

Environmental Assessment

for the

Amendment of the Tonto National Forest Land and Resource Management Plan Management Direction for

Wildland Fire Use



March 2006

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
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Chapter 1- Project Scope

Background

The existing Tonto National Forest Land and Resource Management Plan (Forest Plan) was approved in October of 1985, and the Standards and Guidelines within the current plan reflect agency fire management policy at that time. During the mid 1990's, issues of forest health, public safety, firefighter safety, and wildland/urban interface precipitated a major change in the agency's fire policy. The Secretaries of Agriculture and Interior jointly adopted a new Federal Wildland Fire Management Policy December 18, 1995. The policy has since been incorporated into Chapter 5100 of the Forest Service Manual. The policy supports the need to re-establish the role of fire within fire-dependent ecosystems. This environmental assessment has been completed to meet the requirements of the National Environmental Policy Act of 1969 (NEPA).

Purpose of Action

The purpose of the proposed action is to align fire management direction within the Forest Plan with the Wildland and Prescribed Fire Management Policy. The goal of implementing the Wildland and Prescribed Fire Management Policy is to re-establish a more natural fire regime in short interval fire adapted ecosystems, and to allow lightning caused fire to play, as nearly as possible, its natural role in the ecosystem.

Need for Action

The current Forest Plan is not consistent with the new policy which directs federal agencies to achieve a balance between suppression to protect life, property, and resources, and fire use to manage fuels and maintain healthy ecosystems.

Periodic lightning-caused fires, which are part of the natural ecological processes that help maintain the vegetative communities and habitat diversity, have been suppressed (to protect property and timber value) to the extent that ecological benefits minimized. A lack of natural fire influences over the past century has changed the character of the vegetative communities within the Tonto National Forest. The natural role of fire has been virtually eliminated from a fire-dependant vegetative community within the Tonto National Forest.

The unnatural accumulation of fuels (both dead and live) has left many forested areas susceptible to high intensity wildland fires. Wildland fires burning in chaparral communities are becoming more of a threat to adjacent forest areas. Extensive stands of mature, even-aged brush within the chaparral community are increasing the potential for large scale, intense wildland fires. The interruption of a natural fire return interval has contributed to a decline of structural and vegetative diversity in forested areas. The absence of periodic fires has contributed to an increase of woody species and a decrease in grasses.

Proposed Action

The USDA Forest Service, (Tonto National Forest) proposes to amend the Forest Plan to reflect the new federal wildland fire management policy. Management Direction and related sections will be amended to include the following:

- ◆ Fire, both natural and prescribed, will be authorized as a tool for resource management both within and outside designated Wilderness areas.
- ◆ Management Direction will place an emphasis on reducing the threat of wildland fire within wildland/urban interface.
- ◆ New Standards and Guidelines will allow the use of prescribed fires in all ecosystems, but with limited applications in Sonoran desert, riparian areas, and selected Research Natural Areas.
- ◆ In Sonoran desert and riparian areas, suppression tactics that minimize resource impacts within these ecosystems will be emphasized.
- ◆ Management Direction for Wild and Scenic River areas and Wilderness areas will be amended to make the text more consistent with direction in the laws that designated the units.
- ◆ Standards and Guidelines will be amended to address the need to return natural fire to fire-dependent ecosystems.
- ◆ New standards and guidelines will establish post fire management assessment requirements.

Decision to be Made

The Forest Supervisor has the authority to make the decision to amend the Forest Plan to address fire management on the forest. If the Forest Supervisor decides to amend the Forest Plan, the decision will include revised text for all amended pages. The decision would apply to all National Forest System lands under primary jurisdiction of the Forest Service within the Tonto National Forest. The decision is not applicable to any non-National Forest System lands within the boundaries of the Tonto National Forest. This action is a non-significant amendment of the Forest Plan.

Public Involvement and Issues

Issues are concerns about the legality or effects of implementing the proposed action. A letter identifying the proposed action was sent to all agencies, local governments, organizations and individuals who have expressed interest in the Forest Plan on November 18, 1998. Seven letters of response were received (see Chapter 5). Since that date, the proposed amendment has been included in the Forest's Quarterly Schedule of Proposed Actions. This schedule is sent to approximately 500 parties and is posted on the Forest's website. No comments were received in response to the listing. Five issues were identified as a result of scoping the proposal to amend the Forest Plan. The issues are:

Issues Identified as a Result of Scoping the Proposal to Amend the Forest Plan	
Issue	Determination
1. There is a need to adequately address special status species; those designated as Threatened, Endangered or Sensitive (TE&S).	Effects to listed Threatened and Endangered species, and other special status species was identified as a significant issue. The effects are analyzed in Chapter 3. In addition, a Biological Assessment and Evaluation on the selected action will be prepared and consultation initiated with US Fish & Wildlife Service. Management of each individual prescribed fire requires a project specific determination of the potential effects to TE&S species.
2. The Proposed Action does not address agreements related to private lands and other government agencies.	Agreements are not land or resource allocations or constraints so this issue was not considered significant. However, Forest Service policy encourages collaboration with State and local governments and NEPA requires public notification to interested and affected parties. Where mutually beneficial, there is nothing preventing the Forest Service from entering into agreements with respect to fire management. See Chapter 3, Fire/Fuels Management.
3. An alternative should be included that allows for management of all ignitions that are within prescription.	To allow management of human-caused (non-prescribed) ignitions would not meet the purpose of aligning Forest Plan direction with National Fire Policy. The proposed action would allow for management of all natural ignitions that are within prescription to be managed provided that standards and guidelines are followed before a determination is made to proceed with the action. This issue was therefore not considered to be significant.
4. Increased smoke emissions could pose a direct threat to public health.	This issue was considered to be significant and is analyzed in Chapter 3, primarily in the Air Quality section.
5. Increased smoke emissions would be a public nuisance.	This issue was considered to be significant and is analyzed in Chapter 3, primarily in the Recreation, Wilderness and Related Resources section.
6. Management direction specific to grazing should be revised to minimize grazing effects to wildlife habitat following fires.	This revision or development of range management direction is outside the scope of this proposed action. See Chapter 2 on how this proposed alternative was considered.
7. An alternative should be considered that would not allow prescribed fire or management of natural ignitions.	Such an alternative would not meet the purpose and need for the amendment. See Chapter 2 on how this proposed alternative was considered.

Project Location / Analysis Area

The Tonto National Forest fire management area discussed within this document involves approximately 2.9 million acres. The area is described as part of the central Arizona mountains and

basin region. Steep mountains, deep narrow canyons and mesas characterize topography. The two main drainage basins are the Salt and Verde rivers. Elevations on the Forest range from 1300 - 7800 feet above sea level. The Tonto is within parts of the following counties: Maricopa, Gila, Pinal and Yavapai. Vegetation is highly diverse due to wide variations in soils, elevation, and climate. Plant communities range from the desert scrub and semi-desert grasslands at the drier lower elevations, through the interior chaparral and pinyon-juniper woodland, to ponderosa pine and some mixed conifer.

Additional NEPA Analysis

This environmental analysis is intended to evaluate environmental effects at the Forest Plan, or programmatic level. Implementation by means of prescribed fire will require a separate, site-specific NEPA analysis and documentation for each project. If new information or circumstances result, or may result, in environmental impacts which have not been disclosed in this document, additional analysis and documentation may be required.

Chapter 2 - Alternatives

Alternative Development

On October 8th, 1996, the Tonto National Forest Fire Management Team identified the need to amend the Forest Plan to reflect changes in agency policies regarding fire and fuels management. A steering committee was identified to begin this process and met in January 1997. In February 1997, the steering committee identified the interdisciplinary team, and in March, the interdisciplinary team met to establish the objectives for the proposed amendment. After management needs were identified concerning the existing forest plan, the interdisciplinary team began a page-by-page approach to identify actions that would address both the need for the amendment and expected regulatory and public issues. Following development of the proposed action, letters were sent to interested parties on November 18th, 1998, to inform them of the proposed amendment and to ask for their review and comment.

Alternatives Dropped from Detailed Study

The interdisciplinary team identified four possible alternatives in response to public scoping. Two of these alternatives were dropped from detailed analysis. These were:

- ◆ An alternative was considered which would add/change standards and guidelines in the Forest Plan specifically pertaining to range management. These standards and guidelines would specify time periods for excluding grazing from burned areas in order to maximize vegetative recovery. This alternative was outside the scope of the purpose and need for action. However, new standards and guidelines in the proposed action, Alternative A, will address the need for post-burn evaluations.
- ◆ An alternative was considered in response to social concerns that would prohibit the use of prescribed fire and would not allow the management of natural ignitions. It was determined that this alternative would not meet the intent of the National Wildland and Prescribed Fire Management Policy, and as such would not meet the purpose and need for action.

Alternatives Considered in Detail

The Proposed Action and No Action alternatives were the only alternatives considered in detail.

Alternative Description

Alternative A

Amend the Forest Plan Management Direction to be consistent with the revised Wildland and Prescribed Fire Management Policy and to incorporate the following:

- Revise text to allow fire, both natural and prescribed, to be used as a tool for resource management both within and outside Wilderness areas.
- Revise the text of management prescriptions to place an emphasis on reducing the threat of wildland fire within wildland/urban interface.
- Include new Standards and Guidelines that would allow the use of prescribed fires in all ecosystems, but limit applications in Sonoran desert and riparian areas, and in specific Research Natural Areas.
- Include new Standards and Guidelines for suppression strategies would reduce the potential for resource damage within Sonoran desert and riparian ecosystems.
- Revise text in Wilderness and Wild and Scenic River Management Areas to be more consistent with language in the laws that established the designated units.
- Revise text to address the need to return natural fire to fire-dependent ecosystems.
- Include new Standards and Guidelines that will require post-burn evaluation of management needs.

Alternative B

This is the "No Action" alternative required by the National Environmental Policy Act and implementing regulations. This alternative represents continuation of the existing management. The Forest Plan would not be amended to reflect the new Wildland and Prescribed Fire Management Policy. Therefore natural ignitions could not be managed for resource benefit outside of Wilderness Areas, and prescribed fire could not be used as a tool inside Wilderness Areas to allow the return of a natural fire regime. This alternative serves as a baseline for predicting environmental effects.

Chapter 3 - Affected Environment and Environmental Consequences

Introduction

This Chapter describes the environmental factors within the project area and the changes that can be expected from implementing the action alternative or taking no action at this time. The no action alternative sets the environmental baseline (present condition) for comparing effects of the action alternative.

The significant issues (see Chapter 1) define the scope of the environmental concern for this project. The environmental effects (changes from present baseline condition) that are described in this chapter respond to the identified significant issues.

Fire / Fuels Management

Affected Environment

Fire management in the Tonto National Forest is a coordinated interagency effort involving Federal, State and local agencies. Current management direction, which emphasizes reducing the threat of wildland fire within the wildland/urban interface, may be difficult to attain. Conflicting management emphases in management areas adjacent to Wild and Scenic River, and Wilderness areas limit the management options to meet desired resource objectives. Prescribed fires would continue to be the only option for maintaining natural ecological processes outside wilderness boundaries. During an eight year period from 1991 to 1998, the Tonto National Forest treated an average of 7,417 acres annually using prescribed fire. Wildland fire used for resource benefit is currently the only fire management option to utilize inside Wilderness areas. The current management direction does not adequately address protection of the Sonoran Desert ecosystem from fire.

A study of fire histories at selected sites was conducted for the Tonto National Forest to provide baseline historical and ecological data on past fire regimes. Fire history was reconstructed from fire-scarred pines using tree-ring cross-dating methods (dendrochronology). Fire history was reconstructed at Webber Creek in the ponderosa pine forest stands surrounding Camp Geronimo about eight miles east of Pine, Arizona. Fire history was also reconstructed in the ponderosa pine forest stands covering the upper slopes of Mount Ord, about 10 miles northeast of Sunflower, Arizona.

The mean fire return intervals (number of years between fire scars) at Webber Creek show that small fire events occurred about every 1 to 3 years and ranged between 0.2 and 25 acres. Larger fire events occurred about every 3 to 7 years and ranged between 25 and 250 acres. More extensive fire events occurred about every 8 to 13 years. These fires probably spread throughout the majority of the site and beyond, ranging between 100's and probably at the more conservative intervals reaching 1000's of acres.

The mean fire return intervals at Mount Ord show that small fire events occurred every 1 to 2 years and ranged between 0.2 and 250 acres in size. Larger fire events occurred about every 3 to 8 years and ranged between 250 and 2500 acres. More extensive fire events that spread throughout, and likely beyond, the site, were recorded at lesser intervals about every 9 to 12 years.

The extent of past fires can never be exactly known beyond the sampled tree, but can be implied from individual tree records and extrapolated between trees and sites where fires potentially spread. Although fire-scar data are precise and accurate, the range and variability of these fire-events histories and particularly the spatial inferences are open to interpretation and are therefore only estimates.

Past and present management practices have been very successful in the suppressing wildland fires on the Tonto National Forest. This success has changed the character of the landscape, resulting in an excessive vegetative build up. Current ten-year Tonto National Forest wildland fire data from 1987 to 1996 indicates a total of 3,286 fires affecting 204,000 acres in a variety of vegetation types.

The lack of natural fire influences over the past century has changed the character of the vegetative communities associated with various ecosystems within the Tonto National Forest. Periodic fires that were once part of the natural ecological processes that helped maintain structural, and species diversity, have been virtually removed from the landscape.

Firefighter and public (wildland/urban interface) safety is currently at a greater risk from wildland fires. Fire suppression costs on fires over one thousand acres are increasing on an annual basis. Beneficial effects of fire as part of an ecological process in a landscape are now very limited, where once these ecosystems were adaptive to frequent low intensity fires.

Currently the Tonto is experiencing large and small scale fires with very few intermediate sized fires. Low to moderate intensity fires are not common. This has resulted in large, dense stands of vegetation, and reduced the diversity of mosaic burn patterns in many of the vegetation types found on the forest.

Environmental Consequences

Alternative A - Proposed Action

Alternative A will allow the Tonto National Forest to use Wildland and Prescribed Fire Forest-wide to better protect, maintain and enhance resources. Due to the new wildland and prescribed fire management policy and program, Alternative A offers more opportunities to coordinate with other federal, state and local agencies to address mutual concerns in resource management, resulting in more efficient and effective fire management. Alternative A will also increase comprehensive management direction to protect Sonoran Desert to minimize damage within this ecosystem from fire.

Implementing the proposed action would re-establish a more natural fire regime in short interval fire adaptive ecosystems, and to allow lightning caused fire to play, as nearly as possible, its natural role in the ecosystem. In the short term, the Forest may not experience substantial change in ecosystems due to implementing this activity Forest-wide. It is expected that, in the long term, ecosystems would be influenced by more low to moderate intensity fires.

Benefits from fire use include: improved firefighter's safety due to fuel reductions and improved public safety in the wildland/urban interface. Suppression costs in the short term may be reduced as wildland fires are managed for resource benefit. As tree and shrub densities are reduced and diversity improves, the cost for larger fires could be significantly reduced due to improved suppression strategies. The total number of fires annually may not change over time, but a reduction in large fires as the forest develops a more diverse and mosaic vegetative landscape can be expected.

Alternative B - No Action

This alternative is the continuation of current Forest plan direction. The current Forest Plan is not consistent with the new policy that directs federal agencies to achieve a balance between suppression to protect life, property, and resources, and fire use to regulate fuels and maintain healthy ecosystems.

Opportunities to work with other federal, state and local agencies would be limited to the types of management techniques the Forest is able to utilize.

The natural role of fire will continue to be minimized in the vegetative communities within the Forest. The use of wildland fires for resource benefit would be limited to Wilderness areas only. Wildland fires occurring outside Wilderness boundaries could not be managed for resource benefit, and would continue to be suppressed. Natural ignitions occurring within wilderness boundaries, and subsequently managed as a wildland fire managed for resource benefit, would be contained or suppressed where it could cross those boundaries. Prescribed fires would continue to be the only option for maintaining the natural ecological processes outside wilderness boundaries.

The ability to provide for firefighter and public safety would continue to decline, and the cost of suppression activities would increase.

The unnatural accumulation of fuels (both dead and live) will leave forested areas at risk from fires. The Forest would have an increasing number of large fires, and the lack of vegetative diversity will increase the probability of a large fire environment. The absence of periodic fires will continue to increase woody species and decrease grass species

Alternative B would not adequately address the increased need to protect the Sonoran desert ecosystem.

Watershed Resources

Affected Environment

Water

The Tonto NF lies within the Central Highlands physiographic province of Arizona and contains at least portions of twenty-four 5th code watersheds. The majority of the Forest drains into the Salt and Verde Rivers. Small portions of the Forest lie in watersheds that drain directly to the Gila River, Agua Fria River or Cave Creek. The Forest is a critical source of runoff for water supply reservoirs operated by the Salt River Project on the Salt and Verde River systems, which provide supplies to the Phoenix metro area. Total water yield generated from Forest watersheds is estimated at 350,000 acre-feet annually.

Soils

Soils and vegetation data are derived from the General Ecosystems Survey (GES) Report, USDA Forest Service, Southwestern Region, 1989. The GES, intended as a broad assessment, is mapped at a scale of 1:250,000.

The GES provides erosion data that is based on the Universal Soil Loss Equation (USLE). The USLE erosion model predicts an average soil loss on the Tonto National Forest of 2.1 tons/ acre/year. The soils are also rated for erosion hazard, which is the erosion that is predicted to occur if all vegetative cover (plants and litter) were removed such as would occur with an intense wildfire. In 1989 the rating indicates 1,358,838 acres with a slight erosion hazard, 1,202,602 acres with a moderate erosion hazard, and 376,631 with a severe erosion hazard, which normally occur on steep slopes.

Vegetation

The vegetation in the GES report is mapped at the series level, which means each state within this rank consists of vegetation having the same potential dominant species at climax. In the series there is a degree of homogeneity that reflects the requirements and tolerances of the dominant indicator plants. For the purpose of planning, the vegetation series can be grouped into broad categories.

The **Riparian Series** (71,117 acres) consists of a variety of vegetation types associated with rivers, streams, lakes and springs. There is little published information on historic fire regimes or fire effects on riparian vegetation. It seems likely that the moist and extensive broadleaf deciduous riparian forests functioned as firebreaks. When fire did occur in this zone, it probably burned in a patchy, mosaic pattern, underburning with occasional patches carrying crown fires. Most broadleaf species are easily top killed, but re-sprout following fire. The vegetation on drier terraces adjacent to floodplains, although wetter than upland vegetation on adjacent slopes, probably had higher fire frequencies than did floodplain vegetation. Terraces dominated by evergreen species, such as oaks, juniper and pine, probably had fire regimes more similar for those species. In narrow drainages with steep, valley side slopes or in drainages with intermittent streams and less mesic vegetation, fire frequencies may have more closely approached that of adjacent vegetation types.

The **Sonoran Desert Series** (723,682 acres) consists of a variety of vegetation types. Most have a sparse understory of herbaceous vegetation except during very wet periods when native and non-native invasive annuals can be lush. These introduced annuals have created an environment for large fires, which has increased in the last 10 to 15 years.

The **Semi-Desert Grassland Series** (234,027 acres) contains a mixture of native perennial grasses. In many cases, heavily impacted areas have only a sparse covering of grasses with poor diversity. On gentler

slopes, the vegetative cover is normally not dense enough to carry fire. Steeper slopes normally have a thicker cover of grass and may carry a fire.

The **Chaparral Series** (562,613 acres) is a fire dependent shrub community that requires occasional to frequent fires to maintain its health.

The **Woodland Series** (390,542 acres) consists of a wide variety of diverse habitat types. They range from open juniper savannas with a grassy understory to dense stands of chaparral woodlands that contain species associated with chaparral as well as pinyon/juniper. Past fire regimes were a mixture of surface and crown fires and of variable intensity and frequency depending on site productivity (Gottfried et al. 1995). Productive sites may have sustained patchy fires at intervals of 10 to 50 years and may have attained densities sufficient to carry crown fires at intervals of 200 to 300 years.

The **Arizona Cypress Series** (44,705 acres) is a disturbance dependent ecosystem. Arizona cypress seeds require scarification to sprout. In most cases scarification is provided by fire but in riparian areas it may be provided by flood. Nearly all stands of cypress have only a very sparse herbaceous layer.

The **Forest Series** (361,463 acres) consists of timbered areas primarily ponderosa pine. In most cases the density of these stands have become thicker over time because of a lack of fire due to fire suppression or a lack of a herbaceous layer to carry small fires.

Environmental Consequences

Alternative A - Proposed Action

Water

The proposed action should have a net positive impact on watershed conditions by reducing the number of large wildfires, which have detrimental effects on watersheds. Watershed response to burning depends on several factors, the most important being the severity of the fire and the immediate post fire precipitation regime (Debano et al, 1996). The major effect that fire has on hydrologic responses is through the removal of plant and litter cover, which protects the soil surface. Development of water repellent soils also affects hydrologic response to fire. The amount of plant and litter cover removed during a fire and the extent of water repellent soils developed, determines the magnitude of hydrologic responses that can be expected following fire if precipitation amounts and intensities are equal. Hydrologic responses to burning can include: (1) changes in the timing, magnitude and quantity of stream flows, (2) changes in physical parameters, such as temperature, sediment yield, and dissolved oxygen, (3) changes in biological and chemical constituents, and (4) changes in stream channel morphology.

Important onsite hydrologic processes that can be affected by fire include interception of precipitation, infiltration and runoff, and surface erosion.

Interception - Successful prescribed burns consume only part of the forest floor and do not normally consume canopy except in chaparral and grassland burns. Thus, prescribed burns often have little effect on interception by the upper canopy. Their effect is primarily reduced interception in the lower canopy and partial removal of the litter layer. The remaining litter layer intercepts raindrop impacts that are not intercepted by the upper canopy. Following severe fires, much of the plant canopy and litter layer are completely consumed and consequently little interception occurs. Reduced interception results in greater surface runoff and erosion.

Infiltration and Runoff - Prescribed burning probably has its greatest hydrologic influence on infiltration and consequently on overland flow potential. Prescribed fire normally results in a mosaic pattern of burned organic matter because of natural variations in moisture conditions. This mosaic pattern results in varying degrees of influence on infiltration rates within an area. If properly executed, prescribed burning will not significantly affect the integrated overland flow and streamflow regime of a watershed. Wild fires, in contrast, can have substantial effects on infiltration. Removal of organic material on and within the soil profile can result in a breakdown of soil structure and allow raindrop impact to plug pores and create a surface crust thus reducing infiltration.

The effects of fire on infiltration and runoff can also result in large increases in peak flows. Little information exists on the response of stream flow to low severity prescribed fires. However, because the major watershed responses to severe wildfires often last for only a couple years, and sometimes only for the first runoff season, it is likely that the detection of downstream impacts caused by prescribed burning would be difficult.

Erosion - Prescribed burns are designed so as to not completely consume excessive amounts of litter and vegetative cover. The mosaic pattern produced by prescribed burns reduces the development of water repellent soils and often reduces the amount of soil movement within and from a watershed.

Water quality parameters most affected by fire are sediment and dissolved nutrients.

Sediment - Sediment and turbidity are the most dramatic and important water quality responses associated with fire. The greater the amount of plant canopy and litter removed by a fire, the greater the chances of surface erosion and sediment yield from a given storm. Sediment yields generally return to pre-burn levels within 3 to 5 years following wildfire. Effects of prescribed fire are generally much less than those of intense wildfires.

Nutrients - The most important nutrients affected by fire are nitrogen and phosphorous. Nitrate-N (NO_3), ammonium-N ($\text{NH}_4\text{-N}$), and organic-N are the most common forms of nitrogen studied as indicators of land disturbance on water quality. Nitrate-N is released through volatilization and erosion and is one of the most mobile ions in the soil-water system (Baker, 1990). Nitrogen levels are normally very low (less than 1 mg/l) in southwestern streams draining undisturbed areas. Maximum concentrations of $\text{NO}_3\text{-N}$ following fire range from .01 mg/l to 12.0 mg/l (Rinne and Neary, 1996). The Arizona standard for drinking water is 10 mg/l.

Burning also has significant direct and indirect effects on the phosphorous cycling process. About 50% of total phosphorous available in litter, particularly pinyon-juniper litter is lost during combustion. Some phosphorous is also lost by erosion after a burn. Phosphorous concentrations have been found to increase in overland flow from burned areas, but the increases are usually not sufficient to affect stream or lake water quality (Baker, 1990). Most increases in sediment and chemical constituents are short lived and water quality quickly returns to pre-fire levels.

Prescribed fire usually has minor hydrologic impacts on watersheds because surface vegetation, litter and forest floor are only partially burned (Debano et al, 1996). Differences in impacts between prescribed burning and wildfires depend partly on the vegetation type affected. The hydrologic effects of prescribed fires on each vegetation type are discussed below under Vegetation.

Soils

Alternative A should result in a net long term reduction in soil erosion due to a decreased risk of large wildfires which often result in massive erosion. Complete removal of vegetation could increase existing erosion rates by a factor of about four or five. The short term results may be a small increase in erosion because of more fires, both natural and management ignited. Almost all fires will remove some vegetative or litter cover and expose soils to greater erosion, at least on a short-term basis. The reduced risk of large fires, however, should result in a net benefit to soils.

Vegetation

The effects as they pertain to the various vegetation types follow:

Riparian - The proposed action will allow prescribed fire to be used to achieve the objectives of allowing fire to play its natural ecological role and to reduce unnatural fuel hazards.

Fire can affect riparian ecosystems both directly and indirectly. Direct effects consist mainly of damage to vegetation (trees, shrubs, and grasses) and partial consumption of the underlying litter layer. The severity of damage depends largely on the intensity of the fire. Most broadleaf species are easily top killed, but resprout following a fire. Wildfires have killed mature cottonwood, sycamore, velvet ash and walnut (Bock and Bock, 1990). Intense fires can cause severe damage to plant cover while low intensity cool burning prescribed fires may have minimal effects.

A reduction in large wildfires would benefit riparian areas. Both wildfires and prescribed fires can have indirect effects on riparian systems by changing fluvial processes in a watershed. Increases in peak flows from degraded watershed conditions following a fire (particularly intense wildfires) can have profound influences on riparian biota by sediment deposition in the channel and floodplain, and alteration of channel geomorphic characteristics from scouring and sediment transport. Increases in annual flood peaks of greater than 20 percent can lead to channel instability and degradation, and aquatic and riparian habitat deterioration.

Sonoran Desert – The proposed action will utilize a strategy to minimize damage from fire within this ecosystem. A reduction in large wildfires due to the proposed fire use program, will over time, provide some benefit to desert ecosystems by reducing the amount of fire that spreads to the deserts from other ecosystems. A limited application of fire in the desert may reduce the extent of desert fires somewhat but fire may continue to have a major adverse impact in those years when there is an excessive buildup of annual vegetation.

Semi-Desert Grassland - Most wildfires in this ecosystem are of low to moderate intensity. Some fires may be beneficial, removing dead material and invigorating grasses. Because of this, natural fire can be used more but grasslands, especially flatter areas, do not have heavy enough fuels to carry fires. Fire severity can vary greatly depending on fuel type and density, ranging from severe burns on brush occupied areas to low intensity on sites occupied primarily by grass. This burning pattern would result in a mosaic burn pattern over a specific area. Reduction in shrubby species would most likely increase soil moisture available for grass and stream flow. The proposed action may have only a minimal effect on flatter grassland ecosystems.

Chaparral – The proposed action will provide a mosaic of age classes in chaparral by the use of fire and should benefit this ecosystem by reducing the risk of large wildfires, which can lead to massive amounts of soil erosion. Prescribed burning in chaparral differs from that in ponderosa pine in that primarily the shrub canopies carry both prescribed and wild fires. Burning the canopy in chaparral

makes it more difficult to control the behavior and intensity of the fire so that only minimal impacts to the soil and vegetation will occur.

Woodland - The proposed action will increase structural and vegetative diversity, decrease woody species and increase grasses. Fire effects vary widely depending on the characteristics of the area being burned and the type of burn. The greatest impacts occur where fuel loading and fuel consumption is greatest. Fuel loads in uncut stands are heaviest directly under tree canopies. Prescribed burning in areas where grasslands are being invaded by seedlings and younger trees are generally low intensity fires. Where fuelwood has been harvested and/or pinyon/ juniper stands have been thinned and the slash has been scattered also results in lower severity fires than areas where slash is piled and burned.

Arizona Cypress - There are large variations within the Arizona cypress series. Many areas have a thick brushy understory and are intermixed with chaparral. These areas are very susceptible to large wildfires. Other areas exist as nearly pure stands of cypress and have a low risk of fire. Regardless of the type, the proposed action should reduce the chances of wildfires occurring in the cypress communities.

Forest – The proposed action should re-establish a more natural fire regime in this short interval fire adapted ecosystem and help maintain this vegetative community. It will also increase structural and vegetative diversity. Large differences in impacts can occur in ponderosa pine forests. Successful prescribed burns ignite only the litter and smaller diameter surface fuels. Intense wildfires in contrast result in near total canopy consumption.

Alternative B - No Action

Alternative B would maintain the current fire policy which could eventually lead to more large wildfires, which would have much more severe hydrologic impacts than those of Alternative A.

Soil

Maintaining the current fire policy could eventually lead to more large wildfires. This could lead to a net increase in soil erosion, which tends to greatly increase in areas affected by large wildfires.

Vegetation

Current fire management has resulted in excessively dense vegetation and litter in some ecosystems, which make them more vulnerable to a large wildfire. In other ecosystems, management practices have not caused a buildup of fuels, and in fact, there may not be enough fuels to carry fire in these areas. Current management has left some ecosystems very vulnerable to fire; some have remained unchanged, while others are less susceptible to fire.

The effects, as they pertain to the various vegetation types, follows:

Riparian Areas - An increase in large wildfires would lead to an increase in flooding within and downstream from the burn, with resulting damage to stream channels and riparian vegetation.

Sonoran Desert - The no action alternative will leave the desert more vulnerable to damage from fire than the proposed action.

Semi-Desert Grassland - Most fires in this ecosystem are of low intensity. Therefore, actions that are designed to prevent large wildfires, such as Alternative A, may have only a minimal effect on this ecosystem.

Chaparral - Current management will leave chaparral vulnerable to large-scale fires. Large fires in this ecosystem could also spread to neighboring ecosystems.

Woodland - Because of the large amount of natural diversity within woodlands, effects of the no action alternative are somewhat difficult to predict. Current fire management may leave some stands vulnerable to a wildfire, especially one that moves into the woodlands from another ecosystem. Most stands will have a comparatively low risk of fire.

Arizona Cypress - There are large variations within the Arizona cypress series. Many areas have a thick brushy understory and are intermixed with chaparral. The areas that have a brushy understory may become increasingly vulnerable to a large wildfire under the no action alternative.

Forest - Many parts of these ecosystems are heavily overstocked with trees and are extremely susceptible to large wildfires. With the no action alternative, stand replacing fires are likely to occur because the unnatural accumulation of fuels (both live and dead).

Wildlife and Threatened and Endangered Species

Affected Environment

Over much of the Tonto National Forest, wildlife and their habitats evolved on a landscape shaped by a low intensity, high frequency fire regime. As discussed elsewhere in this document, in pre-settlement times these areas were subject to relatively low fire intensity combined with very frequent occurrence. The reduction of structural diversity and increase in stand densities that have resulted from the suppression strategies of this century have resulted in a corresponding reduction of wildlife habitat diversity across the landscape. Species dependant upon the open herbaceous understories, and variety of structural layers, which fire historically, maintained have been adversely affected. In contrast, Sonoran desert habitats, which for the most part are not fire adapted, have seen an increase in fire frequency, as well as severity. This is due to several factors including the introduction of exotic plant species, livestock grazing, high recreation use, etc. Until recently, fire management strategies in the Sonoran desert have not recognized its unique ecology, and management direction did not adequately address its protection. As a result, wildlife species requiring a static climax desert habitat have been adversely affected.

The Forest Plan lists 30 management indicator species for the Tonto. Ten of these are for riparian and aquatic habitats. Another four are for Sonoran desert habitats. The remaining 16 are for ponderosa pine/mixed conifer, interior chaparral, and pinyon-juniper habitats, all of which are fire adapted vegetation types. The indicator species were selected to be indicative of various structural characteristics within each habitat, i.e. separate species were selected for the purpose of monitoring effects to old growth, structural diversity, openings, snags, etc. The disruption of the fire cycle process, along with other human activities over the past 100+ years, has altered indicator species habitat. It has selected against species requiring structural and vegetative diversity with a significant herbaceous

understory in favor of species adapted to dense, continuous stands, or early seral habitat expanses associated with large scale stand replacing wildfires.

There are 16 federally listed threatened, endangered, and proposed species that occur, or may occur, on the Tonto National Forest. There are an additional 74 species that are considered Forest Service sensitive species. Many of these species are associated with riparian and Sonoran desert habitats. The remaining species are associated with and evolved in fire-adapted habitats. All of these species, not just those associated with fire-adapted habitats, have been affected either directly or indirectly by the alteration of natural fire regimes over the past century. While historically, low intensity fires had little effect on riparian habitats, the larger, more intense fires of today have a much greater likelihood to carry into and through riparian areas, thereby impacting species habitats there.

Environmental Consequences

Alternative A - Proposed Action

Alternative A will allow the Forest Service to use wildland and prescribed fire forest wide to meet vegetative management goals and objectives. In the short term, vegetative change from the existing condition, and therefore changes in the existing wildlife populations and trends, will be minimal. Over time, it is the intent of the proposal that fire adapted vegetative habitats are returned to a condition more like pre-settlement conditions. Achieving this objective will result in a more diverse mix of wildlife habitats across the landscape. A greater diversity of stand structures in fire adapted vegetative communities will ultimately correspond to a greater diversity of wildlife habitats and, thus more stable floral and faunal biodiversity. The proposed action also offers a more comprehensive management direction for the Sonoran desert. It better addresses the value of this ecosystem as unique and provides direction to minimize damage to wildlife habitats resulting from fire.

It is recognized there are a number of factors limiting the use of prescribed and natural fire to achieve management objectives. Unlike pre-settlement times, subdivisions, campgrounds, livestock facilities, and other capital investments are scattered throughout the Forest. Fire intensities (or prescriptions) that would otherwise be considered acceptable from a vegetative standpoint may be unacceptable in proximity to such improvements. The presence of these improvements inherently requires that fires may need to be suppressed, or at least managed under tighter prescriptions, than would otherwise be necessary. The same can be said regarding some threatened, endangered and sensitive (TES) species habitats. Some TES species (e.g. plants) may require specific protection measures from fire. In many cases, TES species habitat is threatened by the very fuels build-ups that the proposed action is attempting to address. In much the same manner as with improvements, fire in the area of such habitats may need to be suppressed or at least managed under tighter prescriptions. In some cases, management of fire in TES species habitats is prescribed by standards and guidelines either in species specific Recovery Plans, or in the Tonto National Forest Plan. In the long term, adoption of the proposed alternative is expected to ultimately result in better protection and maintenance of these TES species habitats. In the short term, close coordination with Forest and other wildlife personnel will be necessary to assure that both wildfire and prescribed fire are managed in a manner that best meets the needs of wildlife habitat while maximizing protection of existing TES species habitats.

Alternative B - No Action

This alternative represents the continuation of current management. The use of wildland fires for resource benefit would be limited to wilderness areas only. Wildland fires occurring outside wilderness

boundaries could not be managed for resource benefit, and would continue to be aggressively suppressed. Management ignited prescribed fires would still be allowed outside wilderness areas. The processes of increased fuel loading, vegetative overcrowding, and the loss of wildlife habitat diversity cannot be reversed through the use of prescribed fire only. The ability to take advantage of natural fire starts that occur under favorable prescriptions adds a much-needed low cost alternative to prescribed burning. Because of some of the previously mentioned constraints to the use of prescribed or natural fire for resource benefit, the land will not be restored to a pre-settlement fire regime. However, by using all the tools available, those conditions can be restored on much of the landscape. It is also those conditions that will best protect many of the TES species habitats that are currently threatened by loss to large wildfires. The no action alternative will provide managers with fewer options to meet both of these objectives.

Air Quality

A comprehensive specialist report that includes a formal Conformity Determination can be found in Appendix A. The following section highlights the conclusions of the comprehensive air quality analysis conducted to support the proposed amendment.

Affected Environment

The Tonto National Forest Analysis Area (Analysis Area) is either classified as in attainment, in non-attainment or is unclassifiable for pollutants regulated by the National Ambient Air Quality Standards (NAAQS) as defined by the Clean Air Act (CAA). The NAAQS sets levels of impacts of certain air pollutants in order to protect public health and welfare as determined by the United States Environmental Protection Agency (EPA). Non-attainment areas for NAAQS that are within the Analysis Area are part of the Phoenix Metropolitan Area, which is classified as a serious non-attainment area for particulate matter less than 10 microns in size (PM-10). The communities of Payson and Globe-Miami are classified as moderate non-attainment areas for PM-10, and the community of Miami is classified as non-attainment for sulfur dioxide (SO₂). Federal activities within non-attainment areas must conform to the requirements of the Arizona State Implementation Plan and are subject to the Conformity Determination requirement of the CAA. Other communities in the Analysis Area are Roosevelt, Tonto Basin, Young, Pine, Strawberry, and Superior. Class I areas within the Analysis Area include the Mazatzal, Pine Mountain, Sierra Ancha and Superstition wilderness areas. Class I areas receive the most stringent protection from anthropogenic air quality degradation and are protected from visibility impairment.

Currently, prescribed fires are ignited intentionally to achieve ecosystem management or fire protection objectives, whereas wildland fires result from unplanned ignitions. Management response to wildland fires varies widely according to economic efficiency, the values at risk including air quality, and the expected ecological consequences. Wildlands include all of the non-agricultural and non-residential rural lands of the Tonto National Forest, including the wildland/urban interface, regardless of ownership, sovereignty, or management objective. Fires not meeting management objectives are at one end of the spectrum in that they are unwanted and unplanned, so they are suppressed. Other wildland fires may provide ecosystem benefits and so are managed with an appropriate, pre-planned response. Air resource management includes any activity to anticipate, plan for, regulate, or monitor air pollution including smoke from these fires.

Smoke from wildland vegetation burning includes carbon monoxide, carbon dioxide, water vapor, particulates, nitrogen oxides and other pollutants. Due to the type and quantity of pollutants emitted from burning, the most applicable NAAQS are listed below:

- PM 10 24-hour standard of 150 micrograms per cubic meter,
- PM 2.5 24-hour standard of 65 micrograms per cubic meter,
- PM 10 annual standard of 50 micrograms per cubic meter, and
- PM 2.5 annual standard of 15 micrograms per cubic meter.

SO₂ emissions are insignificant from wildland vegetation burning and are not analyzed further. Managing potential smoke effects of prescribed fire or wildland fire is focused on protecting Class I visibility, maintaining NAAQS (PM 10 and PM 2.5) and prevention of public nuisance. Currently all prescribed fires are subject to prior approval from ADEQ to ensure burns are conducted under optimum conditions for smoke dispersal, and that NAAQS's are not violated and visibility objectives are met per Arizona Revised Statutes R18-2-15. Current standards of management include release and monitoring of PIBALS (pilot balloons), tracking of weather stations and recording hourly plume dispersion shall be used at all burns within fifteen miles of any non-attainment and Class I wilderness area, and at all burns with ignitions in excess of 250 acres per day.

Environmental Consequences

Alternative A (Proposed Action)

Prescribed Fire

Historically, prescribed burning on the Tonto National Forest has been used to treat approximately 7,500 acres per year with few acres treated under wild land fire use. Under Alternative A, 31,000 acres per year would be treated with prescribed fire. Ultimately, the number of acres treated annually within the analysis area through prescribed fire (and consequently, the amount of smoke produced from prescribed fire) will be determined by a variety of factors, including meteorology/climatology, funding, personnel availability, on-site fire conditions and ADEQ approval.

The chaparral fuel type has been the target vegetation type for prescribed fire from 1991 to 1998 and would remain as the primary target under Alternative A. Ponderosa pine projected burning would substantially increase in October through December each year. Emissions of PM-10 and PM-2.5 would also increase commensurate with the increase in acres annually. Most prescribed burns will produce a mosaic burn pattern leaving as much as 25% of the available fuel unburned.

To reduce smoke impacts from prescribed fire operations, managers will consider and evaluate alternative treatments to achieve land management objectives. The analysis should consider costs and the environmental impacts of each method. Mechanical treatments include, but are not limited to, selective cutting, chipping, thinning or pruning of trees and brush from the wildlands. Mechanical treatments are appropriate land management tools under certain circumstances, although areas such as those designated wilderness, do not allow for mechanical treatment use. In some areas prescribed fire cannot be used safely and effectively without first removing some portion of fuel loading. The use of alternative treatments in the grass and brush vegetation types are extremely limited whereas the timber vegetation type provides greater potential for alternative treatments, but are often limited by economics. Mechanical treatments will be considered to reduce fuel density in wildland/urban interface areas that are at high risk for wildland fires.

To quantify smoke management objectives, a separate and distinct set of smoke management objectives will be identified in the burn plan, together with the emission production and duration prescription parameters in order to accomplish the objectives. Three principal strategies to manage smoke from prescribed fires are: (1) avoidance, considering meteorological conditions when scheduling burn projects to avoid an incursion of smoke into smoke sensitive areas; (2) dilution, controlling the rate or scheduling for dispersion to assure a tolerable concentration of smoke in designated areas; and (3) emission reduction, utilizing techniques to minimize the smoke output per unit area treated. Smoke management plans will address in site specific burn plans the criteria to minimize and mitigate adverse smoke impacts.

Wildland Fire

Wildland fire managed for resource benefit (wildland fire use incidents) is managed under burning prescriptions similar to prescribed fire, with the intent of producing fire effects that are beneficial to the resources involved. Fire behavior, fuel consumption and smoke production of wildland fire use incidents can be expected to closely emulate prescribed fire, rather than intense wildland fire. PM-10 and PM-2.5 emission rates for the various fuel types are expected to be similar to those described above. Unlike most prescribed fires, wildland fire use incidents may involve several different fuel types and burn a random number of acres over an extended period of time. Approximately 18,000 acres per year are projected to be treated with wildland fire use, with chaparral again being the most widely burned fuel type. Noticeable increases in emissions for all fuel types could occur in the July through September months. The wildland fire use estimates are highly variable and represent expected maximum annual activity levels.

By definition, wildland fire use incidents are lightning caused and therefore most likely to occur during the summer season when lightning is most prevalent. Atmospheric conditions are generally favorable for the mixing and dispersal of smoke emissions during this time of year. Historically, lightning caused fires on the Tonto managed as wildland fire use incidents in the Mazatzal Wilderness area resulted in no adverse smoke impacts. Future wildland fire use incidents will be conducted under the ADEQ rules (A.R.S. 182-15). Note that wildland fire use is referred to as prescribed natural fire in the ADEQ rules. The application of “best management practices” will be limited in wildland fire use incidents due to the nature of such events compared to prescribed fires.

Fire Program

Over time, a sustained program of prescribed fire and fire use incidents may lead to a decrease in the amount of emissions produced per acre, due to changes in vegetative composition and decreases in fuel loading and available fuels. The potential severity of fire and risk should be reduced. Frequent use of prescribed and wildland fire use incidents will decrease the potential for serious health effects resulting from smoke and pollutant emissions that come from large unwanted wildland fires. An estimate of projected annual prescribed fire and wildland fire use activity and emissions within the Analysis Area is found in Table 1.

Table 1: Current Projected Annual Emissions and Treatments

Source	PM-10 (tons/year)	PM-2.5 (tons/year)	Acres
Prescribed Fire	2,431	1,863	22,000
Wildland Fire	1,856	1,535	18,300
Total	5,282	4,160	50,260

Potential violations of particulate matter (PM-10 and PM-2.5) standards and visibility impairment are risks inherent in this program. Through proper planning, the use of "best management practices" and coordination with ADEQ, these risks can be mitigated to an acceptable level. Implementing the proposed action under strict adherence to ADEQ rules should not result in violations of NAAQS's and reduce the likelihood of visibility impairment. The ADEQ rule (A.R.S. 18-2-15) follows the EPA's Interim Air Quality Policy on Wildland and Prescribed Fires policy and addresses prescribed fire and wildland fire use incidents, as well as addressing statewide cumulative smoke impacts from participating public agencies.

The Tonto National Forest will develop procedures that establish coordinated smoke management plans with adjacent agencies to ensure the mitigation of smoke impacts on non-attainment and other sensitive areas. Public land management agencies have instituted an Interagency Air Resource Program Manager position at ADEQ to manage the interagency smoke management program with the state. The Tonto National Forest will continue to financially support growth of this interagency smoke management program commensurate with need.

There have been significant smoke impacts on the Tonto National Forest, the Lower Salt River Airshed, and other areas, from prescribed burning by the Bureau of Indian Affairs on Indian Lands. Managing the shared airshed during the fall burning period has the potential to increase the complexity and coordination of prescribed burn activities. The Tonto National Forest will attempt to collaborate with the Bureau of Indian Affairs and respective tribes through the State Smoke Management Program to assure that prescribed fires and wildland fires managed for resource benefit will not cause adverse air quality impacts. It is expected that the proposed action could increase the smoke emissions in the shared airshed with the White Mountain Apache Tribe.

Wildland fire managed for resource benefit (wildland fire use) and prescribed fire will require a site specific burn plan which will address resource concerns, including air quality, prior to implementation. All current smoke management standards and practices will be maintained. The plans will also address the White Mountain Apache Tribe air quality standard for 24-hour of 50 micrograms PM-10 per cubic meter. Potential smoke effects that may impact the White Mountain Apache tribe from the Tonto National Forest will be addressed in site specific burn plans and through compliance with the Arizona Smoke Management Program.

Air Quality Monitoring

The "IMPROVE" (Interagency Monitoring of Protected Visual Environments) program can be used to monitor the effects of fire on air quality and visibility in mandatory Class I Federal areas. On the Tonto National Forest, the IMPROVE program is presently being implemented at the following locations; Mount Ord for the Mazatzal Wilderness, Humboldt Peak for the Pine Mountain Wilderness, and McFadden Peak for Sierra Ancha Wilderness. In the near future, the IMPROVE program will be implemented by ADEQ to monitor the south side of the Superstition Wilderness. This program provides "real-time" information on smoke effects for ADEQ, which will allow for improved smoke management decision-making.

Conformity Issues

See Appendix A for a more detailed explanation of the Conformity Determination process conducted for this Analysis.

The Tonto National Forest does not anticipate an increase in prescribed fire or Wildland Fire Use activities and subsequent emissions in the Payson or Maricopa PM-10 non-attainment areas. This is based on current Forest Plan levels of activity; therefore, these emissions would be in conformity with the existing SIP for the respective area.

There is an anticipated increase in activity and subsequent emissions in the Hayden/Miami Planning Area for PM-10 beyond the current Forest Plan levels. The total annual prescribed fire emissions increase will be above the 100-ton/year de minimus level, which triggers a Conformity Determination for activities in this non-attainment area. Under Conformity, potential impacts can be modeled to determine if emissions will contribute or create an exceedance of the NAAQS. PM-10 emissions computer modeling demonstrates that the increase in activity will not create an exceedance of the annual or 24-hour NAAQS for PM-10. The background PM-10 levels, plus the increase in prescribed fire activities results in marginal increases in PM-10 in the Hayden/Miami Planning Area. These impacts are below the respective annual and 24-hour NAAQS levels and are therefore in Conformity with the SIP. In addition, the prescribed fire activities would be conducted during periods of good smoke dispersion and in accordance with ADEQ guidance (A.R.S. R-18-2-15), which manages the daily emissions to avoid NAAQS violations and protect public health. Since insignificant SO₂ emissions result from the burning of wildland fuels, the SO₂ emissions generated in the Miami SO₂ non-attainment area are deemed to be in Conformity with the applicable SIP.

Alternative B - No Action

Under the "no action" Alternative B, fuel conditions throughout the analysis area will continue to favor large, intense unwanted wildland fires. Considered uncontrolled smoke, generated from unwanted wildland fires is not subject to the standards and guidelines addressed in the State Implementation Plan administered by ADEQ. Wildland fires larger than 100 acres are reported to the ADEQ to allow for better smoke management decisions at other fire operations. Unwanted wildland fires may occur when atmospheric conditions directly affect the transport and dispersal of smoke, as well as fire behavior, potentially resulting in adverse air quality impacts. In general, such unwanted wildland fires have the potential to produce significantly higher emission rates than prescribed fires. When comparing estimated emission rates (PM-10 and PM-2.5) for intense unwanted wildland fires versus prescribed fires, the unwanted fires were 10% to 240% higher in emissions in identical fuelbeds. Unwanted wildland fires have the potential to burn 100% of the available fuel. Prescribed fire, which is ignited within prescription parameters, regulates the fuel consumption and generally consumes only a

percentage of the available fuel. Potential smoke impacts from intense unwanted wildland fires may include periods of increased PM-10 and PM-2.5 emissions that could exceed NAAQS. The Phoenix non-attainment area for ozone is located adjacent to the Analysis Area and has been adversely affected by such wildland fires. In addition, visibility impacts in Class I areas may be excessive in close proximity to large unwanted wildland fires and can contribute to regional haze.

Heritage Resources

Affected Environment

The Tonto National Forest contains a wide variety of heritage resources exhibiting evidence of human activities for the last 11,000 years. The majority of these resources consist of prehistoric sites in open or exposed locations that have been subjected to a range of natural environmental conditions, resulting in the deterioration of organic components, such as wooden construction elements. Most of these sites have been abandoned for at least 600 to 800 years and it is believed that they have been subjected to a minimum one natural fire episode, and probably repeated incidents with negligible affects.

Fire episodes, under conditions of low to moderate intensity, have no visible effects to non-organic artifacts, such as stone tools or ceramics since fires quickly pass over these items. Moderate to high intensity fires can have a detrimental effect when fuel loads are heavy in the vicinity of prehistoric sites because the heat intensities are concentrated in discrete locations. Ceramics have cracked and spalled and even dense rocks such as greenstone metamorphic basalt) have been known to shatter. Rock art sites which are frequently situated in boulder outcrops and escarpment edges are usually well protected by the local topography; however, heavy fuel loads in their vicinity can readily concentrate the heat intensity and duration of a fire resulting in cracking and spalling of the rock, thereby resulting in damage to this resource.

Conversely, there are some areas of the Forest that contain prehistoric sites in protected environments such as cliffs and caves which act to preserve delicate organic components to the deteriorating effects of temperature extremes, moisture and fire. However, it should be noted that while the topographic setting of these sites helps to protect them, fire could still have an impact if heavy fuels become established in the immediate vicinity. This has occurred in the past in the Sierra Ancha Wilderness Area where researchers in the 1930s noted fire damage to roofs and walls of many cliff dwellings resulting from a large fire during the mid-1920s. Additionally, there are numerous historic period sites relating to early ranching and homesteading, mining, military, and Civilian Conservation Corps, including settlement communities and construction camps, which still contain buildings and their remnants which are susceptible to fire effects.

During the Dude Fire of 1990, a National Register of Historic Places site, the Hought Cabin near Payson, was destroyed. Although the Fire Management Organization traditionally attempts to protect sites with fire-sensitive components from the impacts of wildfires and routinely avoids them during prescribed fires, concerns for public safety and property during a fire incident naturally takes precedence.

Environmental Consequences

Alternative A - Proposed Action

Alternative A will result in a lessening of excessive fuel loads and the potential for fires throughout the Forest. This will have the affect of lessening the possibility of damage to prehistoric sites resulting from concentrating fire duration and heat intensity as well as lessening the possibility of important historic sites being sacrificed in response to the necessary demands of Urban/Interface concerns. Additionally, the use of prescribed fires to return the environment to a more naturally balanced ecosystem would also allow for protective measures to be instituted with respect to historic sites or sites that have a potential to be fire-sensitive, thereby mitigating the effects of wildfires that might occur in the vicinity of these locations. Treatment recommendations are habitually incorporated into prescribed burn plans for the protection of heritage resources. This Alternative will allow for a broader opportunity to specifically address the protection of historic and/or fire sensitive sites.

Alternative B - No Action

This Alternative would continue the current fire management program, which would provide minimal protection to heritage resources. The rapid implementation of aggressive suppression activities that occur during fires does not typically allow for instituting protective measures beyond those for firefighter and public safety. Historic and fire-sensitive sites will continue to be impacted by fire episodes. Associated ground disturbing activities can easily disturb and/or destroy heritage resources. The lack of an established vegetative diversity would contribute to the escalation of large fires and an attendant increase of impacts to prehistoric and historic sites within the Forest.

Recreation, Wilderness and Related Resources

Affected Environment

Recreation

The Tonto National Forest is one the most heavily visited national forests because of its proximity to the Phoenix metropolitan area. With few exceptions, the entire Forest is open year around to dispersed recreational use. Developed recreation sites are located primarily along the Salt and Verde Rivers and their reservoirs, and in the ponderosa pine forest immediately below the Mogollon Rim. Other sites are located within or adjacent to riparian areas.

Wilderness

There are currently about 586,000 acres of the Forest which are Congressionally-designated Wilderness Areas. Each Wilderness has its own Management Area(s) in the Forest Plan because management objectives come from the Wilderness Act and implementing regulations and resource management activities are more constrained than in other Forest areas.

Wild and Scenic River

A portion of the Verde River within the Mazatzal Wilderness has been designated as a “Wild” river under the Wild and Scenic Rivers Act. A portion upstream from the Wilderness has been designated as a “Scenic river”. These designations are reflected in the Forest Plan as separate Management Areas in order to better manage for objectives as specified in the authorizing Act.

Visual Resources

The Forest is characterized by outstanding scenery. Visual quality objectives are identified as part of scenery management and are evaluated and addressed for resource management activities on a project-by-project basis.

Environmental Consequences

One of the basic objectives in Forest Service managing recreation resources is to protect the long-term public interest by maintaining and enhancing open space options, public accessibility, and cultural, wilderness, visual, and natural resource values. The purpose in revising Forest Service fire policy is re-establish the role of fire, as nearly as possible, in maintaining vegetative communities and reducing fuel hazards. The long-term goal is to reduce the threat of fires, which also significantly impact recreation related values.

The only significant issue raised through the scoping process with regard to recreation related resources was how smoke generated from a probable increase in wildland fires managed for resource benefits would affect public health, and whether it would create a nuisance to both recreational users and residents in affected areas. An analysis of emissions is detailed within the Air Quality section of this environmental assessment.

The following analysis addresses the stated issue as well as consistency with other management policies.

Recreation

There will be no direct effects to recreation facilities or opportunities as a result of implementing **Alternative A** because it is applied at the planning or programmatic level. Potential indirect effects resulting from increased numbers and acreage of low intensity fires will be addressed through project level, site-specific analysis on proposed prescribed fires and as part of the Go/No Go analysis on natural ignitions. These analyses, which must consider effects to air quality, should mitigate major concerns about the nuisance of smoke to recreational users but there is no possible alternative that will eliminate nuisance smoke in all cases. **Alternative A** should result in less risk of fire damage to recreation resources in the forested areas and better protection from fire damage in Sonoran desert and riparian areas. **Alternative B** would be a continuation of current policy which, over the long term, will likely continue the trend toward larger fires in the ponderosa pine and Sonoran desert areas.

Wilderness

Under **Alternative A**, Management Prescriptions for Wilderness Management Areas will be amended to better define the management of prescribed fire for Wilderness resource objectives. Standards and Guidelines will allow the use of prescribed fires to accomplish the objective of re-establishing a more natural fire regime within Wilderness Areas. The consequence of implementing **Alternative A** should be a reduction of the unnaturally high ground fuels in ponderosa pine and mixed conifer areas, an increase in acreage burned under low to moderate intensity fires, and a decrease in large fires such as the Lone fire which occurred in 1996 in the Four Peaks Wilderness and the Cave Creek complex fire in 2005. **Alternative B**, current policy, would continue a trend toward re-establishing of historic fire patterns within Wilderness Areas but at a slower rate than the new policy.

Wild and Scenic River

Under **Alternative A**, Management Prescriptions for the Verde Wild River and Scenic River Management Areas would be amended to better define the management of prescribed fire under Wild and Scenic River management policy. Because nearly all of the vegetation within these areas is riparian or Sonoran desert, it is expected that there could be fewer acres burned if **Alternative A** is implemented. The new policy would, however, allow for use of prescribed fire in these Management Areas to meet Wild and Scenic River management objectives. **Alternative B** would continue current Forest Plan direction consistent with Forest Service policy. Because of the riverine landscape and vegetation, fire does not play a significant role in these areas.

Visual Resources

Fire and fire management activities can greatly affect the visual quality of the landscape, depending primarily on the intensity and area of burns, and the impacts of fire suppression activities. It has also been recognized that management based on an understanding of the natural and historical effects of fire on landscape character can result in visually pleasing or perhaps even visually enhancing results. The purpose of the proposed action, **Alternative A**, is to re-establish that natural role and regime. This alternative would not have a direct effect on visual qualities, but as described above, potential indirect effects could be increased numbers and acreage of low intensity fires. As with recreation impacts, visual quality concerns would be addressed through project level, site-specific analysis on proposed management-ignited fires and at the Go/No Go analysis on natural ignitions. **Alternative A** will include Standards and Guidelines requiring specific resource considerations as part of the Go/No Go analysis. The emphasis in **Alternative A** for suppression of fires in Sonoran desert and riparian areas should reduce large scale visual impacts but may result in more local impacts from fireline construction. The impacts will be addressed through additional Standards and Guidelines for post-burn rehabilitation assessments. **Alternative B** could result in the continued trend toward larger, more intense wildfires which do impair visual quality, such as the Dude Fire (1990) and the Lone Fire (1996) on the Tonto National Forest and the Rio Fire (1995) which burned thousands of acres of Sonoran desert adjacent to the Forest.

Chapter 4 - List of Preparers

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Chapter 5 - Consultation with Others

List of Contacts

During the preparation of the EA for the proposed amendment, the Forest Service solicited input from various federal, state, and local agencies; environmental and citizen groups; industries; and individuals interested in the issues regarding the proposed action.

Comments were received from the following:

Arizona Game and Fish Department	Natalie Robb
Circle Bar Ranch	John Whitney
Natural Resources Conservation Service	Michael Somerville
Payson Fire Department	Martin deMasi
People for the USA!	James W. Clark
Pinal County Air Quality Control District	Donald P. Gabrielson
The San Carlos Apache Tribe	Jeanette Cassa

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Lahm, Peter. 1999. Specialist Report: Air Quality. USDA Forest Service.