ENVIRONMENTAL ASSESSMENT
USDA Forest Service
Proposed Amendment for the
Prescott National Forest
Land and Resource Management Plan
Prescott National Forest
Yavapai County, Arizona
August 2002

1.0 Chapter 1: Purpose and Need

1.1 Introduction

This environmental assessment (EA) has been prepared to describe the effects of amending the Prescott National Forest Land and Resource Management Plan (Prescott Forest Plan) to update management direction in the areas of fuelwood management, fire management (specifically, wildland fire use), and forest plan monitoring.

A forest management plan is developed to provide direction regarding decisions, goals, and assessments made at various times and at numerous levels. As plans and objectives change, or as new information is made available, a national forest may employ the amendment process to refocus parts of a forest plan between revision cycles. The current Prescott Forest Plan, developed in 1986, reflects some values and policies that are no longer consistent with forest management objectives. The Prescott National Forest (Forest) is proposing to amend its forest plan to reflect current management objectives regarding fuelwood management, fire management (specifically, wildland fire use), and forest plan monitoring. The proposed amendment is attached to this document as Appendix A. The current Monitoring Plan is attached as Appendix B, and the proposed Monitoring Plan as Appendix C.

Based on criteria described in Forest Service Handbook 1909.12, the Forest Supervisor has determined that the proposed amendment to the Prescott Forest Plan is a non-significant forest plan amendment. The amendment contains modifications that "do not significantly alter the multiple-use goals and objectives for long term land and resource management," that are "minor changes in the standards and guidelines," and that represent "opportunities for additional management practices that will contribute to the achievement of the management prescription."

Although this amendment does not constitute a significant change in Forest management direction, any amendment to a forest plan is considered a major federal action and is therefore subject to compliance with the National Environmental Policy Act (NEPA) as amended (42 USC 4321, *et seq*.). Because this amendment to the Prescott Forest Plan has been determined to be non-significant, an environmental impact statement (EIS) is not required; however, an EA must

be prepared to address the potential impacts of the proposed action and determine if further NEPA analysis is warranted.

1.1.1 Project Area

Prescott National Forest encompasses approximately 1,410,000 acres, almost entirely in Yavapai County in central Arizona (Figure 1). Roughly half of the Forest lies west of the City of Prescott, Arizona, in the Juniper, Santa Maria, Sierra Prieta, and Bradshaw Mountains. The other half of the Forest lies east of Prescott and takes in the Black Hills and Mingus Mountain, Black Mesa, and the headwaters of the Verde River. The two halves are separated by Chino Valley, Lonesome Valley, and the Agua Fria River corridor.

1.2 Proposed Action

Prescott National Forest is proposing to amend the Prescott Forest Plan by providing revised direction for fuelwood management, fire management (specifically, wildland fire use), and the Monitoring Plan. Under the proposed amendment:

1. Fuelwood would continue to be made available to the public. The emphasis of fuelwood harvesting would be the improvement of forest health through the management of harvest locations and the seasons (timing) of availability.

2. Lightning-ignited wildland fires, which are currently suppressed except in wilderness areas, would be managed to accomplish specific resource management objectives in four, predefined geographic areas.

3. The Monitoring Plan would be revised to conform to agency standards by incorporating a goal-driven approach to monitoring.

Specific changes to the existing Forest Plan are listed in Section 2.1.2 (Proposed Action Alternative). The proposed amendment is attached to this document as Appendix A; the proposed monitoring plan is attached as Appendix C. In conjunction with the amendment, the Forest Plan would be reformatted. Previous amendments would be incorporated into one uniform document, and portions of the plan deleted through previous amendments would be removed. This process would improve the readability of the plan and would have no effects upon the quality of the human environment.

1.3 Purpose and Need

The proposed plan amendment addresses three components of the current Prescott Forest Plan: (1) fuelwood management, (2) fire management (specifically, wildland fire use), and (3) the Monitoring Plan. The purpose and need for each part of the amendment is discussed below.

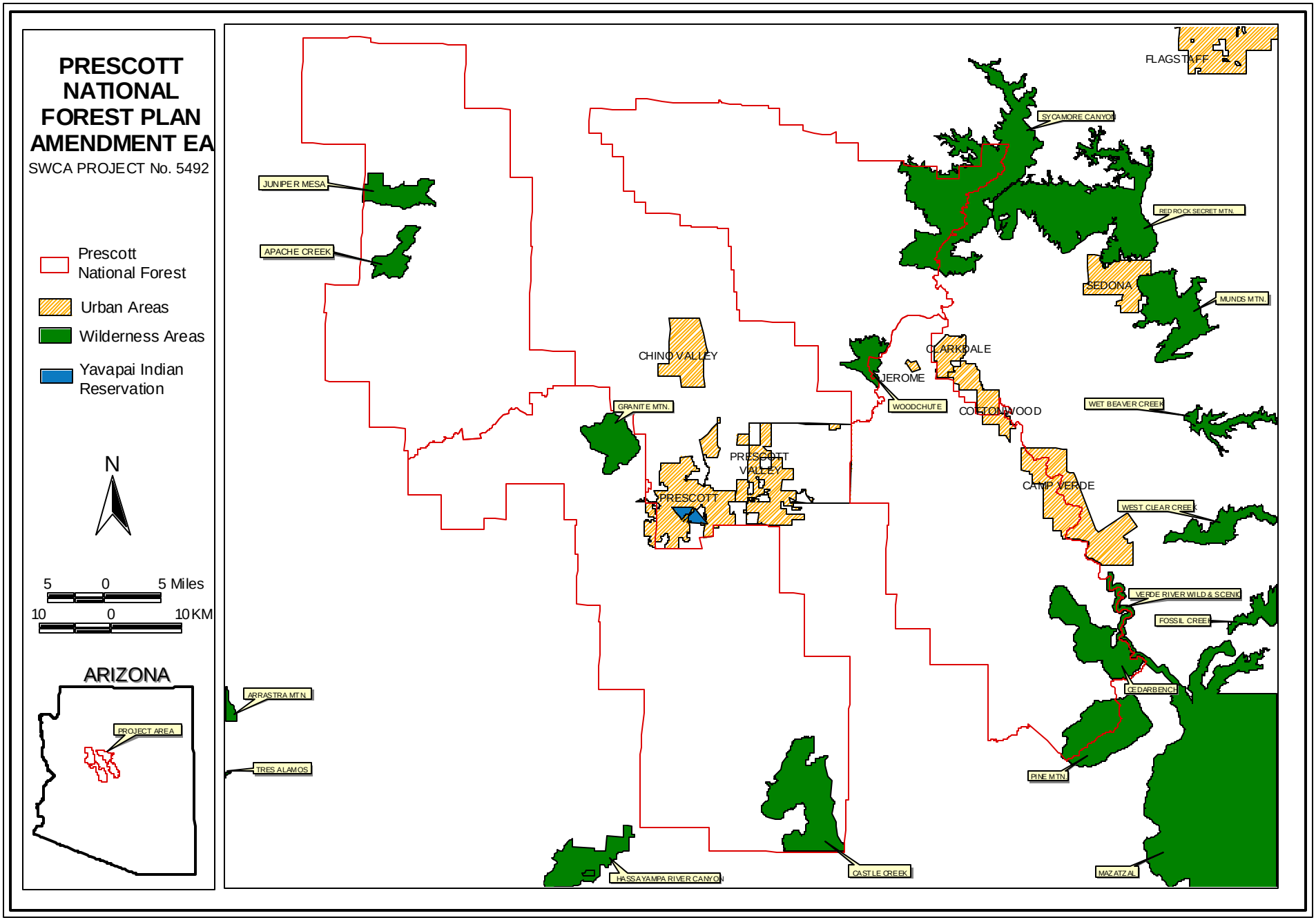

Figure 1. Prescott National Forest, Arizona.

1.3.1 Fuelwood Management

In response to the nationwide oil shortage that began in 1979, the Prescott Forest Plan policy was designed to make green and dead fuelwood widely available to the public as a source of home heating. Harvesting of dead and down fuelwood was allowed year-round and forestwide with a few exceptions (e.g., campgrounds, active timber sales, and old growth areas). As a result of this practice, some popular collecting areas on the Forest suffer shortages of the dead and down wood needed for healthy ecosystems. Woody debris enhances soil health, promotes seedling regeneration, retains moisture, and recycles nutrients. It is used by wildlife for foraging, shelter, nesting, denning, roosting, resting, and aboveground runways. While shortages occur in some parts of the Forest, hazardous fuel loads have built up in areas not frequented by woodcutters, thus increasing the probability of unwanted, intense wildfire that could cause widespread destruction. These trends run counter to desired future ecosystem conditions, which include:

- improved balance in age class distribution of trees;
- a diverse, well-distributed pattern of habitats for wildlife populations and fish species;
- maintained and/or improved habitat for threatened or endangered species;
- protected and improved soil resources;
- long-term, good-quality water flow;
- satisfactory watershed condition in all forest lands; and
- improved riparian areas that are maintained in satisfactory condition.

To help achieve desired future conditions, the proposed amendment would allow the Forest Service to:

- concentrate fuel reduction in areas that will provide the most benefits to forest health;
- use the fuelwood program to reduce hazardous fuels; and
- improve fuelwood program administration and facilitate enforcement of permit compliance.

Future restrictions would be limited to specific areas and times. The total amount of fuelwood available for harvest is expected to remain the same as under current policy and would be adequate to meet anticipated demand given past trends in the number of permits requested.

1.3.2 Fire Management (Wildland Fire Use)

The Prescott Forest Plan needs to be amended to incorporate changes in the direction of federal policy for fire management. In 1995, the U.S. Forest Service, National Park Service, Bureau of Indian Affairs, U.S. Fish and Wildlife Service, and Bureau of Land Management approved the *Federal Wildland Fire Management Policy*, which was revised in the January 2001 *Review and Update*. According to this policy, "Wildland fire will be used to protect, maintain, and enhance resources and, as nearly as possible, be allowed to function in its natural ecological role." The policy also states that "The role of wildland fire as an essential ecological process and natural change agent will be incorporated into the planning process." A natural fire regime is characterized by relatively frequent, low-intensity, naturally ignited fires.

Current management direction in the Prescott Forest Plan requires that all wildland fires outside wilderness areas be suppressed, even if the management goal for the area is for it to be burned.

This practice has resulted in an unnatural fire regime that has (1) allowed the buildup of fuels, which increases the risk of large-scale, high-intensity fire; (2) retarded the recycling of nutrients bound up in dead organic matter; and (3) limited specific conditions, including seed release, soil, light, and nutrients, that are critical for the reproduction of fire-dependent species. The Forest Plan needs to be changed to conform with national policy, and to use naturally ignited fire to support wildland ecosystem health/sustainability and to reduce hazardous fuels.

1.3.3 Monitoring Plan

The current Forest Plan Monitoring Plan is outdated. It needs to be revised to:

- remove items that have proven to be irrelevant or infeasible in providing a meaningful assessment of progress in implementing the Prescott Forest Plan as amended;
- add items that should be monitored to assess that progress in light of revised objectives and directives;
- incorporate national goals and Prescott Forest Plan goals to make the purpose of each monitoring effort clear; and
- conform to agency standards. The Forest Service as an agency is revising its forest plan monitoring model to reflect the *USDA Forest Service Strategic Plan (2000 Revision)* goals, which are (1) Ecosystem Health, (2) Multiple Benefits to People, (3) Scientific and Technical Assistance, and (4) Effective Public Service.

1.4 Decision to Be Made

The Forest Supervisor will decide whether and how to amend the Prescott Forest Plan. He can decide to amend the plan as described in the Proposed Action for the areas of fuelwood management, fire management (specifically, wildland fire use), and the Monitoring Plan; he can decide to amend the plan for parts of those areas; or he can decide to continue managing the forest under the direction provided by the existing Prescott Forest Plan.

1.5 Public Involvement

Post cards announcing the proposed amendment to the Prescott Forest Plan were sent to 595 individuals, organizations, and agencies on the Forest's mailing list of potentially interested parties. The announcement briefly described the proposed amendment and indicated that the amendment was available for review at the Forest's Website (www.fs.fed.us/r3/prescott); at the Forest's offices in Prescott, Arizona; and at Prescott area libraries. The announcement was also posted on the Forest's Website. The public was invited to comment on the amendment by December 22, 2002. That deadline was extended to December 26, 2002, to allow a full 30 days for public comment. Fifteen responses were received. They took the form of letters, e-mails, a telephone conversation, and one visit in person to Prescott National Forest offices in Prescott, Arizona. All comments received and the names of the persons and organizations submitting them are located in the project record.

1.5.1 Issues

The interdisciplinary team for this project analyzed the comments to determine if any of them constituted an issue. An "issue" is defined as "a point of disagreement, debate, or dispute with a proposed action based on some anticipated effect." The majority of comments expressed concern about the wording of the proposed amendment or other aspects of the amendment process that were not based on anticipated environmental effect. Such comments, while valuable input into the Forest's planning process, do not fit the definition of "issues" for the purpose of NEPA environmental impact assessment. Five issues were identified that do fit that definition. They are: (1) forest access in relation to fuelwood harvesting, (2) enforceability of additional restrictions on fuelwood harvesting, (3) economic impact of further restrictions on fuelwood harvesting, (4) wisdom of wildland fire use, and (5) potential impacts of wildland fire use on air quality.

The five identified issues were then evaluated for their significance. Issues were considered "non-significant" if they fit any of the criteria listed below, or "significant" if they did not.

- The issue is outside the scope of the proposed action.
- The issue has been decided by law, regulation, Forest Plan, or other higher-level decision.
- The issue is irrelevant to the decision to be made.
- The issue is conjectural and not supported by scientific (or factual) evidence.

1.5.1.1 Non-significant Issues

Three of the issues raised during public scoping met the criteria for non-significance. A description of each issue and an explanation of the non-significance finding are provided in Table 1. These issues are not included in the Environmental Consequences analysis in this EA.

Table 1. Non-Significant Issues Raised during Public Scoping.

Issue	Reason for Finding of Non-significance
Access - The standard "Address road management issues as needed during fuelwood harvest planning" could be used to arbitrarily close roads. Reasonable public access may be denied in the interest of unspecified "resource goals."	The issue is not supported by scientific or factual evidence. The proposed standard regarding road management in relation to fuelwood harvesting does not allow the Forest Service more latitude to close roads than the existing standard, nor is it likely to result in more road closures. All other standards and guidelines in the Forest Plan (e.g., "Access policy changes for specific roads, trails or cross-country travel require NEPA compliance with full public participation during this process") remain unchanged.
Enforcement - More restrictions encourage wood poaching; the goal to restrict areas for fuelwood harvest will not be practical to enforce.	The issue is conjectural and not supported by scientific (or factual) evidence. The Forest Service regularly imposes restrictions on many kinds of activities in national forests to manage and protect forest resources. To charge that imposition of restrictions "encourages" violation of those restrictions and that enforcement is impractical because it relies primarily on the willingness of individual citizens to abide by the law is a point of view.

Table 1. Non-Significant Issues Raised during Public Scoping (cont.).

Issue	Reason for Finding of Non-significance
Wildland Fire Use - The use of wildland fires (let burn policy) is unwise because fires need to be targeted to get the maximum benefit, whether to protect urban areas or to achieve specific management goals. Opportunistic fires, which are allowed to burn, will seldom meet those criteria.	The issue of using wildland fire as an active part of forest management has already been decided by a "higher-level decision," specifically by the 1995 *Federal Wildland Fire Management Policy* (updated January 2001), which was chartered by the Secretaries of Agriculture and the Interior. The proposed amendment brings the Prescott Forest Plan into conformance with that national policy.

1.5.1.2 Significant Issues

Two of the issues raised during public scoping, air quality and fuelwood harvesting, were determined to be significant and are included in the Environmental Consequences analysis in this EA. A description of each issue and an explanation of the significance finding are provided in Table 2.

Table 2. Significant Issues Raised during Public Scoping.

Issue	Reason for Finding of Significance
Air Quality - The policy to allow naturally caused fires to burn could result in excessive amounts of smoke and unacceptable degradation of air quality.	This issue is within the scope of the proposed action and is relevant to the decision to be made. It has not already been decided by a higher-level decision, nor is it purely conjectural. The potential effects on air quality will be addressed in the EA. The No Action alternative responds to this issue (see Chapter 2).
Fuelwood Harvesting - Additional restrictions to fuelwood harvesting likely under the proposed amendment may hamper the ability of the public to find an affordable supply of wood for heating.	This issue is within the scope of the proposed action and is relevant to the decision to be made. It has not already been decided by a higher-level decision, nor is it purely conjectural. The potential effects on the ability of fuelwood gatherers to find wood for heating will be addressed in the EA. The No Acton alternative responds to this issue (see Chapter 2).

2.0 Chapter 2: Alternatives, including the Proposed Action

2.1 Alternatives Considered in Detail

Based on public input, the Interdisciplinary (ID) Team for this project recommended, and the Forest Supervisor approved, two alternatives for this EA. They are the No Action alternative and the Proposed Action alternative. The No Action alternative is a requirement of NEPA (40 CFR 1502.14(d)). It provides a baseline for assessing the potential impacts of the Proposed Action and is therefore presented first throughout this document. For a programmatic decision such as this forest plan amendment, the No Action alternative means "no change to current management." These two alternatives, as well as one alternative considered but eliminated from detailed study are described below.

2.1.1 No Action Alternative

Under this alternative, current Forest Plan direction (goals, standards, and guidelines) for fuelwood management and wildland fire use would remain in effect (Prescott National Forest Plan 1986). The 1986 Forest Plan Monitoring Plan would also remain in effect. The existing Forest Plan includes the following directives: (1) Fuelwood is treated as a commodity, making it widely available to the public. Gathering of dead and down fuelwood is allowed forestwide and year-round with a few exceptions (e.g., in campgrounds, active timber sales, and old growth areas, and during periods of high fire risk). (2) The wildland fire emphasis is on suppression of all naturally ignited wildland fires and use of prescribed fire to achieve management objectives. Wildland fire use is currently confined to wilderness areas, and is expected to burn no more than about 11,500 acres over the next 10 years (Pers. comm., R. Fluhart, Fuels Manager/Fire Planner, Prescott National Forest, March 2002). (3) The orientation of the current Monitoring Plan is toward individual resources with a relatively heavy concentration on timber and range management.

This alternative responds to both significant issues: (1) Naturally caused fires would not be used to benefit resources; therefore, use of such fire would not impair air quality. (2) No additional restrictions would be placed on fuelwood gathering, so the ability of the public to find an affordable supply of wood for heating would not be affected.

The following sections list the goals and management standards and guidelines applicable to all management areas (except wilderness) that would remain in effect if the Forest Plan were not amended. These goals and management prescriptions, as well as the pertinent standards and guidelines specific to each management area in the Forest, are also provided in the proposed Forest Plan Amendment (Appendix A of this document).

2.1.1.1 Fuelwood Management

Goals

- Provide green and dead fuelwood and other forest products on a sustained yield basis.

Standards and Guidelines

- Environmental analysis for timber/fuelwood sales will:
  - establish harvest objectives
  - establish access alternatives which disclose soil loss and stability figures for each
  - establish why non-timber values are needed
  - demonstrate why timber harvest is the best means of meeting the objectives
  - explore other means of meeting objectives.
- Complement enforcement of county leash laws through public education and use of permit requirements for fuelwood harvest.
- Fuelwood harvest planning will include provisions for road closure. Funding will be collected or programmed as required to effect closures of temporary roads.
- The Forest Service will continue the yearlong fuelwood season, subject to change according to weather conditions.
- Fuelwood harvest from areas requiring structural measures to control erosion will focus upon long term stability of the soil and not the production of wood fiber or range forage.

2.1.1.2 Fire Management (Wildland Fire Use)

Goals

- Provide for fire management support services necessary to sustain resource yields while protecting improvements, investments, and providing for public safety.
- Return fire to its natural role in the ecosystem.

Standards and Guidelines

- Fire management planning.
  - Implement fire prevention activities in accordance with the Prescott Fire Prevention Plan.
  - Provide for wildfire detection and protection of life and property from wildfire.
  - Maintain management policies and crews to keep wildfires to a minimum.
  - Examine the possibility of prescribing fire to more readily relate to naturally occurring fire periods.

2.1.1.3 Monitoring Plan

The 1986 Forest Plan Monitoring Plan is organized by resource (Timber, Range, Wildlife, etc.), with 33 items being monitored (Appendix B). A third of the items (11) concern timber and range management. Information provided under each item is as follows: Purpose, Expected Future Condition, Method, Frequency, Expected Precision Reliability, and Evaluation. The information provided about methods for some resources, notably biological resources, is relatively detailed and specific.

2.1.2 Proposed Action Alternative

The Supervisor of the Prescott National Forest is proposing to amend the Prescott Forest Plan by providing revised direction (goals, standards, and guidelines) for fuelwood management, fire management (specifically, wildland fire use), and the Monitoring Plan.

Fuelwood Management. The proposed amendment emphasizes the use of fuelwood harvesting to accomplish multiple ecosystem objectives. Fuelwood, which is now considered a commodity, would be viewed instead as a by-product of activities that are designed to improve forest health and sustainability. Woodcutters would be directed to accessible areas with abundant woody material, particularly slash resulting from various treatment activities (e.g., hazardous fuel reduction, watershed enhancement, and mistletoe control). They would be restricted from areas where the woody material needed for wildlife habitat, soil generation, nutrient cycling, and general forest health is scarce.

Fire Management (Wildland Fire Use). Management objectives now accomplished through prescribed fire would also be achieved through wildland fire use. "Prescribed fire" is fire intentionally ignited by management actions to achieve specific management objectives. "Wildland fire use" is management of lightning-ignited wildland fire to accomplish specific, prestated resource management objectives in predefined geographic areas. Both prescribed and wildland fire uses fires are managed according to predetermined prescriptions. Under the proposed amendment, both prescribed fire and wildland fire would be used to achieve Forest Plan objectives.

Management of lightning-caused fires for resource objectives, however, presents a situation distinctly different from that of prescribed fire. The location and timing of naturally ignited fires are unknown until they occur and are detected. At the time of detection, a Wildland Fire Implementation Plan (WFIP) is set into motion by district personnel to determine if the fire ignition meets the criteria for allowing it to burn under supervision. This process is described in the Wildland Fire Use section of the Prescott National Forest Fire Management Plan (see Appendix D). The first stage of the plan (commonly referred to as the Go/No-Go decision) makes use of a Decision Criteria Checklist, which is included in Appendix D. Many factors must be considered in making this initial decision, including, but not limited to, threats to human life and property, effects on cultural and natural resources, effects on air quality, potential for keeping the fire within the desired range, proximity of other fires, and the current level of preparedness. A "Yes" response to any element on the checklist indicates the appropriate management response should be suppression. Once a "Go" decision has been made, further stages of the WFIP are implemented for fires that are expected to burn beyond a few acres. These stages include designation of a Maximum Management Area (MMA), beyond which the fire would not be allowed. An ongoing wildland fire use fire that fails to meet predetermined prescriptive elements or fails to meet resource management objectives is suppressed using an appropriate management response.

Wildland fire use would be limited to wilderness areas and to the four Wildland Fire Use Areas identified in Figure 2. These Wildland Fire Use Areas are located in the northwestern, southwestern, northeastern, and southeastern portions of the Forest. They total approximately 1,046,200 acres, or 74 percent of the Forest, and exclude wildland-urban interface areas[1] centered in the Prescott Basin, in the Verde Valley, and around Crown King.

[1] "Wildland-urban interface": Areas where undeveloped wildlands are adjacent to habitations, other high-value improvements, urban development, and areas of concentrated human activity (including developed recreation sites).

Based on past experience in Prescott National Forest, Forest Service personnel predict that approximately 48,000 acres may be burned by wildland fire use over the next decade. This equals 3.44 percent of the entire forest, or 4.64 percent of the Wildland Fire Use Areas (Pers. comm., R. Fluhart, Fuels Manager/Fire Planner, Prescott National Forest, March 2002).

Monitoring Plan. The proposed Monitoring Plan provides a goal-driven approach to monitoring that places stronger emphasis on ecosystem health than does the existing plan. The following is a list of the goals and standards and guidelines applicable to all management areas, except wilderness, that would replace the current goals and management prescriptions listed under the No Action alternative in Section 2.1.1. These goals and management prescriptions, as well as the proposed standards and guidelines specific to each management area in the Forest, are also provided in the proposed Forest Plan Amendment (Appendix A of this document).

In conjunction with the proposed amendment, the Forest Plan would be reformatted. Previous amendments would be incorporated into one uniform document, and portions of the plan deleted through previous amendments would be removed. This process would improve the readability of the plan and would have no effects upon the quality of the human environment.

2.1.2.1 Fuelwood Management

Goals

- The fuelwood sale and harvest program will be used as a tool to accomplish and complement multiple ecosystem objectives.

Standards and Guidelines

- Environmental analysis for timber/fuelwood sales will:
  - establish harvest objectives
  - establish access alternatives which meet standard management practices
  - demonstrate why harvest is the best means of meeting the objectives
  - explore other means of meeting objectives
- Provide public information on the availability of fuelwood and the limits of its supply.
- Address road management issues as needed during fuelwood harvest planning.
- Dead portions of live trees shall not be removed for fuelwood.
- The availability of fuelwood within an area should be determined following analysis of resource issues and needs.

2.1.2.2 Fire Management (Wildland Fire Use)

Goals

- The fire interval, behavior and effects associated with the historic fire regime are returned to the landscape where feasible.
- When and where appropriate, ecosystem objectives are met through the use of prescribed fire and wildland fires used for resource benefits.

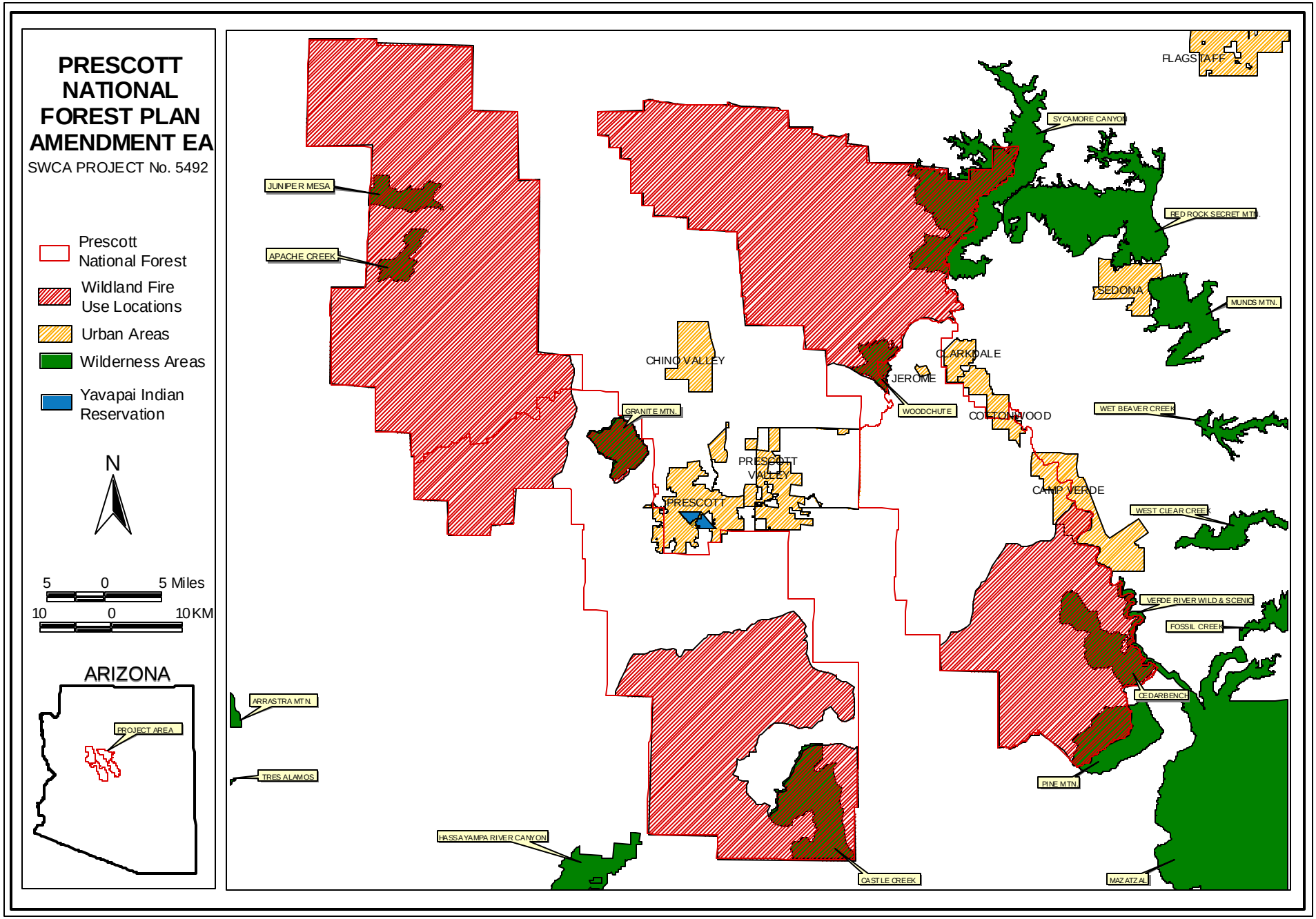

Figure 2. Prescott National Forest Wildland Fire Use Locations.

Standards and Guidelines

- Wildland Fire
    - Firefighter and public safety shall be the first priority in all Fire Management activities.
    - All human-caused fires shall be suppressed using appropriate suppression response strategies.
    - Wildland fire suppression responses shall minimize costs of suppression, resource impacts and risks to life and property.
    - Fire prevention messages should emphasize the difference between unwanted human-caused fires, lightning-caused fires managed for resource benefits and prescribed fires.
    - Prevention and preparedness activities should be designed and implemented following a comprehensive analysis of fire occurrence, resistance to control, values at risk and other factors.
    - The appropriate management response for each wildland fire will vary across the Forest and should include the full spectrum of options from aggressive initial attack to managing fires to accomplish resource objectives.
    - For all management areas (except Area 7, Recreation), lightning-caused fire should be managed to restore fire's natural role in maintaining a healthy, diverse and resilient ecosystem resistant to natural disturbances. Wildland fire use should follow direction specific to the Forest's Fire Management Plan that establishes parameters for risk, fire intensity, size, duration and seasonality.
- Prescribed Fire/Fuels Treatment
    - Consider landscape-scale application of prescribed fire in all appropriate management areas.
    - Consider mechanical fuels treatments where wildland fire use or prescribed fire may cause unacceptable damage to other resources or pose unacceptable risk to private property.
    - Hazardous fuels reduction activities within wildland-urban interface areas should have priority when there are differing resource objectives.
    - Where opportunities exist, cooperative fuels treatment ventures with private, state and other Federal land management agencies should be implemented.

2.1.2.3 Monitoring Plan

The Forest is proposing to update the Monitoring Plan to bring it more in line with national objectives and to better assess implementation of the Prescott Forest Plan. The proposed Monitoring Plan (Appendix C) differs from the current Monitoring Plan (Appendix B) in several respects. First, the proposed plan is goal driven. Each monitored item is introduced by the Prescott Forest Plan goal it addresses. The proposed plan is organized into four broad categories that correspond to the *Forest Service Strategic Plan* (*2000 Revision*). The four categories are:

- Ecosystem Health
- Multiple Benefits to People
- Scientific and Technical Assistance
- Effective Public Service

This orientation ties the specific monitoring items to overarching management directives for the Forest and relates them in a more obvious way to the Forest Plan. Second, the scope of the proposed Monitoring Plan is more comprehensive, covering 48 items compared to 33 in the existing plan. Third, most of the expanded scope concerns ecosystem health, giving more emphasis to that aspect of forest management. Fourth, the type of information provided for each monitored item has changed. The categories of "Purpose" and "Expected Future Condition" have been replaced by "Associated Goals," and the categories "Expected Precision Reliability" and "Evaluation" have been deleted. Fifth, for some items, information provided about monitoring methods is more general, allowing the Forest more flexibility in applying evolving survey standards and protocols. This is particularly true for biological resources. Sixth, the proposed plan incorporates the proposed changes in policy goals for the management of fuelwood harvesting and wildland fire use.

2.2 Alternatives Considered but Eliminated from Detailed Study

2.2.1 Eliminate All Fuelwood Harvesting Restrictions

An alternative was considered that would address the concern about additional restrictions on fuelwood harvesting. This alternative would have altered current policy direction, not by possibly increasing limitations, but by removing the few limitations currently in place. Fuelwood harvesting would be permitted forestwide and year-round on the Forest without exception. This alternative was eliminated from further analysis because it would not meet the purpose and need for the amendment, which is to benefit forest health; reduce hazardous fuels; and improve fuelwood program administration and facilitate enforcement of permit compliance.

2.3 Comparison of Effects under the Alternatives

Predicted effects of the No Action and Proposed Action alternatives are summarized in Table 3.

Table 3. Comparison of Effects by Alternative.

Resource Topic	No Action	Proposed Action
Fire Ecology	The forestwide problem of disrupted fire regimes would persist. The potential for high-intensity wildfires would increase in areas not affected by prescribed burn or mechanical treatments. Predicted acres burned in next decade by unwanted fire total 24,000. Predicted acres burned by wildland fire use total 11,500 (in wilderness only).	In the short term, the fire return interval would be shortened in areas burned by low-intensity, managed fire. Over the long term, an increasing proportion of the Forest would return to a more natural fire regime, resulting in improved forest health and a lower probability of high-intensity, destructive fires. Fuelwood management would help reduce hazardous fuel loads, which would indirectly affect the fire regime by lower the probability of high-intensity, destructive fires. Predicted acres burned in next decade by unwanted fire total 12,000. Predicted acres burned by wildland fire use total 48,500. The proposed Monitoring Plan may indirectly accelerate the return to a more natural fire regime by helping the Forest Service monitor progress toward achieving goals as stated in the Forest Plan and the proposed amendment.
Air Quality	The accumulation of hazardous fuels would increase the potential for large-scale, high-intensity wildfires that could release air pollutants at levels that exceed national and state air quality standards. Predicted particulate emissions over the next decade from all fires total 31,318 tons.	Fuelwood management and wildland fire use would likely affect air quality over the long term by reducing the probability of uncontrolled, large-scale, high-intensity wildfires that can cause severe deterioration of air quality during the event. However, the frequency of low-intensity wildland fires, and therefore the frequency of degraded air quality resulting from fire, would increase. Predicted particulate emissions over the next decade total 32,656 tons. Pollutant levels from wildland fire use are not expected to exceed air quality standards because fires would be allowed to burn only under conditions favorable to smoke dispersal, and each event is expected to be small. Violations of standards, however, are possible. The proposed Monitoring Plan may indirectly affect air quality by helping the Forest Service monitor progress toward achieving the goals for air quality as stated in the Forest Plan.
Wetlands	Current fire and fuelwood harvesting policies may affect wetlands by increasing the probability of large-scale, high-intensity fires that could destroy wetland vegetation and introduce excessive sedimentation via post-fire erosion.	Effects of wildland fire use in wetlands include removing undesirable dead plant debris, releasing nutrients into the soil and water, and recycling minerals. The resulting vegetative vigor and productivity would increase food resources and habitat for wildlife. Wildland fire use and fuelwood management in the vicinity of wetlands may have a beneficial, long-term, indirect effect by decreasing the potential for high-intensity wild fires, which can destroy or diminish wetland values. The proposed Monitoring Plan would not affect how wetlands in the Forest are managed, except to the extent that information acquired through monitoring about resource status and levels of use would help Forest personnel evaluate the effectiveness of management programs.

Table 3. Comparison of Effects by Alternative (cont.).

Resource Topic	No Action	Proposed Action
Wild and Scenic Rivers	Current fire and fuelwood harvesting policies may affect the Wild and Scenic portions of the Verde River by increasing the likelihood of an uncontrolled, high-intensity wildfire spreading into the area and degrading ecological, scenic, and cultural values.	Managing fuelwood harvesting and fire for ecological benefits in the upland portion of the Scenic River Area may enhance the ecological values of the area. Fuelwood harvesting and wildland fire use in the upland portions of the Scenic River Area or adjacent to this area may indirectly affect the Wild and Scenic portions of the Verde River by maintaining a low hazardous fuel load that would lessen the probability of a destructive, high-intensity fire in the future. The proposed Monitoring Plan may indirectly affect this resource by helping the Forest Service monitor progress toward achieving pertinent goals in the Forest Plan.
Threatened, Endangered, Proposed, Sensitive, and Management Indicator Species	In the short term, No Action is expected to have little effect on special status species. Some Sensitive plants could be trampled by fuelwood collectors. Failure to manage fuelwood harvesting for resource values could also indirectly affect special status species by allowing depletion of woody material in some areas of the Forest, thus reducing cover, foraging habitat, and potential soil-building material and nutrients needed for overall forest health. In the long term, the current plan directives may increase the probability that stand-replacing fires would occur, which could destroy wildlife habitat, harm individual plants and animals, and reduce abundance of prey species.	Direct impacts of fuelwood harvesting include possible trampling of Sensitive plants. Forest personnel should consider this potential impact when identifying fuelwood collecting areas under the proposed amendment, and avoid areas with known populations of these plants. Managing fuelwood harvesting for ecological benefits would improve habitat for some special status species by restoring and maintaining appropriate levels of woody debris in targeted areas. Both fuelwood management and wildland fire use may indirectly affect special status species by reducing the probability of destructive wildfire and attendant effects on habitat, individuals, and prey species. Indirect impacts also include enhanced habitat for some bird species by green fuelwood harvesting and wildland fire use that results in forest thinning. Wildland fire use may result in improved growth for some Sensitive plant species, and possible damage or destruction for others, depending on their fire tolerance. Wildland fire use may indirectly affect special status aquatic species by temporarily increasing sedimentation in aquatic habitats that could result in mortality of eggs and young and reduce food base and habitat suitability. Mitigation includes suppressing wildland fires that are ignited immediately upslope of potential, occupied, or designated critical habitat for special status species; directing managed fire away from such areas; or stabilizing post-fire slopes to minimize erosion. The proposed Monitoring Plan may indirectly affect special status species by helping the Forest Service monitor progress toward achieving pertinent goals in the Forest Plan.

Table 3. Comparison of Effects by Alternative (cont.).

Resource Topic	No Action	Proposed Action
Heritage Resources	The increased probability of uncharacteristically severe fires may result in damage to features and artifacts. Damage may result directly from fire or indirectly from erosion caused by loss of plant cover or from fire suppression activities. Historical structures, prehistoric surface features, and artifacts made of combustible organic materials are at greatest direct risk from fire.	Proposed changes in the fuelwood harvesting directives could encourage woodcutters to harvest in more remote, rarely visited areas that contain cultural sites, thereby increasing the probability of cultural resources being discovered and disturbed, stolen, vandalized, or unintentionally damaged. Fuelwood management and wildland fire use would likely affect heritage resources over the long term by reducing the probability of uncontrolled, large-scale, high-intensity wildfires that can damage or destroy historical and prehistoric sites and artifacts. While significant known sites would likely be avoided by wildland fire use, unknown and known non-significant, fire-susceptible sites in Wildland Fire Use Areas could be damaged or destroyed. Few resources would be affected over the next decade because of the relatively small size of the affected area (3.44% of the Forest). The proposed Monitoring Plan may indirectly affect heritage resources by helping the Forest Service monitor progress toward achieving the Forestwide goals as stated in the Forest Plan.
Human Health and Safety	In the short term, this alternative is unlikely to result in any changes relative to human health and safety. Continued fire suppression activities pose risks to firefighters. Over the long term, the increased risk of uncontrolled, high-intensity fires could directly endanger human life and indirectly affect human health by impairing air quality.	Over the long term, fuelwood management and wildland fire use may affect human health and safety by the reducing the risk of uncontrolled, high-intensity fires. Increased particulate emissions from more frequent wildland fires may affect smoke-sensitive individuals, but this effect would be mitigated by the distance of the largest population centers from Wildland Fire Use Areas, the small size of the fires, and the atmospheric conditions under which managed fires would be allowed to burn. The proposed Monitoring Plan would not affect human health and safety.
Fuelwood	The No Action alternative would not affect current trends in fuelwood harvesting. Fuelwood is likely to become more scarce in the more accessible areas favored by fuelwood collectors. Fuelwood harvesting could not be managed as effectively to reduce hazardous fuel loads.	While the overall quantity of fuelwood should not decrease as a result of the proposed action, the accessibility of fuelwood may be affected. Wood gatherers may have to collect in less familiar locations, farther from main roads and from their homes. This possible consequence may be offset by the gatherers being directed to areas with greater concentrations of fuelwood, making the harvesting process more efficient and cost effective. Some designated collecting areas may not be remote at all, as fuel reduction treatment activities accelerate in wildland-urban interface areas. Wildland fire use is likely to reduce the availability of fuelwood in the areas burned. This should not have a noticeable effect on fuelwood harvesting over the next decade because of the relatively small size of the affected area (3.44% of the Forest). The Monitoring Plan may indirectly affect fuelwood harvesting by helping the Forest Service monitor progress toward achieving the pertinent goals as stated in the proposed amendment to the Prescott Forest Plan.
Environmental Justice	The increased long-term probability of a destructive wildfire could disproportionately affect low-income residents who are less likely to have the means to protect their homes, carry insurance, or recover from losses due to a fire.	The Proposed Action is unlikely to have disproportionate effects on minority and/or low-income communities in or around the Forest.

3.0 Chapter 3: Environmental Consequences

3.1 Introduction

Chapter 3 describes the affected environment and the potential environmental consequences of the No Action and Proposed Action alternatives, which are described in Chapter 2. The effects analysis for No Action assumes that future management actions would conform to the goals, standards, and guidelines of the existing Prescott Forest Plan.

This chapter is organized by the following resource topics: Fire Ecology; Air Quality; Wetlands; Wild and Scenic Rivers; Threatened, Endangered, Proposed, Sensitive, and Management Indicator Species; Heritage Resources; Human Health and Safety; Fuelwood Harvesting; and Environmental Justice. Two of these resource topics, Air Quality and Fuelwood Harvesting, are significant issues raised during public scoping. The remaining resources are factors that must be considered when evaluating the significance of impact that would result from adopting the proposed forest plan amendment (Proposed Action).

For each resource topic, the legal and administrative framework is presented, followed by a brief description of the affected environment. The Environmental Consequences section discloses effects that could result from future use of the management direction in each alternative. Effects are identified as direct, indirect, short term, and long term as appropriate. Cumulative effects are also described. Cumulative effects result from the combination of past, present, and reasonably foreseeable future actions or policies with the direct and indirect impacts of using the management direction of each alternative. For this project, actions most likely to combine with the Proposed Action to produce cumulative impacts are mechanical treatment programs on the Forest, like the proposed Boundary Project; prescribed fire on the Forest; and fire management practices on neighboring lands. The geographic scope of the cumulative effects analyses varies according to the resource in question, but generally pertains to Prescott National Forest lands (see Figure 1). Air quality is the principal exception, being a regional resource issue.

3.2 Fire Ecology

3.2.1 Legal and Administrative Framework

The following two statutes contain legal requirements and authorities to plan and carry out activities to protect National Forest System lands and resources from fire:

National Forest Management Act of 1976 (16 USC 1600) - This statute directs the Secretary of Agriculture to specify guidelines for land management plans to ensure protection of forest resources.

Reciprocal Fire Protection Act of 1955 (42 USC 1856) - This statute authorizes reciprocal agreements with federal, state, and other wildland fire protection organizations.

The National Forest Directives System (manuals and handbooks) outlines the administrative framework for fire management activities, which include the protection of resources and other

values from unwanted wildland fire, and prescribed fire and wildland fire use to meet land and resource management goals and objectives. The framework in these manuals and handbooks provides for cost-efficient unwanted wildland fire protection and embraces the positive roles that fire plays on national forest lands. The following portions of the directives apply directly to fire management as addressed in the forest plan: *FSM 2324.2-Management of Fire (in wilderness), FSM 5100-Fire Management.*

Additional direction for implementing the fire management program at the project level comes from the *Wildland and Prescribed Fire Management Policy - Implementation Procedures Reference Guide.* This guide was developed by an interagency team, including representatives from the Forest Service, the Bureau of Land Management, the National Park Service, and the Fish and Wildlife Service. The procedures outlined in the guide are consistent with FSM 5100.

3.2.2 Affected Environment

The particular effect fire has on vegetation types within the Forest is highly variable and likely complex. Ecological processes such as seral stage development,[2] nutrient cycling, fuel accumulation, and water availability are all influenced by fire. Vegetative characteristics such as species composition, age/size class distribution, plant health/vigor, and fuel composition are also influenced by fire.

Vegetation types may be classified by fire regime. The Prescott National Forest has several natural fire regimes because of the diversity in soil, elevation, precipitation, and vegetation type. The natural fire regime is the total pattern of fires within the vegetation type that is characteristic of that portion of the ecosystem. Factors that form the natural fire regime include ignition source, fire event behavior and intensity, size of burn, return interval, and ecological effects. Fire regimes may be described by intensity, frequency, and effect on vegetation.

The Condition Class of a vegetation type or area may be used to define its departure from the natural fire regime. The risk of losing key ecosystem components, the level of alteration from the natural regime, and the departure from historical fire frequencies are used to define the current Condition Class. Reasonable disclosure of the likely effects of incorporating the use of lightning-ignited fire in the Wildland Fire Use Areas of the Prescott National Forest is based upon the associated fire regimes and Condition Classes.

3.2.2.1 Historical Background

Lightning-ignited fire events are natural characteristics of the lands now incorporated into Prescott National Forest. In addition, for thousands of years indigenous peoples ignited wildland fires, probably unintentionally as well as purposefully (Dieterich and Hibbert 1988). The resulting historical pattern of fires was one of frequent, low-intensity, and mixed-severity fire regimes (Covington and Moore 1992; Pers. comm., E. Hollenshead, Fuels Manager Prescott National Forest, November 2001).

[2] Seral Stage: Any stage of development of an ecosystem from a disturbed, unvegetated state to a climax plant community.

This situation was changed by a rather abrupt occupation by Euro-American settlers in the mid-1800s, which brought with it site-specific ecological effects from grazing domestic livestock, harvesting timber, mining ore, and suppressing fire events. The general effect was an immediate disruption in the natural fire regime that has been maintained in part by humans to various degrees up to the present. Resulting ecological changes include wildfire events of increasing size and intensity. Fire exclusion and fire suppression policies in particular have increased the chance of unwanted, high-intensity fires through the steady accumulation of fuel and the general aging of vegetation. These processes can occur on relatively large and contiguous land areas until some event directly impacts the vegetation and fuels. Such events include wildfires, prescribed burns, thinning, and mowing. In the recent past, the Prescott National Forest has averaged about 90 fires annually, with about 60 percent of these caused by lightning (Prescott National Forest Web site at http://www.fs.fed.us/r3/prescott/). Between 1985 and 1996, an estimated 27,700 acres burned as a result of all causes (Pers. comm., R. Fluhart, Fuels Manager/Fire Planner, Prescott National Forest, March 2002).

3.2.2.2 Vegetation Types

The Prescott National Forest includes the vegetation types listed in Table 4. Each type is represented in the four Wildland Fire Use Areas (see Figure 2).

Table 4. Vegetation Classification for Prescott National Forest.

Vegetation Type	Forest Acres
Ponderosa pine	114,633
Pinyon-Juniper	635,637
Chaparral	403,376
Grassland/Desert shrub	82,722
Riparian	16,935
Aquatic	863
TOTAL	**1,254,166**

Source: Environmental Impact Statement for the Prescott National Forest Plan, 1986.

Ponderosa Pine. This vegetation type is represented mostly in the northwestern and southwestern Wildland Fire Use Areas. Ponderosa pine (*Pinus ponderosa*) is the predominant tree species throughout. White fir *(Abies concolor*) and Douglas fir (*Pseudotsuga menziesii*) may be found in association at the higher elevations, while Gambel oak (*Quercus gambelii*), pinyon pine (*Pinus californiarum var. fallax*), junipers (*Juniperus* spp.), and chaparral species are intermixed to varying degrees. Ponderosa pine stands are currently stocked at moderately high levels with an age class composition characterized as young, 1 percent; immature, 99 percent; and mature, 0 percent.

The natural fire regime within this vegetation type on the Forest was probably typical of other western ponderosa pine forests. This regime can be described as having frequent light surface

fires with return intervals of from one to twenty-five years (Covington and Moore 1992, Dieterich and Hibbert 1988). These fires maintained an open and park-like stand with a grass and forb understory. Burning released nutrients from accumulated woody debris and duff.

The suppression of fire, timber harvesting, and historical grazing practices have disrupted this natural fire regime to the extent that current tree stocking is relatively high, and associated forest fuels are more continuous. Understory grass and forb stocking is correspondingly low. Also, the absence of fire has allowed the conversion to shade-tolerant species at the higher elevations. This understory establishes fire ladders to the ponderosa pine overstory. Much of the ponderosa pine vegetation type is currently in Condition Class 3, which means that fire frequencies have departed from historical frequencies by multiple return intervals. Fire regimes have been significantly altered from the natural range, and the risk of losing key ecosystem components is high (Prescott National Forest Fire Management Plan, 1986).

Pinyon-Juniper. This woodland vegetation type is represented in each of the Wildland Fire Use Areas except the southwestern area. The species that make up this vegetation type include pinyon pine and junipers (*Juniperus deppeana, J. monosperma, and J. osteosperma*). In some cases, chaparral may be found intermixed, and in others, grass savannahs are interspersed through the vegetation type. Ponderosa pine and riparian vegetation may be found in some drainage bottoms as well. Pinyon-juniper and pure juniper stands are established at a range of stocking levels with an approximate age class composition as follows: young, 11 percent; immature, 45 percent; and mature, 44 percent. Immature and mature woodland stands typically have little understory vegetation and ground cover. These stands can be characterized by extensive levels of sheet and gully erosion.

The natural fire regime within this vegetation type was likely one characterized by infrequent, severe surface fires with return intervals of more than 25 years (Pers. comm., E. Hollenshead, Fuels Manager, Prescott National Forest, November 2001). Early estimates of historic fire return intervals ranged of 10 to 30 years (Leopold 1924). The natural range of this vegetation type was probably more confined than today, with much of its current range having been grassland with a significantly different fire regime. The natural range was probably more limited to sites that were relatively protected from frequent fire, such as rock outcrops. When these stands burned they likely experienced sporadic crown fires that killed many trees but did not replace the stand (Pers. comm., E. Hollenshead, Fuels Manager, Prescott National Forest, November 2001).

The suppression of fire and historical grazing practices has significantly disrupted the natural fire regime of historical grassland areas, allowing much of them to be replaced by the pinyon-juniper vegetation type, with correspondingly sparse to nonexistent understory vegetation and surface fuels. This current vegetation and fuels condition will not carry the frequent low-intensity fire that occurred naturally in grasslands. The risk of losing key ecosystem components of the displaced grasslands to a fire event is relatively low because the significant loss of the grassland component has already long occurred.

Chaparral. This vegetation type is represented in all Wildland Fire Use Areas with the majority in the northwestern and southwestern areas. Predominant species include mountain mahogany (*Cercocarpus montanus*), manzanita (*Arctostaphylos pungens*), silk tassel (*Garrya wrightii*), scrub oak (*Q. turbinella*), emory oak (*Q. emoryi*), and Arizona white oak (*Q. arizonica*). The

post-fire resprouting shrubs associated with this vegetation type may include Gambel oak, manzanita, mountain mahogany, scrub oak, and silk tassel. This vegetation type is arranged as large, continuous stands of chaparral in addition to being interspersed with ponderosa pine and woodland areas. A range of stocking levels is represented in this vegetation type, with an approximate age class composition as follows: young, 21 percent; immature, 5 percent; and mature, 74 percent. Mature chaparral stands tend to have little understory vegetation and associated ground cover. Extensive levels of sheet and gully erosion can occur in these stands.

The natural fire regime within this vegetation type was characterized as severe surface fires combined with crown fires. The return interval was approximately 35 to 40 years (Floyd-Hanna et al. 1997). These fires served as replacement events in mature stands of chaparral and probably maintained more of a mosaic of age classes across the landscape.

The suppression of fire has moderately altered the natural fire regime in the chaparral vegetation type. Relatively large and continuous stands with little age class or structural diversity now make up much of the chaparral. Most of this type has burned at least once in the last century, which represents a departure by at least one fire return interval. This places the chaparral in Condition Class II. Fire regimes have been moderately altered from their historic range, and the risk of losing key ecosystem components is considered moderate (Prescott National Forest Fire Management Plan, 1986).

Grassland/Desert Shrub. The grassland vegetation type characterizes the southeastern Wildfire Fire Use Area, as well as much of the northern portion of the northwestern Wildfire Fire Use Area. The desert shrub vegetation type characterizes some of the lower elevations of the southwestern Wildland Fire Use Area. Predominant shrub species include scrub oak, algerita (*Berberis fremontii*), catclaw (*Acacia greggii*), and mesquite (*Prosopis* spp.) and are typically widely spaced. Predominant grass species can be found in a range of stocking conditions.

The natural fire regime within this vegetation type was characterized as low-intensity surface fires with a return interval of from one to twenty-five years (Pers. comm., E. Hollenshead, Fuels Manager, Prescott National Forest, November 2001). The frequency and nature of these fires probably maintained the grass composition and prevented establishment of woody vegetation.

The suppression of fire and historical grazing practices have disrupted the natural fire regime on some historical grasslands. Many of these areas have evolved into woodlands with a completely different fire regime. Existing grasslands and desert shrub areas have probably not burned as frequently as in the past. However, fire events have occurred in these types and have helped to promote and maintain the grass component. Departure from the natural fire regime is difficult if not impossible to determine. The risk of losing key ecosystem components may be low.

Riparian. Riparian communities are scattered throughout the Wildland Fire Use Areas along intermittent and perennial streams (most notably the Verde River), around ponds and springs, and in seeps and marshes. Riparian species require free water or moist conditions and vary depending on elevation, substrate, and amounts of water present. Characteristic riparian species include Fremont cottonwood (*Populus Fremontii*), Arizona sycamore (*Platanus wrightii*), velvet ash (*Fraxinus velutina*), Arizona alder (*Alnus oblongifolio*), Arizona walnut (*Juglans major*), and willows (*Salix* spp.); velvet mesquite (*Prosopis velutina*) in mesquite bosques; tamarisk

(*Tamarix* spp.) and seepwillow (*Baccharis salicifolia*); and emergent vegetation such as horsetail (*Equisetum* spp.), bulrushes (*Scirpus* spp.), rushes (*Juncus* spp.), sedges (*Carex* spp.), and reeds (*Phragmites* spp.).

Riparian habitats are not fire-adapted. Historically, fires were infrequent and usually of low intensity because of the damp conditions that normally prevail during the rainy summer months when lightening is most likely to strike; the moisture content of potential fuels tends to be high, and litter decomposes rapidly. In recent years, the frequency and intensity of fire in riparian areas along water courses in the Southwest have increased. This is thought to be the result of increased accumulation of dry fuels (dead wood) due to the reduced frequency of scouring floods, and the invasion of tamarisk, which is highly flammable. Fire has been shown to disrupt the natural functioning of riparian ecosystems, allowing the invasion and expansion of non-native plant species, particularly tamarisk, which, in turn, increases the probability of future fires and further disruption. Fire does not play a role in the natural functioning condition of riparian/aquatic communities (Busch 1995).

3.2.3 Environmental Consequences

The following discussion will emphasize the effects on fire-adapted vegetation types that include ponderosa pine, pinyon-juniper, chaparral, and grassland/desert shrub. The time frame for this disclosure is the anticipated life of this amendment, or until Prescott Forest Plan revision (scheduled for completion in 2010). The natural fire regime over much of the Forest has been disrupted. With respect to the fire ecology across the vegetation types within the proposed Wildland Fire Use Areas of the Forest, the longer the return interval of fire the more severe and larger the fire event. Also, the more acres burned by more numerous fires through time effects the movement towards restoration of the natural fire regime at the landscape level.

3.2.3.1 No Action Alternative

3.2.3.1.1 Fuelwood Management

Retention of current directives for managing fuelwood gathering would have no direct effect on fire ecology within the Forest. In the long term, failure to manage fuelwood harvesting to reduce hazardous fuel loads could indirectly increase the risk of destructive, uncontrolled fires.

3.2.3.1.2 Fire Management (Wildland Fire Use)

Under the current Forest Plan, the managed use of fire is limited to lightning-caused fire in wilderness areas. Lightning-caused fires in non-wilderness areas are required to be suppressed; therefore, the No Action alternative continues and exacerbates the forestwide problem of disrupted fire regimes. The longer fire regimes are disrupted, the greater the accumulated effects (e.g., fuel buildup, nutrient cycle disruption, aging of vegetation, species displacement, etc.). This problem is manifested in larger and higher-intensity fires when burning under critical fire weather conditions. The risk associated with continued fire regime alteration varies with vegetation type. Table 5 gives the estimated number of acres predicted to be burned by wildland fire over the next 10 years for both the No Action and the Proposed Action alternatives. Information is also provided for the historic period 1985-1996 for comparison. Under both

alternatives, prescribed fire is expected to burn an additional 400,000 acres over the next 10 years, including 150,000 acres of grassland (Pers. comm., R. Fluhart, Fuels Manager/Fire Planner, Prescott National Forest, March 2002).

Table 5. Acres Burned by Vegetation Type 1985-1996, and Acres Predicted to Be Burned by Wildland Fire in the Next 10 Years under Both Alternatives.

Vegetation Type	**1985-1996 All Causes**	**No Action Alternative**		**Proposed Action Alternative**	
		Unwanted Wildfire[1]	**Wildland Fire Use**	**Unwanted Wildfire[1]**	**Wildland Fire Use**
Ponderosa pine	8,500	4,500	4,500[2]	1,500	10,500
Pinyon-Juniper	1,600	1,500	1,000[2]	1,500	7,000
Chaparral	14,600	15,000	6,000[2]	8,000	21,000
Grassland/desert shrub	3,000	3,000		1,000	10,000
Subtotal	*27,700*	*24,000*	*11,500*[2]	*12,000*	*48,500*
Total	**27,700**	**35,500**		**60,500**	

Source: R. Fluhart, Fuels Manager/Fire Planner, Prescott National Forest, March 2002
[1] Acres burned despite suppression efforts.
[2] In wilderness management areas only.

Data in Table 5 are broken down by the following vegetation types.

- Ponderosa Pine. As explained in the Affected Environment section, ponderosa pine has a high risk of losing key ecosystem components. Under No Action, this risk would increase as the interval between fire events lengthens. The risk would also increase for unwanted, intense fire that threatens both high-value resources and private property.
- Chaparral. This vegetation type has a moderate risk of losing key ecosystem components. This risk would increase as the interval between fire events lengthens under No Action.
- Pinyon-Juniper and Grassland/Desert Shrub. For reasons explained in the Affected Environment section, the risk of losing key ecosystem components for these vegetation types is considered relatively low. The No Action alternative is expected to result in a continuation of current trends.

Future projects that use prescribed fire may not be sufficient in number or scope to ensure a movement toward approximating more natural fire regimes. Much of the proposed Wildland Fire Use Areas is relatively remote and may not command the limited resources of the Forest. This is particularly true for mechanical treatments, which are costly and time consuming and therefore focused on wildland-urban interface areas and other locations where potential effects of fire on human health, safety, and property are of the greatest concern.

3.2.3.1.3 Monitoring Plan

Continuing to monitor resources under the existing monitoring plan would have no direct or indirect effects on fire ecology within the Forest.

3.2.3.2 Proposed Action Alternative

3.2.3.2.1 Fuelwood Management

Under the Proposed Action, the fuelwood harvesting policy would be used to reduce the accumulation of hazardous fuels on the Forest. This would reduce the probability of large, uncontrolled, high-intensity fires and would promote conditions that would permit a more natural fire regime of low-intensity ground fires.

3.2.3.2.2 Fire Management (Wildland Fire Use)

The short-term effects of the proposed changes in fire management policy may be beneficial for the specific area burned because the wildland fire return interval would have been shortened in that area. This short-term effect may be minimal forestwide because the allowed size of each area burned would likely be small in relation to the total area of the Forest. In the next 10 years, approximately 48,500 acres (3.44 %) of the entire forest are expected to be burned by wildland fire used to benefit resources. Over the long term, effects should become more widespread and beneficial to forest health on a broader scale as areas burned by wildland fire use accumulate. An increasing proportion of the Forest is expected to assume a more natural fire regime.

Ponderosa Pine. An estimated 10,500 acres of ponderosa pine are predicted to be burned by wildland fire use over the next 10 years (see Table 5). Wildland fire use events in this vegetation type are expected to be of low to moderate intensity with size ranging up to approximately two thousand acres (Pers. comm., R. Fluhart, Fuels Manager/Fire Planner, Prescott National Forest, 2002). Burn intensity would likely be variable across the area because of fuels composition and arrangement. Direct effects of wildland fire use would likely include a reduction in ground and ladder fuels composed of chaparral species. Accumulated surface fuels would be reduced as well with indiscriminate mortality of some overstory ponderosa pine trees. Composition of understory tree species such as pinyon pine, junipers, and firs would also decrease. Forest fuels may be further modified to increase understory composition of grass and forb species. Fire hazard would be reduced overall by fuels reduction and modification. Consequently, a lower number of future unwanted, high-intensity fires is a predictable indirect effect of wildland fire use.

It is likely that many chaparral plants under the ponderosa pine canopy would be burned back. Resprouting of certain chaparral plants would be expected. With an unthinned overstory, an improvement in grass composition may be limited because of continued shade. Given existing conditions, there is a high probability of indiscriminate mortality of some of the ponderosa pine overstory because of localized fuel loads under the crowns of trees. This direct effect of wildland fire use could lead to subsequent stand degradation and decreased vigor through the slow mortality of stressed trees. This stand condition, in turn, may be conducive to an increase in disease and insect activity that could weaken the yet healthy trees within the burn mosaic (an

indirect effect of wildland fire use). Excessive forest fuels would be reduced overall but not necessarily modified to a natural condition. The implication of this may be an immediate increase in dry aerial fuels (the crowns of dead standing trees) followed by a short- to mid-term increase in dead and down heavy fuels (fallen trees).

Pinyon-Juniper. An estimated 7,000 acres of pinyon-juniper are predicted to be burned by wildland fire use over the next 10 years (see Table 5). Wildland fire use events in this vegetation type are expected to be of moderate to high intensity with size ranging up to a few acres (Pers. comm., R. Fluhart, Fuels Manager/Fire Planner, Prescott National Forest, 2002). Burn intensity would be high on the few trees likely to crown out. With minimal surface fuels to spread the fire and few ladder fuels, the area burned would likely remain small. The indirect effect on the immediate area could include an increase in vegetative diversity through the establishment of understory vegetation. Fires that are allowed to burn under these conditions are likely to have minimal influence on restoring natural fire regimes to those areas of former grasslands. In areas where grass still predominates and invasion by woody species is early, fires that are allowed to burn would serve to check the invasion and promote grass composition similar to that of the natural fire regime.

Chaparral. An estimated 21,000 acres of chaparral are predicted to be burned by wildland fire use over the next 10 years (see Table 5). Wildland fire use events in this vegetation type are expected to be of high intensity with size ranging up to a few thousand acres (Pers. comm., R. Fluhart, Fuels Manager/Fire Planner, Prescott National Forest, 2002). The immediate effect would be replacement of the chaparral stand. This would improve age class composition as well as nutrient release on a landscape level. Indiscriminate mortality to tree species within the chaparral stand is expected. Short-term, indirect effects may include an increase in grass composition. This modification in fuel from decadent plants with little grass composition to young sprouts with a grass matrix may persist for a short time. Fire hazard would be reduced overall by fuels reduction and modification. Wildland fire use events would approximate the natural fire regime.

Grassland/Desert Shrub. An estimated 10,000 acres of grassland/desert shrub are predicted to be burned by wildland fire use over the next 10 years (see Table 5). Wildland fire use events are expected to be of low intensity with size ranging up to a few thousand acres. The immediate effect would be the release of nutrients and maintenance of grass composition. Some old, decadent shrubs would be replaced by younger, healthier shrubs. The indirect effect of the fire on adjacent vegetation types such as chaparral or juniper would be to reduce encroachment. Fire hazard would be reduced overall by fuels reduction. Wildland fire use events would approximate the natural fire regime.

Riparian. Riparian habitats are not fire-adapted; therefore, wildland fire use to restore a more natural fire regime has little, if any, application to riparian areas. In non-drought conditions, the high moisture content of riparian vegetation resists fire. In dry conditions, fire would be suppressed. Wildland fire use outside and upslope of riparian habitats could result in increased erosion and delivery of sediment to these habitats. In moderation, increased sediment would replenish soil and nutrients to the riparian system. Excessive sedimentation could reduce habitat suitability for riparian and aquatic species.

Measures to mitigate the potential impact of excessive erosion include suppressing wildland fires that are ignited immediately upslope of riparian areas; directing managed fire away from such areas; or stabilizing post-fire slopes to control erosion.

3.2.3.2.3 Monitoring Plan

The proposed Monitoring Plan would not affect how resources in the Forest are managed, except to the extent that information acquired through monitoring about resource status and levels of use would help Forest personnel evaluate the effectiveness of management programs. Therefore, the proposed Monitoring Plan would not directly affect fire ecology on the Forest. The Monitoring Plan may indirectly accelerate the return to a more natural fire regime by helping the Forest Service monitor progress toward achieving Forest goals as stated in the Prescott Forest Plan and the proposed amendment.

3.2.3.3 Cumulative Effects

Whether or not the proposed amendment is adopted, several management directions on the Forest are likely to affect fire ecology in the future. These include, but are not limited to, prescribed fire; mechanical treatments to reduce fuelwood reduction in wildland-urban interface areas; wildland fire use in wilderness areas; and prescriptions related to protecting "old growth" and habitat for Threatened and Endangered species. Current plans call for an estimated 400,000 acres of prescribed fire over the next decade. Prescribed fire, mechanical treatments, and wildland fire use in wilderness areas would reduce hazardous fuel loads, thereby decreasing the potential for high-intensity fire in the affected areas. Fire suppression in "old growth" and some habitats for Threatened and Endangered species would likely maintain unnatural fire regimes in those areas.

Under No Action, the limited ability to use fuelwood harvesting as a tool to control hazardous fuel loads on the Forest, and suppression of all naturally caused wildland fire outside of wilderness areas, would limit the cumulative effectiveness of other programs designed to restore more natural fire regimes. Compared to the present, prescribed fire and mechanical treatments would eventually reduce the probability of a destructive wildfire; however, the disruptive effect of past human activities on the natural fire regime over most of the Forest would persist.

Under the Proposed Action, managing fuelwood harvesting and using wildland fire to benefit forest health, combined with prescribed fire and mechanical treatments, are likely to result in a forest less susceptible to the destructive effects of an uncontrolled, high-intensity wildfire. Depending on the number and size of the naturally ignited fires that are allowed to burn, they would contribute towards restoring and maintaining natural fire regimes in the long term.

3.3. Air Quality

3.3.1 Legal and Administrative Framework

Clean Air Act (42 USC 7401 *et seq*.), with 1990 amendments. The Clean Air Act (CAA) established National Ambient Air Quality Standards (NAAQS) for the country, setting limits of

how large the concentration of an air pollutant may be in the atmosphere. Under the law, states and local authorities are given the primary responsibility for managing air quality. They may set more stringent standards but are not allowed to set standards lower than the NAAQS. The Clean Air Act includes a list of 189 air pollutants that must be regulated by the Environmental Protection Agency (EPA) and allows for the addition of new chemicals as necessary.

The Clean Air Act classifies airsheds into three categories: Class I, Class II, and Class III. Class I airsheds include all international parks, national parks greater than 6,000 acres, and wilderness areas greater than 5,000 acres that existed on August 7, 1977. This class provides protection to pristine areas by severely limiting the amount of additional human-induced air pollution that can be added to these areas. Class II areas include all other areas of the United States. A greater amount of human-induced air pollution may be added to these areas. Class III areas would have the least amount of regulatory protection from additional air pollution; however, no Class III areas have been designated.

EPA Regional Haze Rule (64 FR 35714) - EPA's Regional Haze Rule was developed to protect and improve visibility in the country's 156 national parks and large wilderness areas (Class I areas).

Interim Air Quality Policy on Wildland Fire and Prescribed Fire - This policy complements the Natural Events Policy, which was issued May 30, 1996, to address public health impacts caused by wildfires (i.e., unwanted wildland fires).

Arizona Administrative Code RM 18-2 Article 15, Final rulemaking for Forest and Range Management Burns - This Article applies to federal or state land managers (F/SLMs) who are conducting or assisting a prescribed burn,[3] and all areas of the state except Indian trust lands. All federally managed lands and all state lands, parks, and forests are under the jurisdiction of Arizona Department of Environmental Quality (ADEQ) in matters relating to air pollution from prescribed burning. Controlled burning by federal and other agencies is coordinated through the ADEQ as part of its Arizona Interagency Smoke Management Program. 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 are not violated and visibility objectives are met. Burn-day monitoring requirements include release and tracking of PIBALS (pilot balloons), recording weather measurements (relative humidity, wind direction, wind speed, etc.), and observing and documenting smoke plume direction and dispersal.

3.3.2 Affected Environment

The Prescott National Forest lies within portions of the following ADEQ airsheds:

- Western portion of the Verde River airshed
- Gila River airshed
- Eastern side of the Colorado River/Mexico airshed

These airsheds were established based on watersheds to account for the potential of smoke to drift from higher elevations to concentrate at lower elevations. This potential is a key factor for

[3] Both prescribed fire and wildland fire use are referred to as “prescribed natural fire” by ADEQ.

managing smoke from fire sources. The Forest is unclassifiable for pollutants regulated by the NAAQS as defined by the Clean Air Act.

The ADEQ tracks the quality of ambient air through a statewide network of monitoring sites. Using data collected at the monitoring sites, air quality control measures are developed and implemented to bring non-attainment areas[4] into compliance with federal and state air quality standards through the State Implementation Plan (SIP). There are no non-attainment areas within the Forest; however, the Phoenix Metropolitan Area lies downslope about 30 miles away. The Phoenix Metropolitan Area is classified as a serious non-attainment area for particulate matter less than 10 microns in size (PM_{10}). The City of Payson, which lies within 30 miles of the eastern boundary of the Forest, is also a non-attainment area for particulate matter.

Products from the combustion of wildland vegetation produce mostly carbon-containing compounds, the most important pollutants being particulate matter and carbon monoxide (CO). Carbon monoxide is the most abundant air pollution caused by wildland fires; however, dilution occurs rapidly enough to preclude health hazards associated with CO emissions except within the immediate vicinity of a burn. Therefore, the most applicable NAAQS standards for burning wildland fuels are:

- 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
- $PM_{2.5}$: annual standard of 15 micrograms per cubic meter

Several smoke-sensitive areas are within or immediately adjacent to the Forest. They include the communities of Jerome, Clarkdale, Cottonwood, and Camp Verde in the Verde Valley; the tri-city area of Prescott, Prescott Valley, and Chino Valley; and the communities of Humboldt, Dewey, and Mayer. The Forest also includes two Class I areas: Sycamore Canyon and Pine Mountain Wilderness Areas. Class I areas receive the most stringent protection from anthropogenic air quality degradation and are protected from visibility impairment. Mazatzal Wilderness, another Class I area, lies within 60 miles of the proposed wildland fire use locations. Although Grand Canyon National Park does not lie within 60 miles of the proposed wildland fire use locations, past fires within the Forest have been detected in the park as haze. The worst impact to air clarity at Grand Canyon from fire in the region is seen during the periods of March-April and September-November, when the canyon acts as a sink for smoke (Pers. comm., C. Bowman, Air Quality Specialist, Grand Canyon National Park, October 2001).

The Forest has allowed some lightning-caused fires to burn (wildland fire use) within the Pine Mountain, Castle Creek, and Granite Mountain Wilderness Areas. Recently installed IMPROVE (Interagency Monitoring of Protected Visual Environments) sites monitor visibility for Sycamore Canyon and Pine Mountain. Several years of data will be needed to quantify visibility conditions in both areas. Generally, visibility is good on most days.

[4] Non-Attainment Areas: Cities, counties, or states that do not meet federal standards for clean air for one or more pollutants.

3.3.3 Environmental Consequences

3.3.3.1 No Action Alternative

3.3.3.1.1 Fuelwood Management

Retention of current directives for managing fuelwood gathering would have no direct effect on air quality on or near the Forest. In the long term, failure to manage fuelwood harvesting to reduce hazardous fuel loads could indirectly increase the risk of destructive, uncontrolled fires that could result in severe, temporary degradation of air quality.

3.3.3.1.2 Fire Management (Wildland Fire Use)

Under the No Action alternative, particulate emissions from all fire (prescribed, wildland fire use, and unwanted) in the Forest in the next 10 years would total an estimated 31,318 tons (see Table 6). Fuel conditions throughout the Forest would continue to favor large, intense, unwanted wildland fires. Based on historical frequencies, the Forest can expect 24,000 acres of unwanted wildland fire in the next 10 years (see Table 5). An estimated 941 tons of PM_{10} and 816 tons of $PM_{2.5}$ emissions may be produced as a result. Wildland fire use, which would be confined to wilderness areas, is expected to burn approximately 11,500 acres over the next 10 years, producing an estimated 708 tons of PM_{10} and 303 tons of $PM_{2.5}$ emissions. Wildland fire use estimates are highly variable and represent expected maximum activity levels. Prescribed fire activity would continue, totaling an estimated 400,000 acres over the next decade. This includes up to 150,000 acres of grassland that may be burned, depending on fuel and weather conditions. Approximately 15,440 tons of PM_{10} and 13,110 tons of $PM_{2.5}$ can be expected. Prescribed fire projections represent best estimates of acres treated based on optimum burning and atmospheric conditions and staffing levels for the next decade.

Considered "uncontrolled events," unwanted wildland fires produce smoke that is not subject to the smoke management rules administered by ADEQ. Unlike fires managed for resource benefits, unwanted wildland fires may occur when atmospheric conditions adversely affect the transport and dispersal of smoke. In general, such unwanted wildland fires have the potential to produce significantly higher emission rates than managed fires. When comparing the results from the First Order Fire Effects Model (FOFEM), estimated emission rates (PM_{10} and $PM_{2.5}$) for intense wildland fires were considerably higher (at least 25%) than those of managed fires in identical fuelbeds. Unwanted wildland fires have the potential to burn 100 percent of the available fuel. Prescribed fire and wildland fire use, which are managed within a prescription, regulate the fuel consumption and generally consume 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 and contribute to regional haze. In addition, visibility impacts may be excessive in Class I areas near large unwanted wildland fires.

The current forest plan contains specific language that allows, and in fact encourages, wildland fire use within wilderness areas. Wildland fire use within wilderness is expected to increase. Acreage burned will vary greatly from year to year, with only a few acres possible in one year to several thousand in the next. Wildland fire use incidents are most likely to occur during the summer rainy (monsoon) season when atmospheric conditions are very unstable with excellent

Table 6. Estimated Particulate Emissions (in Tons) by Airshed in the Next 10 Years under the No Action and Proposed Action Alternatives.

Particulate Emissions	**No Action Alternative**			**Proposed Action Alternative**		
	Unwanted Wildland Fire	**Wildland Fire Use**	**Prescribed Fire[1]**	**Unwanted Wildland Fire**	**Wildland Fire Use**	**Prescribed Fire**
Verde Airshed						
$PM_{2.5}$	528	141		234	858	
PM_{10}	611	329		124	1,152	
Subtotal	*1,139*	*470*		*358*	*2,010*	
Gila River Airshed						
$PM_{2.5}$	287	162		303	489	
PM_{10}	329	379		183	741	
Subtotal	*616*	*541*		*486*	*1,230*	
Colorado River Airshed						
$PM_{2.5}$	1	0		1	10	
PM_{10}	1	0		1	10	
Subtotal	*2*	*0*		*2*	*20*	
Forestwide						
$PM_{2.5}$			13,110			13,110
PM_{10}			15,440			15,440
Particulate Emissions by Fire Type	*1,757*	*1,011*	*28,550*	*846*	*3,260*	*28,550*
Total Particulate Emissions by Alternative	**31,318 tons**			**32,656 tons**		

Source: R. Fluhart, Fuels/Fire Planner, Prescott National Forest, March 2002

[1] Based on an estimated 40,000 acres burned per year, including 15,000 acres of grassland.

vertical and horizontal dispersal. Smoke from burns under these conditions will disperse rapidly in the atmosphere and be less likely to impact sensitive receptors. These same weather conditions increase relative humidity and decrease fire intensities, which, in turn, decrease the amount of fuel burned. The result is fewer emissions.

3.3.3.1.3 Monitoring Plan

Retention of the current monitoring plan would have no direct or indirect effects on air quality on or near the Forest.

3.3.3.2 Proposed Action Alternative

3.3.3.2.1 Fuelwood Management

Managing fuelwood harvesting to help reduce hazardous fuel loads on the Forest would reduce the likelihood of unwanted wildland fires, which have the potential to produce significantly higher pollutant emission rates than managed fires.

3.3.3.2.2 Fire Management (Wildland Fire Use)

Under the Proposed Action alternative, particulate emissions from all fire (prescribed, wildland fire use, and unwanted) in the Forest in the next 10 years would total an estimated 32,656 tons (see Table 6). This is a difference of 1,338 tons over estimates for No Action. Particulate emissions would increase under the Proposed Action because wildland fire use would be expanded to non-wilderness areas of the forest where and when it can be safely applied without threats to high-value private property and resources. Based on emission predictions derived from the FOFEM, the Forest can expect 12,000 acres of unwanted wildland fire in the next 10 years (see Table 5). An estimated 308 tons of PM_{10} and 538 tons of $PM_{2.5}$ emissions may be produced as a result (see Table 6). Wildland fire use is expected to burn approximately 48,500 acres over the next 10 years, producing an estimated 1,903 tons of PM_{10} and 1,357 tons of $PM_{2.5}$ emissions. Acres burned by prescribed fire, and the resulting emission projections, are the same as under No Action.

Smoke quantities would increase as the direct result of the more extensive wildland fire use program, and potential NAAQS violations are risks inherent in such a program. Depending on the location of the fire and prevailing atmospheric conditions, a wildland fire use incident could degrade air quality in nearby communities. Air quality in Sycamore Canyon Wilderness and Pine Mountain Wilderness Class I areas may also be affected. The anticipated increase in particulate emissions could increase the incidence of haze in the region, which may sporadically degrade visibility in the Mazatzal Wilderness and Grand Canyon National Park Class I areas.

Potential impacts on air quality would be mitigated by the fact that wildland fire use incidents would only occur when atmospheric conditions favor rapid smoke dispersal. Through proper planning, close adherence to the criteria set forth in the Wildland Fire Implementation Plan (Appendix D), the use of best management practices, and coordination with ADEQ, risks of air quality degradation would be minimized. For these reasons, and because the particulate

emissions anticipated under the Proposed Action are only about four percent greater than under No Action (32,656 vs. 31,318 tons), impacts on air quality in nearby communities, the non-attainment areas of Payson and Phoenix, and Class I areas are likely to be small.

Over time, a sustained program of wildland fire use, combined with prescribed fire, may lead to a decrease in the amount of emissions produced per acre because of changes in vegetative composition and decrease in fuel loading. The potential severity and risk of unwanted fires, and their attendant air quality impacts, should also be reduced.

3.3.3.2.3 Monitoring Plan

The proposed Monitoring Plan would not affect how resources in the Forest are managed, except to the extent that information acquired through monitoring about resource status and levels of use would help Forest personnel evaluate the effectiveness of management programs. Therefore, the proposed Monitoring Plan would not directly affect air quality in the region. The Monitoring Plan may indirectly affect air quality by helping the Forest Service monitor progress toward achieving the goals for air quality as stated in the Prescott Forest Plan.

3.3.3.3 Cumulative Effects

As described in the Fire Regime section, management actions such as prescribed fire, mechanical treatments to reduce fuelwood reduction in wildland-urban interface areas, and wildland fire use in wilderness areas should combine to reduce the probability of uncontrolled, large-scale fires in the future. However, without the added management tools of wildland fire use and greater control over fuelwood harvest, the chances of a destructive wildfire occurring in the future is higher than under the Proposed Action. Such fires can release very high amounts of particulates and other pollutants into the air, impacting the air quality in municipal areas and Class I airsheds in the vicinity, downwind, and downslope. Major wildfires can and often do exceed national and state air quality standards. While such fires can severely degrade air quality over the duration of the event (a few days to a few weeks), if historical precedent on the Forest holds true, they are likely to be rare occurrences. Systematic suppression of all naturally ignited fire except in wilderness areas would generally keep smoke levels low.

Under the Proposed Action, wildland fire use and management of fuelwood harvesting would combine with prescribed fire and mechanical treatments to reduce the likelihood of a wildfire that would severely degrade air quality. However, between prescribed fire and increased wildland fire use, smoke would affect air quality in the region more often. More low-intensity fires (although the anticipated number is small) are expected to burn each year compared to No Action, so air quality in the vicinity of the fires could be impacted more days each year. The increase of predicted particulate emissions from wildland fire use in combination with prescribed fire and fire suppression efforts, however, is not great (31,318 tons under No Action compared to 32,656 tons under the Proposed Action over ten years).

Under both alternatives, statewide coordination through the Arizona Smoke Management Program should mitigate cumulative air quality impacts from multiple prescribed or otherwise managed fires burning simultaneously in different jurisdictions. Also under both alternatives,

air pollution from Phoenix may combine with smoke from wildland and prescribed fires to affect air quality in portions of Yavapai and Maricopa Counties. Potential impacts include degraded visibility in the Pine Mountain Wilderness, a Class I area.

3.4 Wetlands

3.4.1 Legal and Administrative Framework

Pertinent regulations regarding the preservation of wetlands include:

Executive Order 11990 Protection of Wetlands (May 24, 1977; 42 FR 26961) - This order provides for the protection and preservation of wetlands. Each agency is expected to take action to minimize the destruction or degradation of wetlands, and to preserve and enhance the beneficial values of wetlands.

Clean Water Act (33 USC 1344) - Section 404 of the Clean Water Act prohibits discharging dredged or fill material into waters of the United States, including wetlands, without a permit from the U.S. Army Corps of Engineers (Corps). Corps policy requires applicants to avoid impacts on wetlands and other waters of the United States to the extent practicable, then to minimize the remaining impacts, and finally to take measures to compensate for unavoidable impacts.

3.4.2 Affected Environment

Approximately 700 acres of wetlands are scattered throughout the Prescott National Forest. Maps of these locations are not currently available. Wetlands are generally known as areas covered by water or have waterlogged soils for significant periods during the growing season. Plants growing in wetlands are able to live in soils that lack oxygen for at least part of the growing season. Many wetlands on the Forest are not easily recognized because they are dry during part of the year.

The ecological health of a forest ecosystem can greatly depend on its wetlands. Wetlands, especially seasonally flooded freshwater wetlands of the Southwest, often act as groundwater recharge areas where surface water filters into underlying aquifers. They also filter and remove pollutants (e.g., chemicals, pesticides, and heavy metals) from water by incorporating them into sediments or through plant uptake, which neutralizes and biologically breaks them down, eventually releasing the naturally processed elements into the environment. Wetlands also provide feeding, nesting, and wintering habitat for several species of migrating waterfowl and spawning, nursery, feeding, and cover habitat for fish and other aquatic species.

3.4.3 Environmental Consequences

3.4.3.1 No Action Alternative

3.4.3.1.1 Fuelwood Management

Managing fuelwood harvesting under current prescriptions would have no impact on wetlands. These environments contain little dead and down wood and are not desirable collecting locations.

3.4.3.1.2 Fire Management (Wildland Fire Use)

In the long term, the fire suppression policy under the current Forest Plan may have impacts on wetland vegetation by allowing the continued growth of dense stands of fire-prone vegetation and accumulation of hazardous woody fuel in surrounding areas. Destructive wildfires may result, increasing erosion and indirectly causing the discharge of sediment into wetlands. Excessive sediment loads can smother wetland vegetation, change the drainage characteristics of the area, and alter the wetland's ecological balance. An intense fire can directly affect wetlands by destroying ground cover, including roots and rhizomes; by radically altering soil and water chemistry; and by destroying macroinvertebrates and small aquatic animals. This destruction, in turn, results in a loss of cover and nesting habitat and food base for birds dependent on wetland habitats. Recovery of wetland values is likely to be slower for wetlands burned by high-intensity fire than by low-intensity fire (Anderson 1974, as cited in Kirby et al. 1988).

3.4.3.1.3 Monitoring Plan

Continuing to monitor resources under the current monitoring plan would have no direct or indirect effects on wetlands on the Forest.

3.4.3.2 Proposed Action Alternative

3.4.3.2.1 Fuelwood Management

Under the Proposed Action, fuelwood management is not expected to appreciably affect wetlands on the Forest. Woodcutters avoid wetlands because these areas do not to generate dead and down material suitable for wood burning. It is possible that reduction of hazardous fuel loads in adjacent areas through fuelwood management could indirectly affect wetlands by reducing the likelihood of destructive wildfire.

3.4.3.2.2 Fire Management (Wildland Fire Use)

Wildland fires used in accordance with the Wildland Fire Implementation Plan (Appendix D) have the potential to affect wetlands. That effect may be minimal because wildland fire use is most likely to occur during summer months when wetland vegetation tends to be succulent and relatively resistant to fire, particularly low-intensity fire. In addition, wetland acreage is sparse on the Forest (approximately 700 acres and scattered), and the predicted acreage burned by

wildland fire use over the next 10 years is only 3.44 percent of the Forest. The probability of a wildland fire occurring in or near a wetland is therefore small.

If managed fire were to burn through a wetland, potential impacts include a short term loss of nesting and foraging wetland habitat. This effect would be temporary because wetland vegetation tends to recover quickly from moderate fire (Kirby et al. 1988). Wildland fire use could also indirectly result in impacts if loss of vegetation upslope causes an increase in erosion and excessive sedimentation in the wetland. Potential damage may be mitigated by avoiding wildland fire use upslope of wetlands where steep slopes, highly erodible soils, or the likelihood of substantial vegetation loss are present. Impacts can also be avoided by stabilizing erodible soils upslope of wetlands after a fire. Unwanted impacts on wetland wildlife values can be mitigated by avoiding wildland fire use when birds are nesting.

Low-intensity fire, which often burns in a mosaic pattern, removes dead plant debris that can clog wetlands, releases nutrients into the soil and water, and recycles minerals (Beule 1979, Givens 1962, as cited in Kirby et al. 1988). The indirect effects in following years include increased vegetative vigor and productivity, hence increased nesting and cover habitat and food resources for wildlife. Burning can make seed-bearing plants more available to birds that forage on them and promote succulent sprout growth for browsing waterfowl. Low-intensity fire also may open portions of the wetland, making water more accessible for wildlife. In the long term, wildland fire use under the proposed Forest Plan amendment may have an effect on wetlands on the Forest by decreasing the potential for unwanted wildfires that could damage or destroy wetland values.

3.4.3.2.3 Monitoring Plan

The proposed Monitoring Plan would not affect wetlands on the Forest, except to the extent that information acquired through monitoring about resource status and levels of use would help Forest personnel evaluate the effectiveness of management programs to achieve objectives.

3.4.3.3 Cumulative Effects

Potential cumulative effects on wetlands are related to the probability of future high-intensity, destructive wildfire, which can be damaging to wetlands, and the occurrence of periodic, low-intensity fire, which can affect wetlands. Under No Action, planned programs of prescribed fire and mechanical treatments would combine to reduce the probability of destructive fire. Under the Proposed Action, the addition of fuelwood management and wildland fire use in the Wildland Fire Use Areas would further reduce the likelihood of such fires.

3.5 Wild and Scenic Rivers

3.5.1 Legal and Administrative Framework

The primary legislation governing wild and scenic rivers is the *Wild and Scenic Rivers Act of 1968* (16 USC 1271 *et seq*.). However, there are other specific federal regulations (Code of

Federal Regulations), policies (Forest Service Manuals and Handbooks), and guidance (technical manuals and papers) for wild and scenic river management.

3.5.2 Affected Environment

A portion of the Verde River in central Arizona was designated as a National Wild and Scenic River under the Arizona Wilderness Act of 1984 (see Figure 3). The designation is split between a Scenic River Area, which borders Prescott Nation Forest and a Wildland Fire Use Area, and a Wild River Area, which is wholly outside the Forest. The Scenic River Area comprises approximately 5,692 acres, starting at Beasley Flat and continuing downstream 18.3 miles to the boundary of the Mazatzal Wilderness at Childs. The Wild River Area contains approximately 6,824 acres, starting at the Mazatzal Wilderness boundary and continuing downstream 22.2 miles to the confluence of Red Creek. Wild and Scenic River areas are generally 0.5 mile wide, with half of that width on each side of, and parallel to, the river. Configuration of the Verde River designation is still under consideration.

According to the Environmental Impact Statement for the Verde River, approved in 1981, the reach that was subsequently designated a Wild and Scenic River contains outstandingly remarkable scenic, fish and wildlife, and historic and cultural values. The landscape bordering the river includes steep, rocky canyons, plateaus, and wide flood plains. The river itself varies in character from shallow, still pools and slowly moving water to swift rapids and waterfalls during high flows. As one of the few perennial flowing rivers in Arizona, the Verde River is a valuable resource. Vegetation types include semidesert grassland, Great Basin conifer woodland, and Sonoran desertscrub in the uplands, and deciduous riparian woodland, emergent marshland, mixed broadleaf, cottonwood-willow, and mesquite bosques in the riparian areas. The river and these associated habitats provide excellent habitat for a variety of fish and wildlife species, including some that are federally listed as Threatened or Endangered. Recreational activities in the area include fishing, boating, swimming, picnicking, camping, birding, and sightseeing.

3.5.3 Environmental Consequences

3.5.3.1 No Action Alternative

3.5.3.1.1 Fuelwood Management

In the short term, the No Action alternative would not affect the Wild and Scenic portions of the Verde River. However, in the long term, failure to manage fuelwood harvesting to reduce hazardous fuel loads could indirectly increase the risk of destructive fires that could spread into Wild and Scenic portions of the Verde River. Failure to manage fuelwood harvesting to maintain desirable levels of woody material could contribute to deteriorating forest health in these areas.

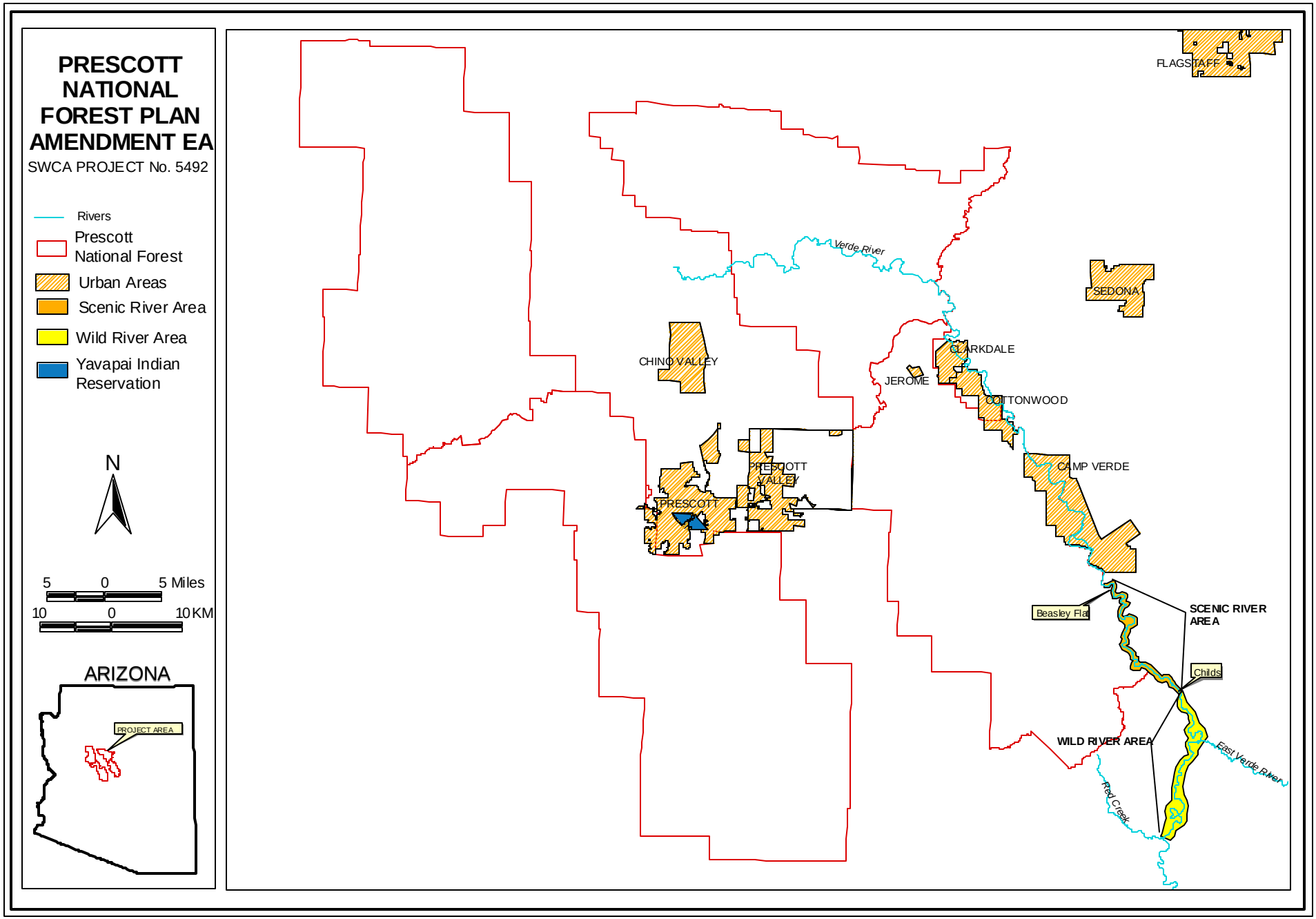

Figure 3. Verde Wild and Scenic River.

3.5.3.1.2 Fire Management (Wildland Fire Use)

The fire suppression policy under the current Forest Plan could indirectly affect the Wild and Scenic portions of the Verde River by increasing the likelihood of an unwanted, high-intensity wildfire spreading into the area and degrading the area's "outstandingly remarkable scenic, fish and wildlife, and historic and cultural values."

3.5.3.1.3 Monitoring Plan

Retention of the current monitoring plan would have no direct or indirect impacts on Wild and Scenic portions of the Verde River.

3.5.3.2 Proposed Action Alternative

3.5.3.2.1 Fuelwood Management

Under the Proposed Action, the component of fuelwood management may affect the Wild and Scenic portions of the Verde River. Fuelwood harvesting would not be permitted in riparian habitat, but may be permitted in upland areas along the Scenic River Area of the Verde River (Pers. comm., G. Wittman, Prescott National Forest, March 2002). As with most other areas in

the Forest, collecting would be allowed if sufficient amounts of woody material were available to allow collecting while also accomplishing Forest Service objectives of maintaining a healthy ecosystem and managing for aesthetic and recreational values. Identifying fuelwood collection areas based on resource benefits in specific locations may indirectly affect the Wild and Scenic Verde River by reducing hazardous fuel loads and the risk of destructive fires that could spread into scenic riparian areas. This directive would also indirectly affect the Wild and Scenic Verde River by maintaining minimum levels of woody material to promote ecosystem health.

3.5.3.2.2 Fire Management (Wildland Fire Use)

Naturally ignited fires would be suppressed in the riparian portion of the Scenic River Area because of the need to manage the area for its ecological, aesthetic, and recreational values. The riparian area is also designated critical habitat for the southwestern willow flycatcher, a federally endangered species. Decision-making criteria in the Wildland Fire Implementation Plan (WFIP) require that habitat for listed species be considered when deciding whether to allow a naturally ignited fire to continue burning. Wildland fire use, however, would be permitted adjacent to and possibly in upland portions of the Scenic River Area. Allowing wildland fires to burn in adjacent and upland areas, in accordance with WFIP guidelines for wildland fire use, would likely have an effect by maintaining a low hazardous fuel load that could lead to destructive wildfire and providing improved habitat for various wildlife species. Given the relatively small amount of wildland fire use predicted over the next 10 years (3.44% of the Forest), the probability of such a fire occurring in the Scenic River Area is small.

3.5.3.2.3 Monitoring Plan

The proposed Monitoring Plan would not affect how resources in the Forest are managed, except to the extent that information acquired through monitoring about resource status and levels of use would help Forest personnel evaluate the effectiveness of management programs. Therefore, the proposed Monitoring Plan would not directly affect the Wild and Scenic Verde River. The Monitoring Plan may indirectly affect this resource by helping the Forest Service monitor progress toward achieving pertinent goals in the Forest Plan.

3.5.3.3 Cumulative Effects

Potential cumulative effects on the Wild and Scenic Verde River are related to the probability of future high-intensity, destructive wildfire, which could damage the values for which this special management area was designated. Under No Action, planned programs of prescribed fire and mechanical treatments would combine to reduce the probability of destructive fire in the vicinity of the Wild and Scenic Verde River. Under the Proposed Action, the addition of fuelwood management and wildland fire use would further reduce the likelihood of such fires.

3.6 Threatened, Endangered, and Proposed; Regional Forester's Sensitive; and Management Indicator Species

3.6.1 Legal and Administrative Framework

Endangered Species Act 1973 (ESA), as amended (16 USC 1531, *et seq.*) - This statute and implementing regulations at 50 CFR 10 provide for the conservation and recovery of federally listed species.

National Forest Management Act of 1976 (16 USC 1600) - This law requires national forests to maintain viable populations of species "well distributed in the planning area."

The Secretary of Agriculture's Policy on Fish and Wildlife (Departmental Regulation 9500-4) - This policy directs the Forest Service to manage habitats for all native and desired nonnative plants, fish, and wildlife species to maintain viable populations of each species; to identify and recover threatened and endangered plant and animal species; and to avoid actions that may cause species to become threatened or endangered.

3.6.2 Affected Environment

Information on Threatened, Endangered, or Proposed (TEP) species; Regional Forester's Sensitive species; and Management Indicator Species was obtained from the U.S. Fish and Wildlife Service (USFWS), from the Heritage Data Management System of the Arizona Game and Fish Department, and from the Prescott National Forest. Detailed information about these species, their occurrence on the Forest, the availability of potential habitat, and potential effects of No Action and the Proposed Action is provided in a Wildlife Specialist Report. This report is available in the project record on file at the Prescott National Forest offices in Prescott, Arizona.

Also included in the project record are a Biological Assessment (BA), a Biological Evaluation (BE), and a Management Indicator Species report. The BA assesses potential project impacts on TEP species; the BE evaluates potential project impacts on Regional Forester's Sensitive species.

Threatened, Endangered, or Proposed Species. Species listed as Threatened, Endangered, or Proposed under the federal Endangered Species Act that are known to occur or that may occur on the Forest are listed in Table 7.

Designated critical habitat for three federally listed species–razorback sucker, loach minnow, and spikedace–occurs on the Forest. Critical habitat for the razorback sucker includes the Verde River and its 100-year floodplain from Perkinsville downstream to Horseshoe Dam. Critical habitat for the loach minnow and the spikedace includes the Verde River and its 100-year floodplain from Sullivan Dam to the confluence with Fossil Creek. Except for the short reach of river from the Forest boundary four miles east of Sullivan Dam to Perkinsville, critical habitat on the Forest for the three species coincide. Designated critical habitat is located within Wildland Fire Use Areas from the Forest boundary east of Sullivan Dam to Clarkdale, and from Interstate 17 near Camp Verde to the southern boundary of the Forest.

Regional Forester's Sensitive Species. The Regional Forester's Sensitive species known to occur or that may occur on the Forest are listed in Table 8. Regional Forester's Sensitive species are species for which population viability is a concern due to a significant current or predicted downward trend in population numbers, density, or habitat capability that would reduce the distribution of the species. Forest Service Sensitive Species Policy (FSM 2670.32) directs national forests to assist states in achieving conservation goals for endemic species; complete biological evaluations of programs and activities; avoid and minimize impacts on species with viability concerns; analyze significance of adverse effects on populations or habitat; and coordinate with states and the USFWS.

Management Indicator Species (MIS). The Prescott National Forest has designated eleven species or groups of species as Management Indicator Species (see Table 9). Each species is intended to indicate the health of certain vegetation types and seral stages (see Table 10). Changes in the population levels of MIS may indicate changes in the amount or quality of the vegetation types that support them.

Table 7. Threatened, Endangered, and Proposed Species Known to Occur or That May Occur on the Prescott National Forest.

Common Name	Scientific Name	Federal Status[1]	Potentially Affected Habitat
Southwestern willow flycatcher	*Empidonax traillii extimus*	E	No southwestern willow flycatchers are known to nest on the Forest at this time, but potential habitat may occur anywhere along the Verde River where there is dense riparian vegetation.
Desert pupfish	*Cyprinodon macularius macularius*	E	No desert pupfish are known to occur on the Forest, but two sites, Government and Reimer Springs, have been recommended for pupfish reintroductions (Bagley et al. 1991). Both springs are in a Wildland Fire Use Area.
Colorado pikeminnow	*Ptychocheilus lucius*	E	Colorado pikeminnows have been reintroduced into the Verde River as an experimental non-essential population and are found from above Beasley Flat to below Childs.
Razorback sucker	*Xyrauchen texanus*	E	Razorback suckers have been reintroduced into the Verde River and are found above and below stocking sites in the vicinity of Beasley Flat. A portion of the Verde River has been designated as critical habitat for this species.
Gila topminnow	*Poeciliposis occidentalis occidentalis*	E	Two locations, Lower Mine Spring and Johnson Wash Spring, currently support Gila topminnows. Lower Mine Spring is in a Wildland Fire Use Area; Johnson Wash Spring is not. An additional 13 sites have been identified as available for reestablishment of Gila topminnow (Weedman 1998).
Gila trout	*Oncorhynchus gilae gilae*	E	No Gila trout currently exist on the Forest. Gap Creek and Sycamore Creek are considered potential habitat for the Gila trout (Pers. comm., A. Sillas, District Biologist, U.S. Forest Service, February 2002). Both streams are within Wildland Fire Use Areas.
Woundfin	*Plagopterus argentissimus*	E	Woundfin do not occur on the Forest, but potential habitat may exist in the Verde River.
Arizona cliffrose	*Purshia subintegra*	E	Arizona cliffrose may occur on limestone outcrops, which are present on the Forest. A population has been tentatively identified near Lucky Canyon southwest of Camp Verde (Pers. comm., B. Phillips, U.S. Forest Service, February 2002).
Bald eagle	*Haliaeetus leucocephalus*	T	Two nest sites are known from the Verde River, one near the confluence with Cottonwood Creek south of Camp Verde and the other near the confluence with Sycamore Creek north of Clarkdale. Both are adjacent to Wildland Fire Use Areas. A third territory at Lynx Lake southeast of Prescott is not in or near a Wildland Fire Use Area. Bald eagles winter along the Verde River.
Mexican spotted owl	*Strix occidentalis lucida*	T	Mixed conifer forest is most commonly used, although pine-oak and riparian areas may be used (Ganey and Dick 1995). Fifteen Protected Activity Centers (PACs) have been designated for Mexican spotted owls within the Forest. Three of these PACs are within the southwestern Wildland Fire Use Area.
Loach minnow	*Tiaroga cobitis*	T	No loach minnows are currently known to exist on or near the Forest, but the Verde River provides potential suitable habitat and has been designated as critical habitat for this species.
Spikedace	*Meda fulgida*	T	Spikedace inhabit the upper reaches of the Verde River, which has been designated as critical habitat for this species.

[1] E = Endangered, T = Threatened, P = Proposed (none known from the Forest)

Table 8. Regional Forester's Sensitive Species Known to Occur or That May Occur on the Prescott National Forest.

Common Name	Scientific Name	Potentially Affected Habitat
Northern goshawk	*Accipiter gentilis*	Generally nests in stands of mature trees with a dense canopy. In the Southwest, most frequently occupies ponderosa pine; mixed species, primarily Douglas fir and white fir; and Englemann spruce-subalpine fir. Nine northern goshawk territories known from the Forest.
Common black-hawk	*Buteogallus anthracinus*	In Arizona, breeds only in mature riparian forests. Consistently nests along the Verde River between Sycamore Canyon and Perkinsville; has been known to nest along Walnut Creek.
American peregrine falcon	*Falco peregrinus anatum*	Nests on inaccessible cliff ledges and occasionally on tall buildings and bridges. In the Forest, nests on Granite Mountain and on Thumb Butte.
Western yellow-billed cuckoo	*Coccyzus americanus*	Nests in large blocks of riparian habitat. On the Verde River, nests between Sullivan Dam and Horseshoe Reservoir.
Gila chub	*Gila intermedia*	Present on the Forest in Sycamore and Little Sycamore Creeks in the Verde Ranger District.
Roundtail chub	*Gila robusta*	Occurs throughout the Verde River from the headwaters downstream to Sheep Bridge near the top of Horseshoe Reservoir.
Mexican garter snake	*Thamnophis eques megalops*	Occupies dense vegetation around stock tanks, streams, and cienegas. Has been found along the Verde River at several locations between Clarkdale and Horseshoe Reservoir. Also known from a pond adjacent to Victor Mine and from Groom Creek.
Narrowheaded garter snake	*Thamnophis rufipunctatus*	Highly aquatic species, associated with riffle/pool complexes of cool, clear, rocky, mountain streams. Has been recorded along the Verde River adjacent to the Forest.
Lowland leopard frog	*Rana yavapaiensis*	Inhabits springs, ponds, and rivers. Ten historic and three new locations known from the Forest. Has also been noted at springs on the Forest during surveys for Gila topminnows.
Arizona toad	*Bufo microscaphus microscaphus*	Occurs in permanent ponds or rocky streams in grassland, ponderosa pine, or pinyon-juniper habitats. On the Forest, has been recorded at Battle Flat and Turkey Creek in the Bradshaw Mountains and along Cottonwood Canyon and Walnut Creek in the Chino Valley Ranger District. Along the Verde River, has apparently been replaced by *B. woodhousii* as far north as Clarkdale.
Verde Rim springsnail	*Pyrgulopsis glandulosa*	Occurs in the Nelson Place Spring complex at the headwaters of Sycamore Creek, Verde Ranger District.
Maricopa tiger beetle	*Cicindela oregona maricopa*	May occur in damp sandy soils along streams throughout the Forest.
Broad-leaf lupine	*Lupinus latifolius* ssp. *leucanthus*	Known from at least seven locations in the Bradshaw Ranger District in ponderosa pine and ponderosa pine/chaparral communities. Suitable habitat scattered throughout the Forest along partially shaded streams and at seeps and springs between 5,000 and 7,000 feet.
Eastwood alum root	*Heuchera eastwoodiae*	Has been found in several locations on the Forest. Potential habitat throughout the Forest on shaded slopes within ponderosa pine, pine-oak, pine/chaparral, and mixed conifer habitats.
Tonto Basin agave	*Agave delamateri*	Known on the Forest from sites overlooking the Verde River.
Tusayan rabbitbrush	*Chrysothamnus molestus*	Found on calcareous soils in grassy openings within pinyon-juniper woodland. Most likely to be found in the northernmost portions of the Forest near Big Black Mesa and at the northern end of the Juniper Mountains.

Table 8. Regional Forester's Sensitive Species Known to Occur or That May Occur on the Prescott National Forest (cont.).

Common Name	Scientific Name	Potentially Affected Habitat
Rock dwelling fleabane	*Erigeron saxatalis*	Occurs on shaded or partially shaded sheer sandstone canyon walls and moist north-facing slopes with steep solid rock and bedrock outcrops. Known on the Forest from Sycamore Canyon.
Heathleaf wild buckwheat	*Eriogonum ericifolium* var. *ericifolium*	Potential habitat for the heathleaf wild buckwheat may exist from 3,000 to 3,500 feet on limestone hills in the Verde Valley.
Ripley wild buckwheat	*Eriogonum ripleyi*	Found in creosote bush-crucifixion thorn and pinyon-juniper woodland communities. Known from Chino Valley Ranger District. Potential habitat exists between 3,000 and 4,500 feet, primarily on limestone hills along major drainages in the vicinity of the Verde River and its headwaters.
Flagstaff pennyroyal	*Hedeoma diffusum*	Occurs on shallow soil of exposed Kaibab limestone pavement, cliffs, and small outcrops in open ponderosa pine forest, generally from 6,300 to 7,000 feet. Known from Sycamore Canyon in the Chino Valley Ranger District.
Arizona phlox	*Phlox amabilis*	Found from 4,790 to 6,900 feet in juniper-chaparral, pinyon-juniper, and pine-oak communities. Found on soils derived from granite, basalt, limestone, and chert. Known from several locations in the Chino Valley Ranger District.
Hualapai milkwort	*Polygala rusbyi*	Occurs in semidesert grassland and juniper woodland at elevations between 3,000 and 5,000 feet. Known from the Forest at Big Chino Valley, Big Black Mesa, Page Flat, and southeast of Camp Verde
Verde Valley sage	*Salvia dorii* ssp. *mearnsii*	Occurs at elevations of 3,120 to 5,120 feet in open desertscrub or pinyon-juniper woodland with sparse vegetative cover. Grows on limestone soils of Tertiary lakebed deposits and on red-brown clay and sandy soil of the Supai/Hermit formations.
Mt. Dellenbaugh sandwort	*Arenaria abberrans*	Potential habitat exists in semidesert grassland and juniper woodland at elevations between 3,000 and 5,000 feet.

Table 9. Management Indicator Species of Prescott National Forest.

Common name	Scientific name
Aquatic macroinvertebrates	
Abert squirrel	*Sciurus aberti*
Mule deer	*Odocoileus hemionus*
Pronghorn	*Antilocapra americana*
Northern goshawk	*Accipiter gentilis*
Hairy woodpecker	*Picoides villosus*
Spotted towhee	*Pipilo maculatus*
Wild turkey	*Meleagris gallopavo*
Pygmy nuthatch	*Sitta pygmaea*
Lucy's warbler	*Vermivora luciae*
Juniper titmouse	*Baeolophus ridgwayi*

Table 10. Management Indicator Species Chosen to Represent Each Vegetation Type and Seral Stage, Prescott National Forest.

Vegetation Type	Seral Stage		
	Early Seral	Late Seral	Snag Component
Ponderosa pine	Abert squirrel	Northern goshawk Pygmy nuthatch Wild turkey	Hairy woodpecker
Pinyon-Juniper	Mule deer	Juniper titmouse	Juniper titmouse
Chaparral	Mule deer	Spotted towhee	N/A
Grassland/Desert shrub	Pronghorn	Pronghorn	N/A
Riparian	---	Lucy's warbler Macroinvertebrates	N/A
Aquatic	---	Macroinvertebrates	N/A

3.6.3 Environmental Consequences

All information in the following analyses is drawn from the Wildlife Specialist Report on file in the project record. Potential impacts on each TEP and Regional Forester's Sensitive species are summarized in Table 11. Potential impacts on each MIS are summarized in Table 12.

3.6.3.1 No Action Alternative

3.6.3.1.1 Fuelwood Management

Threatened, Endangered, and Proposed Species. All effects of the No Action alternative on TEP species would be indirect. Current trends would continue. Under this alternative, the fuelwood harvesting program would not be managed to reduce hazardous fuel loads, thereby increasing the potential for future uncontrolled, large-scale, high-intensity fire. Such fire may kill or injure individuals of TEP species (particularly Arizona cliffrose and eggs and nestlings of southwestern willow flycatcher, Mexican spotted owl, and bald eagle). Unmanaged wildland fire may indirectly affect TEP species by damaging or destroying their habitat and reducing prey species. Intense, unwanted wildfire may affect endangered fish by removing vegetative ground cover and modifying soils upslope of water bodies. Subsequent erosion may deliver large amounts of sediment into occupied aquatic habitats that could make the habitat unsuitable for spawning, smother eggs and young of fish, and diminish the food base. Failure to manage fuelwood harvesting for resource values could also indirectly affect TEP species by allowing depletion of woody material in some areas of the Forest, thus reducing cover, foraging habitat, and potential soil-building material and nutrients needed for overall forest health.

Regional Forester's Sensitive Species. Effects of maintaining the current fuelwood harvesting directives on Regional Forester's Sensitive species would be the same as the effects on TEP species (see above). Individuals of Sensitive plant species could be trampled. Plants, eggs and young of birds, and ground-dwelling animals would be susceptible to direct mortality from the increased likelihood of unwanted fire. Habitat could be damaged or destroyed; the abundance of

prey animals could be reduced. Excessive sedimentation following destructive wildfire could harm Regional Forester's Sensitive aquatic species and their habitat.

Management Indicator Species. Effects of maintaining the current fuelwood harvesting directives on MIS would be the same as the effects on Regional Forester's Sensitive species (see above).

3.6.3.1.2 Fire Management (Wildland Fire Use)

Threatened, Endangered, and Proposed Species. Under the No Action alternative, suppression of all naturally caused wildland fire outside wilderness areas would allow hazardous fuel loads to accumulate to a greater degree. This would increase the likelihood of uncontrolled, large-scale, high-intensity fire. Potential effects of such fire on TEP species would be identical to those described in Section 3.6.3.1.1 above.

Regional Forester's Sensitive Species. Effects of maintaining the current fire management directives on Regional Forester's Sensitive species would be the same as the effects on TEP species (see above).

Management Indicator Species. In the short term, effects on MIS would be the same as the effects on TEP and Regional Forester's Sensitive species (see above). Over the long term, the return of affected vegetation types to earlier seral stages could benefit some MIS species and disadvantage others (see Table 12).

3.6.3.1.3 Monitoring Plan

Continuing to monitor resources under the current monitoring plan would have no direct or indirect effects on special status species on the Forest.

3.6.3.2 Proposed Action Alternative

3.6.3.2.1 Fuelwood Management

Threatened, Endangered, and Proposed Species. No discretionary vegetation manipulation may occur within 200 feet of riparian areas (Prescott Forest Plan). Fuelwood harvest would not occur in aquatic or riparian communities; therefore, proposed changes in fuelwood harvesting directives would not directly affect potential or occupied suitable habitat for the southwestern willow flycatcher, desert pupfish, Colorado pikeminnow, razorback sucker, Gila topminnow, Gila trout, woundfin, loach minnow, and spikedace. Also for this reason, fuelwood harvesting would not disturb southwestern willow flycatchers should they nest within the Forest. Fuelwood harvesting is not expected to directly affect Arizona cliffrose because the vegetation type (desertscrub) associated with this species does not support materials suitable for fuelwood harvest.

Table 11. Summary of Effects on Threatened, Endangered, Proposed, and Regional Forester's Sensitive Species by Alternative.

Common Name	Status[1]	No Action Alternative	Proposed Action Alternative
Southwestern willow flycatcher	E	Higher risk of unwanted, high-intensity fire that would damage or destroy occupied or potential flycatcher habitat.	Reduced likelihood of unwanted, high-intensity fire that would damage or destroy occupied or potential flycatcher habitat.
Desert pupfish	E	Higher risk of unwanted wildland fires that could cause severe sedimentation in potential desert pupfish habitat.	Possible short-term increases in sedimentation as the result of wildland fire use, reducing suitability of potential habitat at Reimer Spring. Reduced likelihood of unwanted wildland fires that could cause severe sedimentation.
Colorado pikeminnow	E	Higher risk of large fires that could result in severe or widespread sedimentation in occupied and suitable habitat.	Possible short-term, localized increases in sedimentation (reducing prey populations and suitability of spawning habitat) as the result of wildland fire use. Reduced likelihood of large fires that could result in severe or widespread sedimentation.
Razorback sucker	E	Higher risk of large fires that could result in severe or widespread sedimentation in occupied and critical habitat.	Possible short-term, localized increases of sedimentation (reducing prey populations) as the result of wildland fire use. Reduced likelihood of large fires that could result in severe or widespread sedimentation.
Gila topminnow	E	Higher risk of unwanted wildland fires that could cause severe sedimentation in occupied or potential Gila topminnow habitat.	Possible short-term increases of sedimentation in occupied habitat at Lower Mine Spring and in potential habitat (reducing populations of invertebrate prey) as the result of wildland fire use. Reduced likelihood of unwanted wildland fires that could cause severe sedimentation.
Gila trout	E	Higher risk of unwanted wildland fires that could cause severe sedimentation in potential Gila trout habitat.	No effects on Gila trout because no Gila trout are currently present on or downstream of the Forest. Possible increases of sedimentation in potential habitat (reducing prey populations and making areas unsuitable for spawning) as the result of wildland fire use. Reduced likelihood of unwanted wildland fires that could cause severe sedimentation.
Woundfin	E	Higher risk of unwanted wildland fires that could cause severe sedimentation in potential woundfin habitat.	No effects on woundfin because no woundfin are currently present on or downstream of the Forest. Possible short-term, localized increases of sedimentation in potential habitat (reducing prey populations and making areas unsuitable for spawning) as the result of wildland fire use. Reduced likelihood of unwanted wildland fires that could cause severe sedimentation.
Arizona cliffrose	E	Higher risk of unwanted wildland fires that could destroy plants identified as Arizona cliffrose.	Slight risk of wildland fire damaging or destroying plants identified as Arizona cliffrose. Reduced likelihood of unwanted wildland fires that could destroy these plants.
Bald eagle	T	Higher risk of unwanted wildland fires that could damage or destroy nesting or wintering habitat.	Reduced likelihood of unwanted wildland fires that could damage or destroy nesting or wintering habitat.

Table 11. Summary of Effects on Threatened, Endangered, Proposed, and Regional Forester's Sensitive Species by Alternative (cont.).

Common Name	Status[1]	No Action Alternative	Proposed Action Alternative
Mexican spotted owl	T	Higher risk of unwanted wildland fires that could damage or destroy occupied or suitable habitat.	Possible injury to or mortality of juvenile spotted owls from smoke inhalation. Reduced likelihood of unwanted wildland fires that could damage or destroy occupied or suitable habitat.
Loach minnow	T	Higher risk of unwanted wildland fires that could cause severe sedimentation in loach minnow critical habitat.	Possible localized increases of sedimentation (reducing habitat suitability and prey populations) as the result of wildland fire use. Reduced likelihood of unwanted wildland fires that could cause severe sedimentation.
Spikedace	T	Higher risk of unwanted wildland fires that could cause severe sedimentation in occupied and critical habitat.	Possible localized increases of sedimentation (suffocating eggs or fry and reducing prey populations) as the result of wildland fire use. Reduced likelihood of unwanted wildland fires that could cause severe sedimentation.
Northern goshawk	S, MIS	Higher risk of unwanted fires that would destroy goshawk habitat.	Possible localized reduction in some prey species or abandonment of individual nests. Overall increase in suitable habitat. Reduced risk of unwanted, high-intensity fires that would destroy goshawk habitat.
Common black-hawk	S	Higher risk of fires that could reduce prey population over large areas or damage or destroy nesting habitat.	Possible localized sedimentation and resulting reduction in prey species as the result of wildland fire. Reduced risk of fires that could reduce prey populations over larger areas or damage or destroy nesting habitat.
American peregrine falcon	S	Higher risk of severe fires that could cause nest abandonment or mortality of nestlings.	Reduced risk of severe fires that could cause nest abandonment or mortality of nestlings.
Western yellow-billed cuckoo	S	Higher risk of severe fires that could damage or destroy occupied or suitable habitat.	Reduced risk of severe fires that could damage or destroy occupied or suitable habitat.
Gila chub	S	Higher risk of severe wildland fires that could cause severe sedimentation in occupied habitat.	Possible localized, short-term increases of sedimentation (smothering eggs or fry and reducing prey populations) as the result of wildland fire use. Reduced risk of unwanted wildland fires that could cause severe sedimentation.
Roundtail chub	S	Higher risk of large fires that could cause severe or widespread sedimentation in occupied habitat.	Possible localized increases in sedimentation (smothering eggs or fry and reducing prey populations) as the result of wildland fire use. Reduced likelihood of large fires that could result in severe or widespread sedimentation.
Mexican garter snake	S	Higher risk of severe fires that could cause direct mortality or reduce prey populations over large areas.	Possible localized increase in sedimentation (reducing prey populations) as the result of wildland fire use. Reduced risk of severe fires that could cause direct mortality or reduce prey populations over large areas.

Table 11. Summary of Effects on Threatened, Endangered, Proposed, and Regional Forester's Sensitive Species by Alternative (cont.).

Common Name	Status[1]	No Action Alternative	Proposed Action Alternative
Narrowheaded garter snake	S	Higher risk of severe fires that could destroy streamside vegetation or reduce prey populations over large areas.	Possible localized destruction of streamside vegetation and localized increases in sedimentation (reducing prey populations) in aquatic areas as the result of wildland fire use. Reduced risk of severe fires that could destroy streamside vegetation or reduce prey populations over large areas.
Lowland leopard frog	S	Higher risk of severe fires that would cause severe or widespread sedimentation.	Possible localized increases in sedimentation (suffocating eggs or tadpoles and reducing prey populations) as the result of wildland fire use. Reduced risk of severe fires that would cause severe or widespread sedimentation.
Arizona toad	S	Higher risk of severe fires that would cause severe or widespread sedimentation.	Possible localized increases in sedimentation (suffocating eggs or tadpoles and reducing prey populations) as the result of wildland fire use. Reduced risk of severe fires that would cause severe or widespread sedimentation.
Verde Rim springsnail	S	Higher risk of severe wildland fires that could cause sedimentation into Nelson Place spring complex and extinction of the species.	Possible increase in sedimentation in Nelson Place Spring (which could cause extinction of the species) as the result of wildland fire use.
Maricopa tiger beetle	S	Higher risk of severe fires that could cause direct mortality of adult or larval Maricopa tiger beetles.	Reduced risk of severe fires that could cause direct mortality of adult or larval Maricopa tiger beetles.
Broad-leaf lupine	S	Higher risk of severe fires that could cause direct mortality of broad-leaf lupine plants.	Reduced risk of severe fires that could cause direct mortality of broad-leaf lupine plants.
Eastwood alum root	S	Higher risk of severe fires that would cause widespread mortality.	Reduced risk of severe fires that would cause more widespread mortality.
Tonto Basin Agave	S	Neither the species nor its habitat would be affected.	Habitat does not support species suitable for fuelwood harvest, and low-level fires would not affect the growing heart of the agave. No impact.
Tusayan rabbitbrush	S	Higher risk of severe fires that would cause mortality of Tusayan rabbitbrush.	Reduced risk of severe fires that would cause mortality of Tusayan rabbitbrush.
Rock dwelling fleabane	S	Neither the species nor its habitat would be affected.	Cliff habitats would not be subject to fuelwood harvest and would be protected from mild to moderate fire. No impact.
Heathleaf wild buckwheat	S	Neither the species nor its habitat would be affected.	Potential habitat would not be subject to fuelwood harvest, and vegetation is too sparse to be affected by fire. No impact.
Ripley wild buckwheat	S	Higher risk of severe fires that would cause widespread mortality of Ripley wild buckwheat.	Possible localized mortality as the result of wildland fire use. Reduced risk of severe fires that would cause more widespread mortality.
Flagstaff pennyroyal	S	Higher risk of severe fires that could cause direct mortality.	Improvement of Flagstaff pennyroyal habitat through use of wildland fire. Reduced risk of severe fires that could cause direct mortality.

Table 11. Summary of Effects on Threatened, Endangered, Proposed, and Regional Forester's Sensitive Species by Alternative (cont.).

Common Name	Status[1]	No Action Alternative	Proposed Action Alternative
Arizona phlox	S	Higher risk of severe fires that would damage or destroy Arizona phlox plants.	Reduced risk of severe fires that would damage or destroy Arizona phlox plants.
Hualapai milkwort	S	Higher risk of severe fires that would damage or destroy Hualapai milkwort plants.	Reduced risk of severe fires that would damage or destroy Hualapai milkwort plants.
Verde Valley Sage	S	Neither the species nor its habitat would be affected.	This species occurs in vegetation types that are too sparse to support fuelwood harvest or fire. No impact.
Mt. Dellenbaugh sandwort	S	Higher risk of severe fires that would damage or destroy Mt. Dellenbaugh sandwort plants.	Reduced risk of severe fires that would damage or destroy Mt. Dellenbaugh sandwort plants.

[1] E = Endangered, T = Threatened, S = Regional Forester's Sensitive,

Table 12. Summary Table of Effects on Management Indicator Species by Alternative.

Common Name	No Action Alternative	Proposed Action Alternative
Aquatic macroinvertebrates	Possible localized increases in sedimentation downslope of wilderness areas where wildland fire use is permitted. Higher risk of severe fires that would cause extreme or widespread sedimentation.	Possible localized increases in sedimentation (altering relative and absolute abundance of macroinvertebrates) as the result of wildland fire use. Reduced risk of severe fires that would cause extreme or widespread sedimentation.
Abert squirrel	Projected burn (and possible return to an early seral stage) of 4,500 acres of ponderosa pine over 10 years as the result of unwanted wildland fire. Projected burn of 4,500 acres of ponderosa pine over 10 years as the result of managed wildland fire.	Projected burn (and possible return to an early seral stage) of 1,500 acres of ponderosa pine over 10 years as the result of unwanted wildland fire. Projected burn of 10,500 acres of ponderosa pine over 10 years by managed wildland fire that would encourage the development of mature trees used by Abert squirrels.
Mule deer	Return of 23,500 acres of chaparral and pinyon-juniper over 10 years to an early seral stage that would provide preferred food for mule deer.	Return of 37,500 acres of chaparral and pinyon-juniper over 10 years to an early seral stage that would provide preferred food for mule deer.
Pronghorn	Projected burn of 3,000 acres of grassland over 10 years. Fires would stimulate growth of food plants. Higher risk of large fires that could make areas unsuitable for pronghorn.	Projected burn of 11,000 acres of grassland over 10 years. Fires would stimulate growth of food plants. Reduced likelihood of large fires that could make areas unsuitable for pronghorn.
Northern goshawk	Projected burn (and possible return to an early seral stage) of 4,500 acres of ponderosa pine over 10 years as the result of unwanted wildland fire. Projected burn of 4,500 acres of ponderosa pine over 10 years as the result of managed wildland fire. Higher risk of catastrophic fires that would destroy goshawk habitat.	Possible localized reduction in some prey species or abandonment of individual nests. Projected burn (and possible return to an early seral stage unsuitable for goshawks) of 1,500 acres of ponderosa pine over 10 years as the result of unwanted wildland fire. Projected burn of 10,500 acres of ponderosa pine over 10 years by managed wildland fire that would encourage the development of mature trees. Overall increase in suitable habitat. Reduced risk of catastrophic fires that would destroy goshawk habitat.

Table 12. Summary Table of Effects on Management Indicator Species by Alternative.

Common Name	No Action Alternative	Proposed Action Alternative
Hairy woodpecker	Projected burn of 4,500 acres of ponderosa pine over 10 years as the result of unwanted wildland fire. Some of these fires could be stand-replacement fires that would return ponderosa pine to an early seral stage and would result in concentrations of snags that could provide foraging and nesting sites. Projected burn of 4,500 acres of ponderosa pine over 10 years as the result of managed wildland fire that would encourage the growth of large ponderosa pine trees that could provide nesting and foraging sites.	Projected burn of 1,500 acres of ponderosa pine over 10 years as the result of unwanted wildland fire. Some of these fires could be stand-replacement fires that would return ponderosa pine to an early seral stage and would result in concentrations of snags that could provide foraging and nesting sites. Projected burn of 10,500 acres of ponderosa pine over 10 years by managed wildland fire that would encourage the growth of large ponderosa pine trees that could provide nesting and foraging sites.
Spotted towhee	Projected return of 21,000 acres of chaparral to an early seral stage over 10 years as the result of fire. Early seral stage chaparral does not provide habitat for spotted towhees. Higher risk of severe fires that would return large areas of chaparral to an early seral stage.	Projected return of 29,000 acres of chaparral to an early seral stage over 10 years as the result of fire. Early seral stage chaparral does not provide habitat for spotted towhees. Reduced risk of severe fires that would return large areas of chaparral to an early seral stage.
Wild turkey	Projected burn (and possible return to an early seral stage that would not support wild turkeys) of 4,500 acres of ponderosa pine over 10 years as the result of unwanted wildland fire. Projected burn of 4,500 acres of ponderosa pine over 10 years by managed wildland fire that would promote the open forest conditions preferred by wild turkeys.	Projected burn (and possible return to an early seral stage that would not support wild turkeys) of 1,500 acres of ponderosa pine over 10 years as the result of unwanted wildland fire. Projected burn of 10,500 acres of ponderosa pine over 10 years by managed wildland fire that would promote the open forest conditions preferred by wild turkeys.
Pygmy nuthatch	Projected burn (and possible return to an early seral stage that would not support pygmy nuthatches) of 4,500 acres of ponderosa pine over 10 years as the result of unwanted wildland fire. Projected burn of 4,500 acres of ponderosa pine over 10 years by managed wildland fire that would encourage the growth of large ponderosa pine trees that could provide nesting and foraging sites.	Projected burn (and possible return to an early seral stage that would not support pygmy nuthatches) of 1,500 acres of ponderosa pine over 10 years as the result of unwanted wildland fire. Projected burn of 10,500 acres of ponderosa pine over 10 years by managed wildland fire that would encourage the growth of large ponderosa pine trees that could provide nesting and foraging sites.
Lucy's warbler	Higher risk of severe fires that would return riparian woodland to an early seral stage that would not support Lucy's warblers.	Reduced risk of severe fires that would return riparian woodland to an early seral stage that would not support Lucy's warblers.
Juniper titmouse	Return of 2,500 acres of pinyon-juniper habitat to an early seral stage that would not support juniper titmice. Higher risk of severe fires that would return large areas of pinyon-juniper to an early seral stage.	Return of 8,500 acres of pinyon-juniper habitat to an early seral stage that would not support juniper titmice. Reduced risk of severe fires that would return large areas of pinyon-juniper to an early seral stage.

Fuelwood harvesting would be allowed in Mexican spotted owl PACs but not during the breeding season, which is between March 1 and August 31 (*Mexican Spotted Owl Standards and Guidelines*, Appendix F of the Forest Plan and proposed amendment). Therefore, fuelwood harvesting under the proposed amendment would not result in disturbance to nesting owls. Guidelines indicate that the harvest of conifers less than nine inches in diameter would be permitted only in limited areas within PACs, and that harvest of fuelwood should retain key species such as oak, and key features such as snags and large downed logs. These guidelines would ensure that disturbance to spotted owl habitat from fuelwood harvest would be limited.

Areas near bald eagle nests are closed to vehicle and foot traffic during breeding season (December-June). Fuelwood harvesting, therefore, would not result in disturbance to nesting eagles. Fuelwood harvesting could occur in bald eagle nesting areas outside of the nesting season, but this is unlikely due to steep terrain or lack of suitable firewood.

All fuelwood harvest activities on the Forest would be managed to benefit wildlife habitat and watershed health. This includes managing fuelwood removal and access to fuelwood collecting areas to prevent erosion and excess sedimentation in riparian/aquatic habitats. As a result, the proposed changes in fuelwood harvesting prescriptions are not expected to result in harm to habitats for TEP aquatic species. The USFWS recommends that access alternatives to fuelwood harvest areas within stipulated basins be analyzed for soil loss and stability to reduce possible sedimentation in water bodies containing Threatened and Endangered fish species (letter from David L. Harlow, Field Supervisor, Arizona Ecological Services Field Office, USFWS, dated January 17, 2002).

Managing the fuelwood harvest program to reduce hazardous fuels on the Forest may indirectly affect the southwestern willow flycatcher and Mexican spotted owl over the long term by reducing the probability of unwanted, high-intensity fires that could destroy potential and/or occupied habitat or cause direct mortality of nestlings on or adjacent to the Forest. Lowering the probability of intense wildfire would also decrease the potential for severe erosion and subsequent sedimentation of habitats used by, or potentially suitable for, TEP aquatic species. Under this alternative, Arizona cliffrose populations, if they occur on the Forest, would be less susceptible to destruction by intense wildfire over the long term.

Regional Forester's Sensitive Species. No discretionary vegetation manipulation may occur within 200 feet of riparian areas. Fuelwood harvest would not occur in aquatic or riparian communities; therefore, proposed changes in fuelwood harvesting directives would not directly affect the following species or their habitat: common black-hawk, yellow-billed cuckoo, Gila chub, roundtail chub, Mexican garter snake, narrowheaded garter snake, lowland leopard frogs, Arizona toad, Verde Rim springsnail, and Maricopa tiger beetle.

Human activity, including fuelwood harvesting, in northern goshawk nesting areas would be restricted during the breeding season (March 1 to September 30), as stipulated in Appendix G of the Forest Plan and proposed amendment, thus avoiding nest failures caused by human disturbance. Human activity would also continue to be restricted in the vicinity of peregrine falcon nests during nesting season. As a result, the fuelwood harvesting element of the proposed amendment is not expected to directly affect either northern goshawks or peregrine falcons.

Green fuelwood harvesting outside the breeding season in goshawk territories would facilitate understory thinning, which allows trees to grow more rapidly and to greater sizes. Larger trees would provide nesting sites, protection from predators for nestlings, and increased prey habitat.

Fuelwood harvesting could result in direct trampling of individual plants of the broad-leaf lupine, Eastwood alum root, Tusayan rabbitbrush, Arizona phlox, Hualapai milkwort, and Mt. Dellenbaugh sandwort. Forest personnel should consider this potential impact when identifying fuelwood collecting areas under the proposed amendment, and avoid areas with known populations of any of these plants. The only known populations of Flagstaff Pennyroyal on the Forest are within the Sycamore Canyon Wilderness and would not be subjected to fuelwood harvesting activities. Fuelwood harvesting is also not expected to directly affect Tonto Basin agave, rock dwelling fleabane, Heathleaf wild buckwheat, Ripley wild buckwheat, or Verde Valley sage because the habitats associated with these species do not support materials suitable for fuelwood harvest.

All fuelwood harvest activities on the Forest would be managed to benefit wildlife habitat and watershed health and is not expected to result in increased erosion or sedimentation in habitat for aquatic species, including Gila chub, roundtail chub, Mexican garter snake, narrowheaded garter snake, lowland leopard frogs, Arizona toad, and Verde Rim springsnail.

The management of fuelwood harvesting to reduce hazardous fuels would likely result in a lower probability of unwanted, high-intensity fires that could affect Regional Forester's Sensitive species by damaging or destroying their occupied or potential habitat; causing direct mortality of ground-dwelling animals and bird nestlings; causing nest abandonment by birds; reducing abundance of prey species; and damaging or destroying populations of plant species.

Management Indicator Species. The proposed changes in fuelwood harvesting directives would indirectly affect MIS in ponderosa pine and pinyon-juniper woodland habitats by precluding collecting from areas suffering a shortage of dead and down wood. Allowing appropriate amounts of woody debris to accumulate and decompose over the long term improves soil condition and enhances watershed condition and forest health. Improved forest health, in turn, provides more suitable habitat for MIS. Woody debris also provides aboveground runways and opportunities for foraging, shelter, nesting, roosting, and resting—habitat characteristics useful in varying degrees for Abert squirrel, juniper titmouse, and wild turkey. The amount of forest likely to be closed to wood gathering for ecological reasons cannot be predicted at this time; however, beneficial effects on MIS of managing fuelwood harvesting for forest health are expected to accumulate over time. MIS species would also benefit from managing fuelwood harvesting to reduce the buildup of hazardous fuels that could result in destructive fire. See Table 12 for effects specific to each species.

3.6.3.2.2 Fire Management (Wildland Fire Use)

Threatened, Endangered, and Proposed Species. Because southwestern willow flycatchers are not known to occur in Wildland Fire Use Areas, wildland fire use should have no direct effects on them or their occupied habitat. Indirect effects resulting from the destruction of potential flycatcher habitat along the Verde River within Wildland Fire Use Areas are not expected

because the Go/No-Go decision criteria stipulate that a fire would be suppressed if it is likely to result in unacceptable effects on natural resources (Appendix D). Fires are considered a critical threat to flycatcher habitat, and destruction of habitat of a federally listed species is an unacceptable effect; therefore, wildland fire use would not be permitted in potential flycatcher habitat. Over the long term, using wildland fire for resource benefits should reduce the incidence of widespread, catastrophic fires that could damage or destroy flycatcher habitat or cause nest abandonment in areas adjacent to the Forest.

Two bald eagle nest sites are known from the Verde River adjacent to the Forest; both border Wildland Fire Use Areas. Low-level wildland fires are unlikely to consume large trees used by bald eagles for nesting or roosting but could reduce populations of prey species. A wildland fire in the immediate vicinity of a bald eagle nest could cause abandonment of the nest or direct mortality of nestlings by smoke inhalation. Lightning-caused fires, however, are most likely to happen during summer monsoon season (July-September), which occurs after bald eagle nesting season.

Use of wildland fire to achieve forest management objectives may result in more frequent low-level fires in spotted owl habitat. Most wildland fires would be ignited by lightning during the summer monsoon season (July-September). Young owls would be able to fly by that time but could be injured or killed by smoke inhalation. Fire would not be expected to cause future reproductive failure for adult owls. Jenness (2000) found that low-level fires had no clear positive or negative impact on the subsequent presence or reproduction of Mexican spotted owls. As a result, wildland fire use is not likely to affect the Mexican spotted owl, except by reducing the likelihood of more destructive wildfire.

Wildland fire use upslope of suitable habitat in springs, creeks, and the Verde River may indirectly cause increases in flows of sediments, nutrients, and ash into potential or occupied suitable habitat for desert pupfish, Gila topminnow, Gila trout, Colorado pikeminnow, razorback sucker, woundfin, loach minnow, and spikedace. Potentially affected habitat includes designated critical habitat on the Verde River for razorback sucker, loach minnow, and spikedace. Increased sedimentation can make occupied habitat unsuitable for spawning, smother eggs and young of fish, and diminish the food base for fish. Effects would be short term. Because managed wildland fires would be of low intensity, ground cover damage and consequent erosion would be less than that of high-intensity, unwanted wildfire. Vegetation would likely recover more quickly. As a result, potential sedimentation effects on TEP aquatic species and their habitats are likely to be less severe and shorter in duration than effects of high-intensity wildfire. Measures to mitigate the potential impact of erosion include suppressing wildland fires that are ignited immediately upslope of potential, occupied, or designated critical habitat for TEP species; directing managed fire away from such areas; or stabilizing post-fire slopes to minimize erosion.

Any wildland fire that burns occupied Arizona cliffrose habitat on limestone outcrops could directly affect the Arizona cliffrose through mortality of individual plants; however, wildland fire is unlikely in Arizona cliffrose habitat on the Forest because groundcover is not sufficiently dense to carry a fire.

Over the long term, use of wildland fire may indirectly affect southwestern willow flycatcher, bald eagle, and Mexican spotted owl by reducing the probability of widespread, unwanted wildfires that could damage or destroy habitat, cause nest abandonment, and result in mortality of young. Lowering the probability of intense wildfire would also decrease the potential for severe erosion and subsequent sedimentation of habitats used by, or potentially suitable for, aquatic TEP species. Use of wildland fire over the long term should reduce the likelihood that plants tentatively identified as Arizona cliffrose would be destroyed by intense wildfire.

Regional Forester's Sensitive Species. Naturally ignited wildland fire use in northern goshawk territories could help to create and maintain open forest conditions beneficial to hunting goshawks. Underburning would promote the development of large trees and allow for the colonization of grasses, shrubs, and forbs that would benefit several prey species. At the same time, the loss of downed logs and woody material would reduce habitat for some prey species. The *Northern Goshawk Standards and Guidelines* (Appendix H of the Forest Plan and proposed amendment) allow prescribed fire in nesting and Post Fledgling Areas (PFAs) at any time of year, but fires in the nesting area during nesting season may cause abandonment of the nest and mortality of nestlings.

Because damp, riparian areas do not burn readily in the non-drought conditions when wildland fire use would be allowed, wildland fire use is not expected to result in direct mortality of, or destroy habitat for, common black-hawk, yellow-billed cuckoo, Mexican garter snake, narrowheaded garter snake, lowland leopard frog, Arizona toad, and Maricopa tiger beetle.

Wildland fire use upslope of springs, creeks, ponds, stock tanks, and the Verde River may cause increases in flows of sediments, nutrients, and ash into aquatic habitats. Heavy sedimentation may smother eggs and young of Gila chub, roundtail chub, lowland leopard frog, and Arizona toad. It could reduce prey species for all these species, as well as for Mexican garter snake, narrowheaded garter snake, and common black-hawk. Heavy sedimentation in Nelson Place Spring could result in the extinction of the Verde Rim springsnail. Measures to mitigate these potential impacts include suppressing wildfires that are ignited immediately upslope of potential or occupied habitat for these species; directing managed fire away from such areas; or stabilizing post-fire slopes to minimize erosion. Mitigation is particularly important in the vicinity of Nelson Place Spring because of the limited distribution of the Verde Rim springsnail.

Wildland fire use is not expected to affect rock dwelling fleabane, Heathleaf wild buckwheat, Ripley wild buckwheat, or Verde Valley sage because of sparsely vegetated or protected habitats. Tonto Basin agave is not likely to be affected because low-level fires would not damage the growing heart of the plant. The effect of low-intensity fire on Arizona phlox, Hualapai milkwort, Mt. Dellenbaugh sandwort is unknown, but vegetation communities where they have been found are fire adapted, suggesting that they would not be destroyed by mild to moderate fires. Eastwood alum root, on the other hand, is not expected to be fire tolerant and even low-intensity fire could damage or destroy individual plants. Wildland fire use could:

- affect Flagstaff pennyroyal by removing shade and clearing needle litter that limit plant growth;
- increase vegetative growth of Tusayan rabbitbrush; and

- damage or destroy the aboveground portion of broad-leaf lupine; however, this species is considered to be fire tolerant, and individual plants should recover.

Over the long term, wildland fire use is expected to reduce the probability of unwanted, high-intensity fires that could affect Regional Forester's Sensitive species by damaging or destroying their habitat; causing direct mortality of ground-dwelling animals and bird nestlings; causing nest abandonment by birds; reducing abundance of prey species; and damaging or destroying populations of plant species.

Management Indicator Species. See Table 12 for effects of wildland fire use on each MIS, including quantification of impact by vegetation type.

3.6.3.2.3 Monitoring Plan

The proposed Monitoring Plan would not affect how resources in the Forest are managed, except to the extent that information acquired through monitoring about resource status would help Forest personnel evaluate the effectiveness of management programs. Therefore, the proposed Monitoring Plan would not directly affect TEP, Regional Forester's Sensitive, and MIS species. The Monitoring Plan may indirectly affect such resources by helping the Forest Service monitor progress toward achieving the Forestwide goals as stated in the Prescott Forest Plan and the proposed amendment.

3.6.3.3 Cumulative Effects

Potential cumulative effects on TEP, Regional Forester's Sensitive, and Management Indicator Species on the Forest are related to the probability of future high-intensity, destructive wildfire, which could result in mortality of individuals of special status species, and damage or destroy occupied and/or potential suitable habitat. Under No Action, planned programs of prescribed fire and mechanical treatments would combine to reduce the probability of destructive fire. Under the Proposed Action, the addition of fuelwood management and wildland fire use would further reduce the likelihood of such fires.

3.7 Heritage Resources

3.7.1 Legal and Administrative Framework

National Historic Preservation Act of 1966, as amended (16 USC 470, *et seq.*) - Section 106 of the National Historic Preservation Act requires the Forest Service to determine if federally funded, permitted, or licensed activities will affect significant cultural resources.

The Forest Service is required to consider the effects of agency undertakings on heritage resources deemed eligible for listing and those sites listed in the National Register of Historic Places (NRHP). The criteria for listing in the NRHP refer to the qualities of significance in American history, architecture, archaeology, and culture. Once cultural sites have been evaluated for their significance, management activities are focused on those determined to be eligible for the NRHP.

3.7.2 Affected Environment

Heritage resources on the Prescott National Forest consist of sites, structures, and objects created and used by prehistoric and historic peoples. These phenomena represent the physical remains of past human occupation and activities in the area. A wide variety of cultural site types are represented. These types exist both above and below the modern ground surface. Prehistoric representations may include scatters of flaked stone tool manufacture, ground stone artifacts, ceramics, pit house depressions, pueblo ruins, masonry storage granaries, rockshelters, stone tool quarries and processing areas, sweat lodges and wickiups, and other manifestations of aboriginal lifestyles spanning several thousand years. Historic site types include trails, roads, and railroads created for exploration and expansion into the West; pioneer settlements and homesteads; military camps; and structures and modified landscapes related to mining, ranching, homesteading, railroading, and recreational/management developments done since the government administration of the Forest. Historic structures on the Forest are largely constructed of wood and are therefore subject to natural deterioration and decay, even when properly maintained. However, the Forest also contains historic structures associated with mining, ranching, and other uses that have remained minimally affected by destructive natural forces and remain as excellent examples of specific architectural styles and outstanding craftsmanship. Both archaeological and historical sites have been subjected to fires at varying intervals and intensities depending on their location in different environmental settings containing variable fuel loads.

Cultural resource sites may contain a diversity of artifacts and materials made, used, or introduced into site locations by past occupants. These materials include stone, mineral, wood, bone, clay (fired and unfired ceramics, wall plaster and adobe), and plants (in the form of charcoal, seeds, pollens, and plant parts). These remains of past human activity are found throughout the Forest and range widely in age and condition. Since the mid-1970s, the Forest Service has conducted heritage resource inventories to identify and evaluate heritage resources. These surveys have been conducted largely in advance of proposed undertakings on federal lands. Since that time approximately 122,000 acres (10.2 percent) of Prescott National Forest lands have been examined at various survey intensities resulting in the identification of about 2,620 sites.

From these data, it is tempting to generalize the number of sites that could be expected to be found within the Forest. However, because many of the surveys were conducted in support of other land developments or management activities and not strictly to gain data that could be used to predict the numbers, types, and location of sites in the Forest, it is not feasible to provide a statistically accurate estimate of the total number of expected sites without much more detailed analyses.

The Prescott National Forest contains sites that have been determined eligible for, and have actually been nominated to, the NRHP. Currently, there are approximately 585 eligible properties and only 13 NRHP-listed properties on the Forest. Fire lookout towers are an example of a specific historic property type that has been systematically evaluated for NRHP eligibility throughout the Forest. Most of the towers consist of metal (but sometimes wooden) towers

capped with a wooden building and platform. Their construction is similar across Arizona national forests, but their integrity varies widely. Many of them have been modified significantly for modern use, to the point where they no longer retain their integrity for NRHP-eligibility.

3.7.3 Environmental Consequences

3.7.3.1 No Action Alternative

3.7.3.1.1 Fuelwood Management

Under the No Action alternative, the fuelwood harvesting program would not be managed to reduce hazardous fuel loads. Effects of this policy on heritage resources would be indirect. It is likely that in the long term, fuel loading would continue to increase, thus leading to larger, uncharacteristically severe fires that tend to result in more severe damage to surface features and artifacts than do lower-intensity fires. When unplanned ignitions occur under such conditions, the Forest may not be able to suppress wildland fire, and it is likely that some fire-susceptible heritage resources would be directly and indirectly affected. The number of potentially affected sites cannot be predicted.

Direct effects of high-intensity wildfire range from total destruction of structures and artifacts made of organic material, to structural weakening of stone material through extreme temperatures. Such fire is most likely to impact historic sites, which may have aboveground features that are susceptible to burning, and which are likely to contain organic materials that might burn even if buried. Prehistoric sites, which are less likely to contain organic materials, are less likely to be affected. Since the spread of unwanted fire may not be controllable, affected cultural sites may be previously known or unknown, significant or non-significant. Firefighters may or may not be able to protect known significant sites.

Indirect impacts of destructive fire include erosion losses resulting from burned vegetation cover and soil modification, deterioration and weathering after the matrix of artifacts and features have been initially damaged by extreme temperatures, or changes in the landscape adjacent to sites.

3.7.3.1.2 Fire Management (Wildland Fire Use)

Under the No Action alternative, all naturally caused wildland fire outside wilderness areas would be suppressed. Effects of this policy on heritage resources would be indirect. Fire suppression would allow hazardous fuel loads to accumulate to a greater degree compared to the Proposed Action alternative. This would increase the risk of larger, uncharacteristically severe fires that tend to result in more severe damage to surface features and artifacts than lower-intensity fires (see Section 3.7.3.1.2 above)

Indirect effects of No Action include potential damage to heritage resources resulting from fire suppression measures, which would occur more frequently under this alternative than under the Proposed Action. Fire suppression activities that result in surface disturbance, such as clearing of fire lines to mineral subsoil or grubbing to extinguish small fires, have a potential to disturb or

damage prehistoric sites located on or below the surface. Advance planning for the preservation of heritage resources is not feasible on wildland fires where suppression efforts are undertaken. However, cultural resource specialists should be employed on fire management teams to identify heritage resources in the fire area and, when possible, to conduct surveys in advance of ground-disturbing activities deemed necessary to control the fire. Cultural resource protection efforts should focus on avoiding and protecting sites from suppression activities.

3.7.3.1.3 Monitoring Plan

Continuing to monitor resources under the current monitoring plan would have no direct or indirect effects on heritage resources on the Forest.

3.7.3.2 Proposed Action Alternative

3.7.3.2.1 Fuelwood Management

Proposed changes in the fuelwood harvesting directives could affect heritage resources by encouraging woodcutters to harvest in more remote, rarely visited areas that contain cultural sites. Increased use of such an area increases the probability of cultural resources being discovered and disturbed, stolen, vandalized, or unintentionally damaged. Beneficial effects may result as well. Previously unknown sites may be discovered and reported to Forest personnel by woodcutters, thus increasing archaeologists' awareness of prehistoric or historical occupation of the area. Heritage resources in areas closed to fuelwood harvesting under the proposed directives may be subject to less disturbance as a result of the closure. Potential unwanted impacts on heritage resources may be mitigated by closing areas with known significant sites to fuelwood harvesting.

3.7.3.2.2 Fire Management (Wildland Fire Use)

One of the considerations in the Wildland Fire Management Plan (Appendix D), including the Decision Criteria Checklist, is the potential effect of a naturally ignited wildland fire on cultural resources. If potential effects on cultural resources are thought to be outside the range of acceptable effects, the fire would be suppressed, or measures would be taken to protect the resource. This caveat pertains only to known sites, however, and the Wildland Fire Use Areas have not been comprehensively inventoried. Unrecorded sites, both prehistoric and historic, undoubtedly exist. Such resources, as well as known non-significant sites in the Wildland Fire Use Areas, could be affected by wildland fire use. The degree of effect would vary according to the materials involved. The low-intensity fire characteristic of wildland fire use is unlikely to harm artifactual material other than organic matter on the surface. For this reason, historic features and artifacts, which are more likely to include wood and fiber, are generally more susceptible to damage from low-intensity fire than prehistoric resources. As future surveys in wildland fire burned areas are completed for Forest undertakings, additional resources will be located that will require documentation, evaluation, and protection. Some may warrant stabilization and interpretation.

Potential indirect effects of wildland fire use include post-fire erosion, although such effects would likely be less severe compared to the aftermath of high-intensity fire. The probability of heritage resources being affected at all under this alternative is low, however, because only a small percentage of the Wildland Fire Use Areas (4.64%) is predicted to burn by wildland fire managed for resource benefit. The number of potentially affected sites cannot be predicted.

Because fewer fires would be suppressed under this alternative than under No Action, the probability of damage to heritage resources resulting from suppression activities would be reduced. Over the long term, fuel loads in the Forest are expected to reach a more natural condition, reducing the probability of uncontrolled, high-intensity fires that are more potentially destructive than low-intensity fires. Consequently, the potential for damage or loss of heritage resources on the Forest as a result of wildfire would be reduced compared to No Action.

3.7.3.2.3 Monitoring Plan

The proposed Monitoring Plan would not affect how resources in the Forest are managed, except to the extent that information acquired through monitoring about resource status would help Forest personnel evaluate the effectiveness of management programs. Therefore, the proposed Monitoring Plan would not directly affect heritage resources. The Monitoring Plan may indirectly affect such resources by helping the Forest Service monitor progress toward achieving the Forestwide goals as stated in the Prescott Forest Plan.

3.7.3.3 Cumulative Effects

Potential cumulative effects on heritage resources on the Forest are related to the probability of future high-intensity, destructive wildfire, which could damage or destroy archaeological resources. Under No Action, planned programs of prescribed fire and mechanical treatments would combine to reduce the probability of destructive fire. Under the Proposed Action, the addition of fuelwood management and wildland fire use would further reduce the likelihood of such fires.

3.8 Human Health and Safety

3.8.1 Legal and Administrative Framework

Clean Air Act (42 USC 7401 *et seq*.) - A summary of the Clean Air Act is given in Section 3.3.1 of this document.

Interim Air Quality Policy on Wildland Fire and Prescribed Fire - A summary of this policy is given in Section 3.3.1 of this document.

Arizona Administrative Code RM 18-2 Article 15, Final rulemaking for Forest and Range Management Burns - A summary of this Arizona Administrative Code is given in Section 3.3.1 of this document.

Federal Wildland Fire Management Policy, January 2001 Review and Update – The first-named guiding principle and policy is "Firefighter and public safety is the first priority in every fire management activity." National policy also stipulates that "Fire management plans and activities incorporate public health and environmental quality considerations."

3.8.2 Affected Environment

The main concerns related to the proposed Forest Plan amendment in terms of human health and safety are potential fire hazards and impacts of wildland fire use on air quality as it relates to health. Safety hazards posed by wildland fire are most acute for personnel suppressing or managing fire. Residents and their possessions in wildland-urban interface areas are at risk as well. Wildland-urban interface areas in and around the Forest include numerous inholdings scattered throughout the Forest, with heaviest concentrations in the Prescott Basin, a 59,000-acre, high-use area to the west and south of the City of Prescott. The Verde Valley, Mingus Mountain, and the area around Crown King are also notable wildland-urban interface areas. Structures, vehicles, and livestock in and directly adjacent to the Forest are at greatest risk of loss or damage from wildfire.

Potential health hazards associated with smoke pollution could affect a broader area that extends beyond Forest boundaries. Potentially affected areas include developed inholdings within the Forest and the communities of Jerome, Clarkdale, Cottonwood, and Camp Verde in the Verde Valle; the tri-city area of Prescott, Prescott Valley, and Chino Valley; and the Humboldt, Dewey, and Mayer areas. According to the 2000 census, the populations of these communities and outlying areas total over 130,000. Two, more remote communities, Phoenix and Payson, may be of concern because they have pre-existing air quality problems that could be exacerbated by smoke. Both are non-attainment areas for particulate matter; however, their more remote locations (30 miles or more from the nearest forest boundary) make them less likely to experience the heavy concentrations of the smoke that present the greatest health hazards.

3.8.3 Environmental Consequences

3.8.3.2 Proposed Action Alternative

3.8.3.2.1 Fuelwood Management

The proposed changes in management of fuelwood harvesting may beneficially affect human health and safety, particularly over the long term, by reducing hazardous fuel loads in portions of the Forest, and thereby lowering the risk of destructive wildfire that poses the greatest risk to both firefighters and residents of the area.

3.8.3.2.2 Fire Management (Wildland Fire Use)

The use of wildland fire is the most important component of the proposed Forest Plan amendment relating to human health and safety. Managing a wildland fire (as opposed to suppression) entails a certain amount of safety risk. However, according to the Wildland Fire Implementation Plan, including the Decision Criteria Checklist (Appendix D), a naturally ignited

wildland fire would be suppressed if there were a threat to life, property, or resources that could not be mitigated. The potential for air quality impacts would be considered as well. The Clean Air Act, Arizona Smoke Management Program (AAC Title 18, Ch.2, Article 15), and Regional Haze SIP (64 CFR 35714) prohibit the use of wildland fire if federal and state air quality standards were likely to be exceeded (see the Air Quality section of this Chapter for more information). Regardless of precautions, wildland fire use would necessarily release smoke into the air, and smoky conditions would occur in the vicinity of the Wildland Fire Use Areas more frequently than under No Action. The total volume of particulates released on the Forest over a ten-year period would also be greater than under No Action. These conditions are not expected to present health risks for most residents, however, because (1) the Wildland Fire Use Areas are located some distance from the largest populations, (2) the size of any single managed wildland fire and the resulting emission amounts are expected to be relatively small, and (3) wildland fire would be used to benefit resources under atmospheric conditions that facilitate smoke dispersal. Nonetheless, individuals particularly sensitive to smoke (e.g., people with asthma and other chronic respiratory conditions) may be affected periodically. Over time, the probability of a dangerous, high-intensity fire and attendant risks to the safety and health of firefighters and civilians would decrease as larger areas of forest return to more natural fire regimes. As the frequency of suppression activities decreases, the rate of suppression-related injury may decrease as well.

3.8.3.2.3 Monitoring Plan

The proposed Monitoring Plan would not affect human health and safety.

3.8.3.3 Cumulative Effects

Potential cumulative effects on human health and safety on the Forest are related to the probability of future high-intensity, destructive wildfire, which place both firefighters and civilian residents at risk of injury and death. Under No Action, planned programs of prescribed fire and mechanical treatments are likely to somewhat reduce the probability of destructive fire. Under the Proposed Action, the addition of fuelwood management and wildland fire use would further reduce the likelihood of such fires. Statewide coordination through the Arizona Smoke Management Program should mitigate cumulative air quality impacts from multiple prescribed or otherwise managed fires burning simultaneously in different jurisdictions.

Under both alternatives, statewide coordination through the Arizona Smoke Management Program should mitigate cumulative air quality impacts from multiple prescribed or otherwise managed fires burning simultaneously in different jurisdictions.

3.9 Fuelwood Harvesting

3.9.1 Legal and Administrative Framework

The authority of the U.S. Forest Service to permit the public use of resources on national forests originated with the *Organic Administration Act of 1897* (16 USC 471, *et seq*.) – The purpose of this Act was to "preserve and protect forests," to "secure favorable conditions of water flows,"

and to "furnish a continuous supply of timber for the use and necessities of the citizens of the United States." The Act provided for the use of "timber and stone found upon national forests, free of charge, by bona fide settlers, miners, residents, and prospectors for minerals, for firewood, fencing, buildings, mining, prospecting, and other domestic purposes…" Numerous subsequent statutes and regulations have reinforced the authority of the Forest Service to manage national forests to both preserve and protect forest resources and make them available to the public.

3.9.2 Affected Environment

Fuelwood harvesting in Prescott National Forest is the only economic resource that will be affected by the Proposed Action. Under the current Forest Management Plan, dead and down and green fuelwood is made widely available to the public. Forest policy generally permits fuelwood harvesting forestwide and year-round; however, some restrictions do apply. For example, collecting may be restricted in certain high-use areas, like campgrounds, or when conditions are unfavorable, as when fire risk is high. The public is informed of any needed restrictions at the time the fuelwood permit is issued. Fuelwood harvesters tend to gather wood in the most accessible areas, those closest to town and roads. Consequently, these areas are subject to shortages of woody material needed for a healthy ecosystem. At the same time, other areas farther away from communities experience an accumulation of woody material resulting in a hazardous fuel load.

Fuelwood is considered an affordable source of fuel for heating homes, and some residents in the area use fuelwood as the primary or secondary energy source for heating. Approximately 3,902 cords of fuelwood were sold from various personal use and commercial sale areas in the Forest in 2000 (U.S. Forest Service 2001). This amount is below the estimated sustainable yield predicted for the year. The total number of personal use permits for dead and down and green fuelwood was 1,052 for the fiscal year 2001 (Pers. Comm., G. Wittman, Prescott National Forest, March 2002). Based on the number of permits sold, fuelwood harvesting declined over the last decade but appears to have stabilized in the last two years. The decline is likely the result of changing technology (the popularity of pellet stoves), increased access to natural gas as pipelines are extended, and decreased apprehension about fuel availability and prices once the fuel shortages of the 1970s receded in memory (Pers. comm., G. Wittman, Prescott National Forest, April 2002). Personal fuelwood permits issued by the Prescott National Forest are $5.00 per cord with a three-cord minimum and a ten-cord maximum per family per year. The average woodcutter collects three to five cords. Occasionally, the Forest designates a free-use area to dispose of slash.

3.9.3 Environmental Consequences

3.9.3.1 No Action Alternative

3.9.3.1.1 Fuelwood Management

The No Action alternative would not affect current trends in fuelwood harvesting. The Forest is likely to issue a similar number of permits in the near future as in the recent past. Permit holders

would continue to collect in the most accessible areas. As a result, dead and down fuelwood is likely to become increasingly scarce in those areas. Shortages of woody material needed for forest health (e.g., wildlife habitat, desirable watershed condition, soil nutrients) would become more acute in areas along some roads and close to human communities. Some woodcutters are likely to be frustrated as dead and down wood in their favored collecting areas becomes more difficult to find. More remote areas would continue to experience excess buildup of woody material that presents wildfire hazards. The increased risk of destructive wildfire due to this buildup could affect the availability of fuelwood in burned areas.

3.9.3.1.2 Fire Management (Wildland Fire Use)

Continuation of the current fire management directives is not likely to affect fuelwood harvesting; however, the increased risk of destructive wildfire due to the buildup of hazardous fuels could affect the availability of fuelwood in burned areas.

3.9.3.1.3 Monitoring Plan

Continuing to monitor resources under the current monitoring plan would have no direct or indirect effects on fuelwood harvesting on the Forest.

3.9.3.2 Proposed Action Alternative

3.9.3.2.1 Fuelwood Management

Under the Proposed Action alternative, harvesting of dead and down fuelwood would not be permitted in areas that experience shortages of woody material. These areas are concentrated near roads and communities. Harvesting would be allowed in areas where it would further management goals and objectives, particularly where woody material and/or green wood present a wildfire hazard. Fuelwood availability may also be restricted by season (when roads are impassable because of muddy conditions or vehicular use would result in excessive rutting and erosion). Decisions about where and when fuelwood would be permitted or restricted would be based on an assessment of fuelwood conditions in specific areas of the Forest. Overall quantity of fuelwood available for residential use is not expected to decrease, in part because of planned fuel reduction, watershed enhancement, other slash-producing treatments will generate a fairly constant supply of dead and down material.

As a result of the Proposed Action, fuelwood gatherers would still be able to collect both dead and down and green wood, but, at times, gathering may be less convenient that under No Action. Wood gatherers may have to collect in less familiar locations farther from main roads and from their homes. This could entail greater costs for the collector in terms of time, difficulty in accessing the wood, and travel-related expenses. Potential inconvenience and increased costs associated with collecting in more remote areas may be offset by the gatherers being directed to areas with greater concentrations of fuelwood, making the harvesting process more efficient and cost effective. Some designated collecting areas may not be remote at all, as fuel reduction treatment activities accelerate in wildland-urban interface areas.

3.9.3.2.2 Fire Management (Wildland Fire Use)

Wildland fire use is likely to reduce the availability of fuelwood in the areas burned. This should not have a noticeable effect on fuelwood harvesting over the next decade because of the relatively small size of the affected area (3.44% of the Forest).

3.9.3.2.3 Monitoring Plan

The proposed Monitoring Plan would not affect how resources in the Forest are managed, except to the extent that information acquired through monitoring about resource status would help Forest personnel evaluate the effectiveness of management programs. Therefore, the proposed Monitoring Plan would not directly affect fuelwood harvesting. The Monitoring Plan may indirectly affect fuelwood harvesting by helping the Forest Service monitor progress toward achieving pertinent goals in the proposed amendment to the Prescott Forest Plan.

3.9.3.3 Cumulative Effects

No cumulative effects on fuelwood harvesting are anticipated. Under both alternatives, slash from planned mechanical treatments designed to reduce hazardous fuels would help maintain adequate fuelwood to meet demand.

3.10 Environmental Justice

3.10.1 Legal and Administrative Framework

Executive Order 12898 (1994) directs federal agencies to focus attention on the human health and environmental conditions in minority and/or low-income communities. The purpose of the Executive Order is to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects on minority and/or low-income populations. In general, the purpose of the environmental justice order is to not allow people to suffer disproportionately as a result of their ethnicity or income level.

3.10.2 Affected Environment

Yavapai County contains approximately 70,171 households according to the 2000 Arizona census. The majority of these households are located in and around the Forest, with most clustered in the Prescott area, particularly in the City of Prescott and Prescott Valley, and along the Verde River, particularly in and near the communities of Camp Verde, Cottonwood, and Clarkdale. All communities within and adjacent to the Forest are at some distance from the Wildland Fire Use Areas. Minority and low-income residents make up approximately 13.4 percent and 13.8 percent of Yavapai County residents, respectively. Compared to the state as a whole, Yavapai County has a smaller proportion of minority persons (13.4 percent vs. 36.2 percent), and a smaller proportion of persons below the poverty level (13.8 percent vs. 15.5 percent). Yavapai County ranks fifth out of fifteen counties in the State of Arizona in median annual household income ($30,230). Compared to Yavapai County as a whole, the population of the Prescott area has a lower proportion of minorities and persons below the poverty level, while

populations in the Verde Valley communities tend to have a higher proportion. Despite these differences, low-income and minority populations are generally found throughout the region's communities.

Some individuals who gather wood under personal permits may do so because they have low incomes and need an inexpensive way to heat their homes. At $5.00 per cord (three-cord, or $15.00 minimum) for the permit, fuelwood collecting on the Forest is very economical. It has been reported that the average amount of wood burned to heat a household in one year (when wood is the sole source of heat) is five cords (The Trevey 1999). While it is reasonable to assume that some portion of fuelwood harvesters on the Forest fall into low-income and/or minority categories, no socioeconomic data are collected when permits are issued and no studies have been done of the socioeconomic status of fuelwood harvesters on the Forest. In a statewide study conducted in Oklahoma, however, households that harvested fuelwood for heating purposes had annual incomes averaging $8,738 higher than households that did not burn wood at all (Marcouiller et al. n.d). Whether a similar relationship pertains to the Prescott National Forest area is unknown. The Oklahoma study found no significant difference between fuelwood gatherers and non-burners in terms of age or education, parameters that might be correlated with social status. In that study, 39 percent of the wood burners did so for pleasure; 37 percent used fuelwood as a secondary source of heat; and 24 percent used it as their primary source of heat. No information is available about the racial or ethnic makeup of permit holders on Prescott National Forest.

3.10.3 Environmental Consequences

3.10.3.1 No Action Alternative

3.10.3.1.1 Fuelwood Management

The No Action alternative would result in no change in current conditions and trends; therefore, it is unlikely that it would have disproportionate effects on minority and/or low-income communities in or around the Forest. It is possible, however, that if No Action results in continued fuel buildup, and that buildup causes an uncontrolled, destructive wildfire, low-income residents with homes in the wildland-urban interface areas could suffer disproportionately. A study on the effects of wildfire on poverty in the United States, conducted in 2001, found that wildfire can intensify poverty by affecting households that lack "adequate resources to reduce the flammability of nearby wildlands, fire-proof homes and other structures, respond quickly and effectively when wildfires occur, and recover from economic losses resulting from fires" (ECONorthwest 2001). Low-income households are less likely to have adequate fire insurance, and they are more likely to have a larger proportion of their financial assets tied up in structures, vehicles, and livestock—assets that are susceptible to loss from fire.

3.10.3.1.2 Fire Management (Wildland Fire Use)

The effects of continuing current fire management policies on environmental justice would be the same as described in Section 3.10.3.1.1 above.

3.10.3.1.3 Monitoring Plan

Continuing to monitor resources under the current monitoring plan would have no direct or indirect effects on environmental justice on or near the Forest.

3.10.3.2 Proposed Action Alternative

3.10.3.2.1 Fuelwood Management

It is not expected that the Proposed Action would disproportionately affect minority and/or low-income populations in or around the Forest. Proposed changes in the direction of the fuelwood harvesting program would not reduce the amount of dead and down made available for harvesting under personal permits. Ample fuelwood would be available for those who rely on it as an economical source of heat for their homes. Changes in the locations open to fuelwood collecting may entail increased traveling expenses, principally more automotive fuel to drive greater distances. This would have the greatest effect on those who harvest large quantities of wood (5-10 cords per family), requiring multiple trips. Multiple trips would be necessary because pickup trucks generally hold from a third to a half of a cord, although specially equipped large-bed trucks can carry up to a full cord. All fuelwood harvesters, regardless of economic or racial/ethnic background would be affected by the proposed changes. No data exist to indicate what proportion of those affected might fall into low-income or minority categories, but the socioeconomic statistics for Yavapai County compared to the state as whole suggest that the proportion is likely to be low.

3.10.3.2.2 Fire Management (Wildland Fire Use)

The proposed changes in the fire management policy for the Prescott National Forest would not disproportionately affect minority and/or low-income populations because these populations are not concentrated in any specific area relative to the Forest, and the anticipated increased frequency of smoke (particulate emissions) resulting from wildland fire use would not disproportionately affect any particular populated area.

3.10.3.2.3 Monitoring Plan

The proposed Monitoring Plan would not affect how resources in the Forest are managed, except to the extent that information acquired through monitoring about resource status and levels of use would help Forest personnel evaluate the effectiveness of management programs. Therefore, the proposed Monitoring Plan would not disproportionately affect minority and/or low-income populations.

3.10.3.3 Cumulative Effects

Because the Proposed Action is expected to disproportionately affect minority and/or low-income populations, it would not contribute to cumulative effects relative to environmental justice.

4.0 Chapter 4: Agencies and Persons Consulted

Prescott National Forest retained the assistance of a third party consultant, SWCA, Inc., Environmental Consultants (SWCA), for the preparation of this EA. Only two persons not affiliated with the Forest or SWCA were contacted for information. They are listed in Table 13.

Table 13. Persons Other Than Prescott National Forest and Third Party Consultant Personnel Consulted in Preparation of the Environmental Assessment.

Name	Title	Agency
Carl Bowman	Air Quality Specialist	Grand Canyon National Park
Tim Martin	Air Quality Meteorologist	Arizona Department of Environmental Quality

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