency investigation team will review all entrapments and fire shelter deployments.

The Fire Management Plan will be reviewed annually and revised every five years according to RM-18. Necessary updates or changes will be accomplished prior to the next fire season. The superintendent will review any additions, deletions, or changes to determine if such alterations warrant a re-approval of the plan.

XII. CONSULTATION AND COORDINATION

FMO, Saguaro National Park
Wildland Fire Specialist, IMR – Santa Fe
Tonto National Forest
Tonto Basin Fire District
U.S. Fish and Wildlife Service
State Historic Preservation Office

APPENDICES

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Definitions

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

Expected Weather Conditions – Those weather conditions indicated as common, likely, or highly probably based on current and expected trends and their comparison to historical weather records. These are the most probably weather conditions for this location and time. These conditions are used in making fire behavior forecasts for different scenarios.

Experienced Severe Weather Conditions – Those weather conditions that occur infrequently, but have been experienced on the fire site area during the period of weather records. For example, rare event weather conditions that significantly influence fires may have occurred only once, but their record can be used to establish a baseline for a worst-case scenario. These are the most severe conditions that can be expected. These conditions are used in making fire behavior forecasts for different scenarios.

Fire Complexity Analysis – A process for assessing wildland fire organizational needs and relative complexity in terms of ICS types.

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 Management Unit (FMU) – Any land management area definable by objectives, topographic features, access, values-to-be-protected, political boundaries, fuel types, or major fire regimes, etc., that sets it apart from management characteristics of an adjacent unit. FMUs are delineated in Fire Management Plans (FMP). These units may have dominant management objectives and pre-selected strategies assigned to accomplish these objectives.

Initial Attack – An aggressive suppression action consistent with firefighter and public safety and values to be protected.

Mitigation Actions – Mitigation actions are considered to be those on-the-ground activities that will check, direct, or delay the spread of fire and minimize threats to life, property, and resources. Mitigation actions may include mechanical and physical non-fire tasks, specific fire applications, and limited suppression actions. These actions will be used to construct firelines, reduce excessive fuel concentrations, reduce vertical fuel continuity, create fuel breaks or barriers around critical or sensitive sites or resources, create “blacklines” through controlled burnouts, and to limit fire spread and behavior.

Normal Fire Year – The normal fire year for suppressed wildland fires is the year with the third highest number of wildland fires in the past ten years of record.

Preparedness – Activities that lead to a safe, efficient and cost effective fire management program in support of land and resource management objectives through appropriate planning and coordination. This term replaced presuppression.

Prescribed Fire – Any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire plan must exist, and NEPA requirements must be met, prior to ignition. This term replaced management ignited prescribed fire.

Wildland Fire – Any non-structure fire, other than prescribed fire, that occurs in the wildland. This term encompasses fires previously called both wildfires and prescribed natural fires.

Wildland Fire Complexity Analysis – The formal process to determine the full complexity rating for wildland fires. It utilizes twelve variables having numerically weighted importance combined with user identified

complexity values.

Wildland Fire Implementation Plan – 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.

Wildland Fire Management Program – The full range of activities and functions necessary for planning, preparedness, emergency suppression operations, and emergency rehabilitation of wildland fires, and prescribed fire operations, including non-activity fuels management to reduce risks to public safety and to restore and sustain ecosystem health.

Wildland Fire Situation Analysis – A decision-making process that evaluates alternative management strategies against selected safety, environmental, social, economic, political, and resource management objectives.

Wildland Fire Suppression – An appropriate management response to wildland fire that results in curtailment of fire spread and eliminates all identified threats from the particular fire. All wildland fire suppression activities provide for firefighter and public safety as the highest consideration, but minimize loss of resource values, economic expenditures, and/or the use of critical firefighting resources.

Wildland Fire Use – The management of naturally ignited wildland fires to accomplish specific pre-stated resource management objectives in pre-defined geographic areas outlined in Fire Management Plans. Operational management is described in the Wildland Fire Implementation Plan.

Species lists

1. **Plants** (Jenkins, et al., 1991)
2. **Mammals** (Swann, et al., 1996)
3. **Reptiles** (Swann, et al., 1996)
4. **Amphibians** (Swann, et al., 1996)
5. **Birds** (Hiett, et al., 1996)
6. **Invertebrates** (Price, et al, 1995)

All species lists are on file at Tonto National Monument.

NEPA and NHPA compliance

The Finding of No Significant Impact for the Environmental Assessment follows this page.