

# Appendix A

## Responses to Scoping Comments

This section displays respondents' original written correspondence and the Peaks and Mormon Lake Ranger Districts' responses to those comments. Where appropriate, the responses direct readers to sections in the Environmental Assessment where comments have been fully addressed in the context of the appropriate resource areas or where text of the original Proposed Action, including mitigation measures, has been modified or amended to address these public concerns.

## Responses to Scoping Comments

### Comment 1-1

All weed treatment methods were considered during development of the proposed activities. Many infestations are within limited spray zones (within 1 mile of residences, trailheads, etc) as defined in the Forest Plan. Therefore, herbicide treatments in these areas are restricted. Other methods of control must be tried first before herbicides would be used. Manual treatment is costly and time consuming considering the scale of work to be accomplished, but will be utilized in some areas. Biocontrol was suggested as a means of economic but efficient control. Additionally, treatments may be adjusted during implementation. The Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds, Coconino, Kaibab and Prescott National Forests (2005) allows for adaptive management of weed treatments for this project. Under this guidance, the treatments could be changed if a more efficient and/or economic method is found.

Appendix E includes detailed information on weed management practices and proposed treatments.

### Comment 1-2

Post-treatment monitoring is part of the treatment plan and is addressed in the Weed EIS. See the Monitoring section in Chapter 2 for more detailed monitoring processes regarding weed treatments. Appendix E contains detailed monitoring activities regarding weed management practices.

### Comment 1-3

Appendices D and E include Best Management Practices for prescribed fire practices.

### Comment 1-4

Meadow restoration was synonymous with Grassland and Savannah Restoration in the original Proposed Action text. Treatment is referred to as Meadow and Grassland Thinning in the Environmental Assessment for consistency.

### Comment 2-1

There are numerous terms and names to describe older ponderosa pine trees. The use of yellow pine is the standard description of old ponderosa pines that exhibit large plates and colors ranging from lighter yellows, to dark oranges, and rust tones.

### Comment 2-2

In areas proposed for hand thinning, slash will be piled and burned. Broadcast burning on the ground will follow this slash burning. Where slash created would not be excessive, slash may be lopped and burned in a broadcast burn.

### Comment 2-3

Figure 2-4 is a map of the existing and designated old growth sites in the project area. A more detailed map of 10K planning area designation is located in the Project Record.

## Comment 2-4

Trees left in pinyon-juniper treatment areas will be large trees of all kinds, not only juniper. Site specific evaluations will be done for each of the treated stands that contain pinyon pine and junipers. Prescriptions will be written to address the needs of the stand and what is appropriate for the habitat type.

## Comment 2-5

The common name for *Hedeoma diffusum* is Flagstaff pennyroyal. The Environmental Assessment includes both names.

The common name for *Clematis hirsutissima var. arizonica* is Arizona leatherflower.

## Comment 2-6

The obliteration of old, unneeded roads and the management of all roads in the project area will be addressed through the Travel Management Rule planning process that is occurring on the Coconino National Forest. The scope of this project is limited to fuel reduction and forest restoration processes that do not include road and trail management activities or planning. The effects of continued road and trail use in the area, however, are analyzed in the Recreation section in Chapter 3.

## Comment 2-7

Native species are accustomed to and have developed historically with periodic fire. Research suggests that mountain mahogany resprouts vigorously after fire. Neither frequent fires nor long periods without fire will have detrimental impacts to these species.

The Fire and Fuels section and Vegetation section in Chapter 3 addresses the effects of fire on vegetative species.

## Comment 2-8

A list of weed management treatments is located in Appendix D.

## Comment 3-1

References are located in Chapter 5 of the Environmental Assessment.

## Comment 3-2

Invasive species, water and soil quality, wildlife species, and road management issues are all addressed in the Environmental Assessment. Specific management activities and mitigation measures are described in Chapter 2. The effects of these activities are analyzed in Chapter 3.

Invasive species management is further described in Appendix D.

## Comment 3-3

The project is in compliance with all Forest Plan direction regarding old growth management as well as direction under authority of the Healthy Forests Restoration Act (HFRA). The Vegetation section in Chapter 3 discloses the effects of the activities on old growth forest structure. Appendix

B includes detailed discussion of how this project meets the old growth planning requirements of HFRA.

#### Comment 3-4

The large tree management rationale and criteria were developed to provide more insight into large management situations and how large tree management is integrated into overall vegetative health and structure of the forest. Although the rationale described in Appendix B provides an ecologically justified rationale for why trees may be removed, it is also important to focus on the large tree component that will remain in the project area after treatment. The rationale only provide the context in which large trees removal would occur to meet resource needs and the Purpose and Need for Action, not the frequency of situations or the number of trees removed. Only a stem map of every tree in the project area could provide data that the respondent is asking for and provide exact number of locations these situations may occur.

Chapter 3 provides a modeled estimate of large trees removed (where modeling is possible) to meet some of these rationale and resource needs. No trees over 24 inches DBH will be thinned. No yellow pines, regardless of diameter, will be thinned. Over ninety-nine percent of all the trees proposed for thinning in the project area will be less than 16 inches in diameter.

The criteria for the creation of openings listed in Appendix B provides guidance to field crews in laying out openings that are required under Forest Plan direction for northern goshawk habitat. The agency is not intent on creating openings where large trees over 16 inches DBH exist. The criteria reflect this, although it is estimated that a small portion of large trees may be removed to create openings. These trees will typically be removed only if they do not meet other forest restoration goals of the project, such as reducing dwarf mistletoe infection and protecting and enhancing oaks and yellow pines. The criteria do state that uninfected pine trees between 14-18 inches DBH should not be removed for the creation of openings.

To meet canopy cover and density standards of the project, the resulting structure in some areas after treatment could result in a structure consisting of primarily large diameter trees if a diameter limit were implemented. While this would occur on relatively few areas, this situation would result in a structure with undesirable age and class diversity.

In most cases, smaller trees will be removed first in opening up yellow pine clumps and groups and reducing competition to yellow pines.

Large mistletoe infected trees are important as wildlife habitat. The intent of the thinning in dwarf mistletoe infected areas is to limit spread to more natural rates and acceptable levels as described in the Forest Plan and not to completely eradicate dwarf mistletoe. Since fire suppression practices were first implemented, increased densities have increased the rate of spread than normal spread rates in more open forested sites.

Treatment for dwarf mistletoe will only occur in two Locations (286 and 297) and will most likely involved the thinning of large, mistletoe infected trees to treat the most severely infected groups.

To obtain an accurate number of large trees removed in grassland areas, a stem map would need to be created. This level of data collection is neither practical nor needed for this level of environmental analysis.

Comment 3-5

The described conditions were general descriptions for meadow and riparian areas in the greater Flagstaff area and not specific to the project area. These are due to soil and water conditions and gully episodes that occurred in the early 1900's a hundred years ago. Some wetter meadows have dropped water tables.

Chapter 3 includes soil and watershed existing conditions and environmental effects of the proposed action and no treatment that are specific to the project area.

Comment 3-6

The Vegetation section in Chapter 3 includes a detailed discussion of VSS class distribution in the project area. Some elements of old growth ecosystems, such as snag and logs, may be deficient in certain VSS 6 stands.

Comment 3-7

The project boundary and analysis area was determined by fuels specialists to include the Wildland-Urban Interface and sufficient protective space to defend communities from wildlife. Direction in the Coconino National Forest Plan and Community Wildfire Protection Plan help define these areas.

The Environmental Assessment includes maps of fire hazard ratings (pre- and post-treatment) and treatment activities and locations.

Comment 3-8

The initial Proposed Action mailed to the public contained sufficient information to describe the existing conditions, desired future conditions, and difference between them or the need for change. The Environmental Assessment includes detailed information regarding the existing conditions (Affected Environment sections in Chapter 3) of the project area for all resource areas.

Comments 3-9 and 3-10

The Environmental Consequences part of the Vegetation section of Chapter 3 includes detailed information on forest structure pre- and post-treatment.

The Proposed Action section in Chapter 2 further defines proposed forest structural patterns, including group and clump structure.

Comment 3-11

The Flagstaff/Lake Mary Ecosystem Amendment (2003) is part of the Coconino Forest Plan. Electronic copies are available at:

<http://www.fs.fed.us/r3/coconino/publications/plan-revision-2006/index.shtml>.

Comment 3-12

Large trees will be identified for removal by the marking crew after a project decision and silvicultural prescriptions are completed. It is not feasible to mark proposed large trees for removal before a decision is made.

Large tree diameter limits were not selected as part of or an alternative to the Proposed Action for reasons disclosed in the *Alternatives Considered but Eliminated from Detailed Study* section in Chapter 2. The Peaks and Mormon Lake District Ranger will make a decision on this project primarily on ecological needs, and will not compromise the desired conditions on the premise of a respondent's commitment to not object the project.

Comment 4-1

Chapter 2 includes mitigation stating that the Coconino National Forest will work together with interested parties, including the National Park Service, to implement prescribed fire treatments in and adjacent to the project area.

Comment 4-2

Implementation of thinning and burning will be coordinated with the National Park Service along the Walnut Canyon entrance road.

Comment 5-1

The effects of a 12-inch DBH diameter limit are disclosed in the Vegetation section of Chapter 3. This diameter limit proposal was not incorporated into another action alternative for reasons discussed in the *Alternatives Considered but Eliminated from Detailed Study* section in Chapter 2.

A 12-inch diameter limit would not lead to the enhancement and creation of a sustainable, uneven age forest structure as described in the Purpose and Need for Action.

Comment 5-2

Thinning activities in the Walnut Canyon area will use roads that are still open and avoid, to the greatest extent possible, roads that have been previously closed by forest staff or volunteer activities. Proposed temporary roads that will be created to remove slash and stems will be closed when thinning is completed. Treatment areas north of Walnut Canyon were designed to address road closure concerns and will be primarily thinned by hand to limit mechanical entry. Figure 2-5 includes a detailed map of the area that includes preliminary proposed haul routes and temporary road locations.

The Recreation section in Chapter 3 includes analysis of the proposed activities on the road and trail system.

Comment 5-3

Impacts to the Flagstaff pennyroyal will be mitigated by following Forest Plan for the management of *Hedeoma diffusum*. Additional mitigation for plant species including clematis is included in Chapter 2.

Comment 5-4

No oaks will be intentionally thinned in management activities. Chapter 2 includes mitigation measures designed to protect oaks in the area. The effects of thinning trees on oaks are described in Chapter 3. Large tree management criteria described in Appendix B also includes direction on enhancing oak growth and health in the project area.

## Comment 5-5

Direct and indirect effects of treatments for noxious weeds are addressed in the Noxious and Invasive Weed section of Chapter 3. Mitigation measures designed to limit the spread of invasive plants is listed in Chapter 2 and further described in Appendix E.

## Comment 5-6

Within the project area there are approximately 700 archaeological sites. These sites consist primarily of prehistoric artifact scatters, pithouses, and masonry structures made of basalt and dacite cobbles. There are also a number of historic sites dispersed throughout the project area associated with logging railroad and homesteading activities.

The proposed action will assist in limiting fire threats to cultural resources by removing heavy fuels, burning existing fuels, and reducing the possibility of future emergency fire suppression activities that could damage cultural resources.

The surveys addressed a number of fire threats to cultural resources resulting from the proposed activities. The entire project area was either completely inventoried or sampled depending on site types and density. Surface artifacts were identified and diagnostic artifacts were documented by use, date, phase, and cultural affiliation when possible. Fuels forms were completed for each site recording fuel loads, site type (fire tolerance), and threats to the resources such as stumps in structures or trash piles, dead trees, and slash piles on sites. Additionally, district archaeologists will be on site during prescribed burning activities and they will also monitor 20% of sites after burning per the 2001 WUI Programmatic Agreement (2001 PA).

Activities will restrict burning within fire intolerant sites while allowing prescribed burning in the fire tolerant archaeological sites. Using current fire effects research on cultural resources (Deal, 1999; Jackson, 1998; Rude, In Press; Ruscavage-Barz, 1999; et al), these sites will not be adversely affected per the 2001 Region 3 WUI PA. By allowing low intensity prescribed fires to burn through historically and prehistorically burned archaeological sites, current fuel loads resulting from historic fire suppression and subsequent fuel buildup will be reduced. These treatments will prevent extensive heat damage during any future wildfire events and lower catastrophic fire threats. If this plan is implemented, emergency fire suppression activities will be lessened and the potential for ground disturbing activities like dozer fire-line construction will be diminished.

## Comment 5-7

Drainage restoration will be analyzed under separate NEPA documentation since this action is not directly tied to fuel reduction and forest structure needs. Due to the possible environmental degradation, however, Lands and Watershed staff are currently looking into possible management scenarios and working with Pine Canyon Golf Course to address these concerns.

## Comment 6-1

Areas stated in the comments will be treated in the Proposed Action.

## Comment 6-2

Please see the response to Comment 2-6.

### Comment 7-1

Campbell Mesa will be receiving minimal hand thinning. Selective prescribed burning will also reduce some of the ladder fuels. The Proposed Action and Mitigation Measures section in Chapter 2 include management direction to address this concern.

### Comment 8-1

Activities in the Proposed Action have been modified to address respondent concerns while still meeting the fuel reduction and forest restoration objectives of the project. Thinning will take place in some areas in and around the Hitchin' Post stables, although most has been changed from mechanical to hand thinning. Hand thinning will have less of a visual impact and leave more mid-diameter trees (larger than 12" DBH) than with mechanical thinning. Group and clump structure will provide much visual screening while still creating interspaces that are critical for fuel reduction needs and improved understory productivity and diversity.

Prescribed burning will still produce some burn scars on remnant trees. Increased understory productivity may help screen some scarring. Burn scarring is a natural, historic process and is a normal part of the landscape in fire-adapted ecosystems.

From a visual and user-experience standpoint, some thinning and prescribed burning may be preferable to a charred landscape in which numerous trees are torched (burn scars on the entire tree) and the landscape is altered for much longer time periods. Soil erosion, dead standing trees, and trail damage can also occur if a wildfire occurred in the area, all of which lead to poor guest experiences.

As described in Chapter 2, on-site consultation with the Forest landscape architect and silviculturist will occur during layout activities to ensure visual concerns are met in sensitive areas. Consideration will be given to scenery management when thinning is implemented along permittee trails and roads. Thinning will be varied using a combination of moderate and light thinning applications, and may include small clump and group deferrals. Slash and treatment areas will be treated or rehabilitated promptly for the protection of scenic values.

Visual and noise buffers will be left in place to address concerns, Visual and noise buffers will be left along Lake Mary Road and a visual screening strip will be left in between the key permittee trails and the community. No more than 20% of Location 318 will be left in denser patches.

### Comment 8-2

Portions of the skunk canyon area will not be thinned under this project. See Figures 2-1 and 2-2 maps of treated areas near skunk canyon.

### Comment 8-3

The project manager and resource staff have met with the respondent to discuss management concepts described in Comment 8-1. Future meetings will occur to discuss management opportunities in the field with the respondent.

# Appendix B

## Healthy Forests Restoration Act Authorities for the Eastside Fuel Reduction and Forest Health Project

This analysis provides a description of how the Eastside Fuel Reduction and Forest Health Project Proposed Action meets the requirements set forth under the Healthy Forests Restoration Act of 2003 (HFRA). The HFRA was written to expedite the preparation and implementation of hazardous fuels reduction projects on federal lands. Because HFRA requirements are different than projects authorized under traditional NEPA authority, this document serves as a road map for educating the public on these differences.

### Public Collaboration

The Peaks and Mormon Lake Ranger District collaborated with Greater Flagstaff Forests Partnership (GFFP) on all phases of planning and project design for this project. The partnership represents a broad spectrum of community interests in the Flagstaff area including federal, state, and local agencies; academic groups; professional societies; conservation organizations; and local fire departments including Flagstaff, Highlands and Summit Fire. The Forest Service has worked collaboratively with GFFP over the past year to jointly develop desired future conditions, possible management approaches, monitoring and mitigation measures, and the Proposed Action. The Forest Service and GFFP have also conducted numerous field trips and meetings to discuss project goals and objectives for the project area. In March 2006, the GFFP Board of Directors provided their endorsement for the Proposed Action.

The District replied to three respondents in attempts attempting to clarify thinning and road management concerns. These responses were important steps to keep the collaborative dialog between the public and the District ongoing, and to ensure that partners stayed abreast of the planning process.

### Wildland-Urban Interface and At-Risk Communities

Section 102(a) includes direction on types of lands that fit under HFRA authority. This project is consistent with the Implementation Plan<sup>1</sup> and includes the following:

- ❑ The wildland-urban interface areas of at risk communities (Section 102(a)(1)); and
- ❑ Federal lands not in the WUI that have threatened and endangered species habitat where the natural fire regimes are important for (or where wildfire proposes a threat to) the species or their habitat, and where fuel reduction projects will enhance their protection from catastrophic wildfire (and complies with applicable guidelines in management or recovery plans) (Section 102(a)(5)). See the Wildlife Section in Chapter 3 for more detail on current conditions of threatened species habitat and fire hazard ratings.

The Flagstaff area was listed in the January 4, 2001 and updated in August 17, 2001 Federal Register notice (66 FR 753) describing at-risk communities. The Wildland Urban Interface (WUI) for this project is defined through HFRA and the Community Wildfire Protection Plan (CWPP).

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<sup>1</sup> Implementation Plan for the Comprehensive Strategy for a Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment (May 2002).

The CWPP defines the interface as an area where public safety is the over-riding goal. The WUI is sufficiently large to:

- Reduce the potential of a high intensity fire from entering the community;
- Create an area whereby fire suppression efforts will be successful;
- Limit large amounts of wind-driven embers from settling on the community; and
- Protect critical infrastructure.

The project area is located completely within the Community Wildfire Protection Plan analysis area. The WUI as defined in this plan covers a majority of the project area. See [www.gffp.org](http://www.gffp.org) for a detailed map of the WUI area.

### **Community Wildfire Protection Plan**

See Appendix C - Community Wildfire Protection Plan Direction for more information on how this project was developed to accommodate management goals and direction described in the CWPP.

### **Threatened and Endangered Species**

The HFRA authorizes treatments on federal lands outside of the WUI that have threatened and endangered species habitat where the natural fire regimes are important for (or where wildfire proposes a threat to) the species or their habitat, and where fuel reduction projects will enhance their protection from catastrophic wildfire (and complies with applicable guidelines in management or recovery plans) (Section 102(a)(5)).

Natural fire regimes are identified as being important for threatened and endangered species and their habitat in the MSO Recovery Plan (1995). A main threat identified during the listing process for Mexican spotted owls was wildfire risk. The Upper Gila Mountain Recovery Unit, which encompasses the project area, has a high fire threat and has significant owl populations that have the potential of being seriously impacted by fire. Large crown fires can reduce or eliminate nesting, roosting, and foraging habitat. Desirable characteristics of many nest and roost sites place them at high fire risk.

This authorized hazardous fuel reduction project will provide enhanced protection from catastrophic wildland fire for threatened and endangered species and their habitat. The Proposed Action includes management actions within MSO habitat to improve nesting and roosting habitat and reduce fuels in these areas. Many of these areas, including the PAC, are within the WUI area. Prescribed fire and minimal thinning can reduce fuel loadings and create small openings to increase horizontal diversity and promote growth of shrubs, grasses, and forbs.

Coordination among fuel and fire specialists and biologists in the development of prescribed burn plans will occur to minimize impacts to birds and their habitat. See the Project Design Features section of the Proposed Action for project-specific mitigation and management practices.

The potential beneficial and adverse effects to the species in both the short-term and long-term will be described in the Environmental Assessment for the project.

## Old Growth

The HFRA requires that the Forest Service fully maintain, or contribute toward, the restoration of the structure and composition of old growth stands according to the pre-fire suppression old growth characteristics of the forest type.

The Coconino Forest Plan (USDA 1986) was amended in 1996 to incorporate management direction for the northern goshawk and Mexican spotted owl. This amendment included new direction regarding the management of old growth ecosystems.

Section 102 (e)(3) provides that old growth direction in resource management plans established (or amended) on or after December 15, 1993, is sufficient to meet the requirements of Section 102 (e)(2) and will be used by agencies carrying out projects under the HFRA.

Old growth stands have been identified through district mapping and planning activities. Figure 2-4 provides locations of the 5,120 acres of land designated for old growth development and 374 acres of existing old growth forest in the Proposed Action. Table 3-3.1 provides a summary of allocation by 10K.

The Proposed Action is in compliance with, or is moving in the desired direction to meet all Forest Plan standards and guidelines for old growth management. While these old growth development areas will meet old growth structural values sooner than other areas, other lands will also be managed to increase tree growth rates and ensure the development of additional old growth areas over time.

## Large Tree Management

Vegetation treatments in the Proposed Action are designed to focus primarily on the thinning of small diameter trees to meet the Purpose and Need for Action. The Proposed Action was designed to best balance the need for reducing fuels and restoring forest health, which includes protecting wildlife and their habitat, meadows and grasslands, and watershed function. A healthy, large tree population is an essential component of a healthy forest. To preserve the existing mature forest component, no yellow-barked pines will be thinned.

While the Forest Service is not purposely targeting the removal of any large trees, it recognizes the need to remove some large trees to manage for overall forest health in a sustained manner, not just the health of the current large tree component. Thinning smaller trees can achieve fuel reduction objectives, yet there are situations where the removal of large trees may need to occur to meet other forest structure needs and Forest Plan direction. Project goals and objectives are described in Eastside Project Need for Change Report (February 2006). This analysis should be reviewed in tandem with the Proposed Action to gain a better understanding of vegetative characteristics in the project area.

While the Proposed Action describes treatment methods and post-treatment forest structure values, it does not detail the management of individual trees. Trees selected for retention and removal—including large trees—will be determined by silviculturists in the field on a site-specific basis. The Proposed Action and this document do not show the actual numbers of large trees retained or removed, but they can provide the context in which large tree removal would occur to meet resource needs. Although the criteria listed in the following sections provide an ecologically justified rationale for why trees may be removed, it is also important to focus on the large tree component that will remain in the project area after treatment.

### **Process and History**

Early in the development of the Mountaineer HFRA project (July 2005), the Forest Service and GFFP met to discuss large tree definitions, site specificity of large tree management, rationale for the retention and removal of large trees, and diameter caps. Subsequent large tree discussions were held within project interdisciplinary (ID) team meetings that were scheduled throughout late summer and fall. In these ID team meetings, Forest Service and GFFP members developed desired future condition statements, treatment timeframes, and possible management practices. Large tree management concerns were discussed at these meetings and during subsequent GFFP Project Team field trips. Forest Service silviculturists provided in depth concerns about large tree management during numerous ID team meetings. Resulting dialog of large tree management concerns for the Mountaineer project was captured in meetings and discussions for the Eastside Fuel Reduction and Forest Restoration Project as well.

The Forest Service collaboratively developed the Purpose and Need for Action and Proposed Action with GFFP during the winter of 2005-6.

### **Large Tree Definition**

While the current GFFP policy (December 2004) regarding large tree management does not specify a size threshold in describing large trees, this analysis (based on numerous discussions with GFFP) defines large trees as 16 inches diameter at breast height (DBH) or larger for ponderosa pine for this project. Although definition by diameter helps provide a visual image of large trees, tree diameter is only one way to measure the ecological value of a given tree.

### **Forest Stand Data**

The project's vegetation and stand data are derived from stand exams performed by the Forest Service prior to project planning. A stand is a delineated area of land that contains a plant community that is generally uniform in cover type, age and size class, and is distinguishable from adjacent plant communities. Field crews collected detailed information at a number of points across stands. The number of points varied according to stand size, structural characteristics, and level of intensity designated for the project. The collected data was then extrapolated to best estimate current vegetative characteristics (trees per acre, tree size, etc.) for entire stands. This modeling of stand characteristics is derived from computer modeling programs. While this information is sufficiently accurate to provide general stand characteristics, it does not detail actual numbers or placement of trees within stands.

Because this data is averaged per stand and stem maps or verified data for individual trees do not exist, actual numbers of trees—including large trees—that would be retained or removed cannot be detailed in an environmental analysis. Rather, estimates would be based on modeling and provide a context for the relative numbers of trees to be removed depending on proposed vegetative treatments and desired post-treatment values such as canopy cover percentages. As prescriptions are implemented and trees are marked for removal, actual numbers and sizes of trees targeted for removal can be assessed.

### **Simulations**

The Forest Service will run preliminary estimates of the number of trees removed using stand data and predicted stand conditions after treatment with the Forest Vegetation Simulator (FVS) program. The FVS program can model stand characteristics before and after treatment and into the future. This program, however, cannot model the creation of openings or estimate the numbers of large trees removed to create these openings. While the Forest Service predicts that

few large trees would be removed under this project, it is difficult to predict actual numbers due to the inherent variability of stand structure.

### **Rationale and Criteria for Removal of Large Trees**

The following sections describe situations where large trees could be removed to meet project goals and objectives. While the following criteria are listed individually, they are all components of a healthy forest. All of these situations are directly linked to the goal of forest restoration listed in the Purpose and Need for Action, as well as the Need for Change Report. Often, more than one of these conditions exists in a treatment area where removal of a large tree may satisfy a number of these criteria.

The number of large trees that could be removed varies by stand and is highly dependent upon current forest structure. For example, some stands may exhibit a forest structure where large trees are aggregated in clumps or groups. Other areas may have an evenly spaced and distributed population of large trees. The creation of openings would most likely require fewer large trees to be removed in the first scenario compared to the second.

Where possible, criteria were written to further define how forest structure would remain on the ground after treatment.

### **Creation of Openings and Natural Regeneration Areas**

Historically, ponderosa pine forests in northern Arizona were characterized by frequent, low-intensity surface fires occurring every 3 to 15 years. The historic fire regime maintained an open canopy structure and a variable, patchy tree distribution (Moir et al 1997, Covington et al 1997). Desired future conditions for the project area include openings within forested stands that recreate a more open stand structure, increase horizontal heterogeneity and understory productivity, decrease fire hazard, and improve wildlife habitat for northern goshawk, antelope, turkey, and several edge species. Openings also provide areas where natural regeneration can occur. The Proposed Action includes the creation of new or the enhancement of existing openings within at least 20% of the project area to meet Forest Plan direction for Vegetative Structural Stage (VSS) classes. Openings would range in size from  $\frac{1}{4}$  to 4 acres<sup>2</sup>.

### **Criteria for the creation of openings include the following (not in order of priority):**

- Create openings in northwest-southeast directional patterns to provide fuelbreaks.
- Avoid rocky soils
- Utilize and enhance existing openings
- Utilize areas with dwarf mistletoe infection
- Utilize areas with bug kill trees
- Utilize areas that lack pre-settlement evidences
- Avoid areas with New Mexico locust populations
- Enhance spaces between oaks and yellow pines
- Avoid uninfected 14-18 inch black jacks where possible
- Emphasize VSS 3 (5-12" DBH) areas

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<sup>2</sup> Seedling and saplings areas (Vegetative Structural Stage 1 and 2 classes) are currently lacking in the project area. Forest Plan direction for the northern goshawk calls for 10% distribution in each of the VSS 1 and VSS 2 classes.

## **A Sustainable, Uneven-Aged Forest Structure**

A forest structure that consists solely of trees greater than 16 inches DBH would not contain sufficient age diversity. Without regeneration, stand structure would not persist over time. Even-aged forest structures are only self-sustaining through stand-replacing events, such as catastrophic crown fire, which is not desirable within the project area, or through management actions that mimic stand replacing events such as clearcutting. Additionally, certain insects favor trees in certain diameter classes (DeMars and Roettgering 2003). As a forest becomes denser, it becomes less resistant to bark beetle infestation. Insects are attracted to trees under stress from lack of resources (water, nutrients, light) due to vegetative competition. An uneven-aged structure with lower tree densities would be less susceptible to landscape-scale insect attack and mortality (USDA Forest Service 2002, Long 2003, Amman et al 2003) and promote understory diversity. Proposed vegetative treatments would create openings and clump or group trees where possible to emphasize this diverse forest structure.

## **Canopy Cover**

Canopy cover is an important measure when determining thinning treatments since it is a measure common to numerous resource areas in determining treatment effectiveness. Proposed canopy cover values are important to meet since canopy cover acts as a surrogate measure for other measures such as fuel loads, tree competition, and habitat for wildlife species.

Canopy cover values in the Proposed Action were developed to meet fuel reduction objectives and comply with Forest Plan direction for northern goshawk and Mexican spotted owls. Some large trees could be removed to meet target canopy cover values in situations where not removing them would conflict with other objectives listed in this section. For example, if a stand is targeted for an uneven age structure after treatment, removing all trees up to 16 inches DBH may not result in the desired structure, even though the canopy cover value may be met. In this scenario, a few large trees would be thinned and some smaller diameter trees would be retained, providing more structural diversity within the stand.

## **Increased Vigor, Longevity, and Development of Old, Yellow Ponderosa Pine**

Ponderosa pine trees begin to turn yellow at approximately 150 years of age. Due to the current dense forest structure, some yellow pines have smaller diameters than normally associated with old, yellow trees due decreased growth rates from competition among trees for light, nutrients, and water. Thinning black-barked pine trees around the drip line of yellow pines will decrease competition among trees, increase yellow pine vigor and longevity, decrease susceptibility to successful bark beetle attack, and decrease the risk of mortality due to crown fire (Stone et al 1999, Kolb et al 2001, Wallin et al 2004).

## **Decreased Dwarf Mistletoe Infection**

Dwarf mistletoe (*Arceuthobium vaginatum subsp. cryptopodum*) is a parasitic plant that infects ponderosa pine. Infection is spread via pressure-released seeds and expands at a rate of 1-2 feet per year (Conklin 2000). Dwarf mistletoe (DM) is considered a tree pathogen because infection results in reduced tree growth, reduced tree vigor, branch deformations, and shortened life span of the infected host. Additionally, in comparison to uninfected trees, trees infected with DM are more susceptible to bark beetle attack and are also more flammable due to the accumulation of resin and branch deformations (Conklin 2000). Since Euro-American settlement and the advent of fire suppression, DM populations in the southwest are thought to have increased with increased forest densities (Conklin 2000). A more open, park-like forest structure would have limited the spread of DM infection.

Retaining infected trees in the overstory could spread infection to smaller trees in the understory. For example, a stand may contain a 16-inch DBH black-barked pine tree infected with dwarf mistletoe and a 14-inch DBH pine tree free from infection. In this case, the larger tree would be removed and the smaller tree would be retained. If, however, the infected tree is a yellow pine or group of yellow pines, then a 1 chain (66 feet) buffer would be cut around the tree or group to prevent the spread of infection. Infected yellow pines would be retained because of their rarity in the project area and because they provide good habitat as snags or nesting areas for wildlife species.

To decrease (not eliminate) the incidence and spread of dwarf mistletoe infection within the project area, a limited number of infected, overstory large trees may be removed.

### **Meadow and Grassland Thinning**

Many meadow and grassland areas are relatively open and have fewer larger trees than heavily forested stands. Most of these areas were logged previously during railroad construction and development. Many of the larger, straighter “yellow” pines in the area were cut. This left a forest structure with larger pines that were less desirable from a timber production viewpoint. These trees often exhibit twisted or bent stems, multiple tops, or low heights. In addition, due to fire exclusion, some grasslands have experienced encroachment of ponderosa pine for approximately 125 years. Some of these encroaching trees have reached larger diameters due to open growing conditions. Many of these trees are “wolfy” black-barked pine trees that are characterized by below average heights (less than 40-50 feet), wide spread crowns, excessive taper, and excessive limbs that extend to the ground (Smith 1986). This low canopy base and high canopy bulk density makes them prone to torching during fire events.

Grasslands identified for restoration were selected based on Terrestrial Ecosystem Survey (TES) units 53 and 55, Forest Plan Management Area 9 (Meadows) units, and orthophoto quadrant maps. TES units 53 and 55 are considered valley plains and swales that are unsuitable for timber production. These areas receive added moisture from surrounding areas and hold water seasonally.

While site boundaries are fairly accurate in delineating forest structure or topographical differences between sites, actual management boundaries that divide forested areas from savannah or grassland areas would be identified in the field and guide management direction. For example, TES unit boundaries do not follow stand boundaries and some stands may contain only a portion of a TES unit. Because of this, sites identified for grassland thinning may not receive uniform treatment. The number of remaining trees in grassland areas after treatment would be based on the number of evidences of pre-settlement trees. Remaining portions of sites that have similar vegetative characteristics and forest structure values to adjacent forested sites would receive thinning treatments similar to those proposed for the adjacent sites.

When selecting trees for retention in these areas, tree markers will retain genetically desirable trees over “wolf” trees, where possible, although some “wolf” trees would be retained due to the excess number of them. Retained trees will be selected from the healthiest trees in a stand, not necessarily the closest in distance to historic evidences. Genetically desirable, large trees would most likely not be thinned in these areas.

### **Increased Growth, Vigor, and Longevity of Gambel Oak**

Due to past harvesting of Gambel oak, both legally and illegally, large oak trees (greater than 10 inches diameter at root collar) are rare within the project area. One objective of the project is to

increase the productivity and age class diversity of Gambel oak. A desired future condition is to contain more larger oaks within the project area. Thinning of ponderosa pine around clumps of Gambel oak (oak stems greater than 5 inches DRC) would reduce competition between pine and oaks for moisture, nutrients, and sunlight. Reduced competition for these resources will increase tree vigor, growth, and longevity.

# Appendix C

## Community Wildfire Protection Plan Direction

The development of the Community Wildfire Protection Plan (CWPP) for Flagstaff and Surrounding Communities (January 2005) was coordinated by GFFP and Ponderosa Fire Advisory Council. This plan is a collaborative planning and implementation tool that helps mitigate immediate fire hazards to communities at risk and restore fire-adapted ponderosa pine forests in the area. It provides a broad operating framework for treatment within the area.

According to the CWPP, the immediate, but not exclusive, focus is on protecting communities. Restoration efforts would be directed toward protecting and promoting development of old growth and large trees, but not at the expense of providing adequate fire protection to communities at risk.

Desired future conditions for the area as described in the CWPP includes:

Actions and treatments will leave both the landscape and at-risk communities resistant to catastrophic fire. Ponderosa pine stands will generally range from 30-100 larger-diameter trees/acre and/or basal area of 40-80/acre, be found in groups in varying degrees of interlocking canopy, and be separated by openings of various sizes. This pattern of tree clumps and openings will be variable and provide for a diverse, rich, robust, and healthy ecosystem that supports a variety of butterflies, songbirds, mycorrhizae, carabid beetles, pollinators, grasses, flowers, shrubs, and herbaceous plants. Further, it will avoid a homogenous, plantation appearance. Thicker groupings of trees, including all sizes, are found scattered throughout the larger area.

Forest structure and composition descriptions are very similar to the desired future conditions for this project.

### ***Treatment Guidelines***

The CWPP provides recommendations for successful outcomes instead of prescriptive options for the treatment of ponderosa pine forests. Treatment guidelines are intended to serve as a general guide for management direction and provide a framework within which specific prescriptions can be developed. Modification of the guidelines based upon site-specific conditions and needs is required and encouraged by the plan.

The Proposed Action and associated project design features closely follow CWPP treatment guidelines for tree selection, cutting techniques, slash treatment, pile burning, broadcast burning, and maintenance treatments.

### ***Implementation and Treatment Types***

Site specific planning occurred in the development of the Proposed Action with GFFP partners to determine appropriate treatment types and forest structure values. Wildfire hazard ratings for the area are based on tree crown height, fuel levels, canopy cover, fuel type, number of trees per acre, and slope characteristics. This site-specific analysis using current ground data guided the development of the Proposed Action treatments, which may vary from ForestERA models and treatment recommendations found in the Implementation and Monitoring Section of the CWPP.

## Proposed Treatments

Treatment actions in the Proposed Action were designed to reduce fire hazard ratings to low or moderate where possible as well as meet other resource area direction. The District used agency fuel models to determine fire hazard ratings within the project area. The ID Team and GFFP developed a Proposed Action that best met fire hazard reduction needs near communities and wildlife and forest restoration needs in other areas. In some cases, the team attempted to balance these sometimes opposing needs. Canopy cover target values are one element to measure desired conditions and treatment intensity since silviculture, wildlife, and fuel resource areas all use this measure. Proposed treatments range from relatively open park-like conditions (approximately 30% canopy closure) to denser stands (approximately 60% canopy cover), depending on resource needs. Forest structure also varies from area to area depending on resource objectives.

## Community Wildfire Protection Plan Treatments

Map 3 in the CWPP depicts ForestERA predicted fire behavior patterns based on current forest conditions. The CWPP presents treatment in a “course-filter” approach that recognizes the necessity of site-specific planning to complement CWPP models. Five treatment types are proposed in the area, ranging from light intensity burning and no thinning to high intensity (heavy) thinning followed by prescribed fire. Treatments are designed to reduce predicted fire behavior from Active Crown Fire behavior to Passive Crown Fire.

## Treatment Comparison

Model inputs and assumptions, and desired future conditions are different between the CWPP and the Eastside Project. While low and moderate fire hazard ratings in Forest Service analyses roughly correspond to Surface or Passive fire behavior categories described in the CWPP, there is a difference in the suggested treatments to achieve these lower fire hazard ratings or fire behavior categories. A full comparison between ForestERA models still needs to be conducted. As the CWPP is a “living” document and may change with new information, future versions may better align with Forest Service models for fire hazard and other resource issues.

Forest Service fire hazard ratings serve as the fine-scale analysis tool which the CWPP allows for. The CWPP analysis area also is missing some communities and private property parcels in its maps. The Proposed Action accounts for these deficiencies. In some areas, the Proposed Action includes thinning that is heavier than what the CWPP calls for. In other areas, heavier thinning that the CWPP recommends is not needed.

A majority of the acres proposed for treatment would be burned without thinning or hand thinned (12,356 acres of prescribed burn only). Much of the CWPP direction for the area calls for low intensity thinning and burning. Due to layout and layout costs, low intensity thinning would not be employed in many areas. Areas that are proposed for thinning may be treated heavier to accommodate for areas that are not thinned and provide needed fuel breaks and defensible space.

Most acres proposed for thinning have a 40% canopy cover or higher objective. A majority of the treatment proposed by the CWPP in Map 11B is a Low intensity thinning and burning treatment that includes a reduction of approximately 20% in canopy cover. Some stands with only a 20% canopy cover reduction do not reduce fire hazard ratings sufficiently, especially over the long term (20-40 year treatment effectiveness). Most of the stands proposed for thinning fall within the Light to Moderate Intensity thinning treatments of the CWPP that result in a 30% decrease in canopy cover, 40% decrease in basal area, and 72% decrease in trees per acre.

### **Effects of Treatments**

ForestERA modeled effects of treating the project area with the treatment recommendations and are included in the CWPP. Effects of the proposed action will be included in the Environmental Assessment. Full comparisons of ForestERA models with Forest Service programs would need to be made before an adequate comparison of effects can be made.

### **Monitoring and Assessment Plan**

To best manage fuel reduction projects in an adaptable manner, the Forest Service will conduct monitoring of treatment accomplishments. Additional monitoring direction is described in the Monitoring section of the Proposed Action.

Funds will be allocated to accomplish Forest Plan monitoring requirements associated with this project. Monitoring results will be stored in the Project Record and shared with GFFP or other interested parties and will serve as a tool for public education and adaptive management.

A CWPP Review Team has recently been established to coordinate the tracking and monitoring of CWPP implementation. While no specific monitoring measures have been identified yet for this project, the Forest Service will work with the CWPP Review Team to look at possible monitoring activities to determine treatment effectiveness and accomplishments.

# Appendix D

## Best Management Practices – Timber Operations

Best Management Practices (BMPs) are "a practice or a combination of practices, that is determined by a State (or designated area-wide planning agency) after problem assessment, examination of alternative practices and appropriate public participation to be the most effective, practicable (including technological, economic, and institutional considerations) means of preventing or reducing the amount of pollution generated by non-point sources to a level compatible with water quality goals Guidelines for using Best Management Practices" (FSH 2509.22). Authority and guidance to prescribe and implement BMPs is defined in FSM 2501, 2530, FSH 2509.22 and the Forest Plan.

### 24.11 - Use of Terrestrial Ecosystem Survey Timber Harvest Limitation Rating

1. Objective. To identify severe and moderate erosion hazard areas and other soil limitations in order to adjust treatment measures to prevent downstream water quality degradation.

### 24.13 - Limiting the Operating Period of Timber Sale Activities

1. Objective. To ensure that the Purchaser conducts operations, including but not limited to erosion control work, road maintenance, and log landing drainage in a timely manner, within the time period specified in the Timber Sale Contract.

The CT6.3 "Plan of Operation" provision is required in all Timber Sale Contracts. This provision states that the Purchaser must submit a general plan of operation which will set forth planned periods for and methods of road construction, timber harvesting, completion of slash disposal, erosion control work, and other contractual requirements. Forest Service written approval of the Plan of Operation is a prerequisite to the commencement of the Purchaser's operation. Provision BT6.6 can be used to suspend operations because of wet or saturated soils in order to protect soil and water resources.

### 24.18 - Tractor Skidding Location and Design

1. Objective. To minimize erosion and sedimentation by designing skidding patterns to best fit the terrain. Proper skid pattern management involves such things as locating skid trails to avoid stream courses and restriction of skidders to designated trails. The Sale Administrator locates the skid trails with the timber Purchaser or by agreeing to the Purchaser's proposed locations prior to construction

### 24.2 - Log Landing Location

1. Objective. To locate landings so creation of unsatisfactory watershed conditions which lead to water quality degradation is avoided.

### 24.21 - Erosion Prevention and Control Measures During Timber Sale Operations

1. Objective. To ensure that the Purchaser's operations shall be conducted reasonably to minimize soil erosion.

Equipment shall not be operated when soil conditions are such that accelerated soil erosion will result. The kinds and intensity of control work required of the Purchaser shall be adjusted to soil and weather conditions and the need for controlling runoff. Erosion control work shall be kept current immediately preceding expected seasonal periods of precipitation or runoff.

#### 24.3 - Slash Treatment in Sensitive Areas

1. Objective. To comply with Federal and state water quality standards by protecting sensitive areas from degradation which would result from using mechanized equipment for slash disposal.

Protected streamcourses will be designated on the sale area map. Disturbance from mechanical equipment will be minimal within 50' on either side of the protected streamcourse.

#### 41.3 - Obliteration of Roads

1. Objective. To reduce sediment generated from unneeded roads, roads that run in streambeds, and roads that are located in streamside management zones by closing them to vehicle use and restoring them to productivity.

Roads that are no longer necessary for public access or management purposes need to be obliterated. Roads that are allowed to exist without proper maintenance are subject to continued, uncorrected damage and can become chronic sediment sources.

# Appendix E

## Best Management Practices and Recommended Activities –

### Noxious and Invasive Weeds

The Final Environmental Impact Statement (FEIS) for Treatment of Noxious and Invasive Weeds, Coconino, Kaibab and Prescott National Forests, and Coconino, Mohave and Yavapai Counties, Arizona (2005) amended the Coconino National Forest Plan. Appendix B of that document includes specific design features, best management practices, required protection measures and mitigation measures to manage Noxious and Invasive Weeds.

Preventing the introduction and spread of noxious weeds is one objective of integrated weed management programs on the Coconino National Forest. The following list of integrated best management practices for weeds, and recommended management activities was adapted from the FEIS and is designed to mitigate identified risks of weed introduction and spread in the project area. Only those measures applicable to this project are included in this list.

### Integrated Weed Management Practices

Objective	Best Known Practice
<p>Incorporate weed prevention and control into project layout, design, alternative evaluation, and project decisions.</p>	<p>Environmental analysis for projects and maintenance programs will need to assess weed risks, analyze potential treatment of high-risk sites for weed establishment and spread, and identify prevention practices. This practice was incorporated during NEPA Analysis in Botany Specialists Report and incorporated into Environmental Assessment.</p> <p>Determine prevention and maintenance needs, including the use of herbicides if needed, at the onset of project planning. This practice was incorporated during NEPA Analysis in Botany Specialists Report and incorporated into Environmental Assessment.</p> <p>Include weed surveys at the project planning stage as outlined in “General Weed Management Practices” This practice was incorporated during NEPA Analysis in Botany Specialists Report and incorporated into Environmental Assessment.</p> <p>For timber sale purchaser road maintenance and decommissioning, use standard timber sale contract clauses such as WO-C/CT 6.36 to ensure appropriate equipment cleaning. Incorporate during implementation.</p>

Objective	Best Known Practice
	<p>For new and reconstruction of roads conducted as part of public works (construction) contracts and service contracts include contract language for equipment cleaning such as is in WO-C/CT 6.36. .Incorporate during implementation.</p>
<p>Avoid or remove sources of weed seed and propagules to prevent new weed infestations and the spread of existing weeds.</p>	<p>Before ground-disturbing activities begin, inventory and prioritize treatment of invasive weeds in project operating areas and along access routes, or within reasonably expected potential invasion vicinity. Surveys conducted by field crews prior to NEPA analysis.</p> <p>Do a risk assessment accordingly; control weeds as necessary. This practice was incorporated during NEPA Analysis in Botany Specialists Report and incorporated into Environmental Assessment.</p> <p>After completing the practice above, reduce the risk of spreading and creating weed infestations. Plan operating areas and access routes to avoid heavy infestation areas, plan closure of access routes at finish of project, and/or begin project operations in uninfested areas before operating in weed-infested areas. Locate and use weed-free project staging areas. Incorporate during implementation.</p> <p>Ensure that all outside (rental, other agency or unit) equipment is free of weed seed and propagules before it is accepted by the contracting officers representative. Wash vehicles and equipment before entering project area, focusing especially on areas such as undercarriages,tires and wheel wells that may harbor seeds and fragments of noxious or invasive weeds. Incorporate during implementation.</p> <p>Remove mud, dirt, and plant parts from project equipment before moving it into a project area. Determine the need for, and when appropriate, identify sites where equipment can be cleaned. Clean all equipment before entering National Forest System lands. This practice does not apply to service vehicles traveling frequently in and out of the project area that will remain on a clean roadway. Incorporate during implementation.</p>

Objective	Best Known Practice
	<p>If operating in areas infested with weeds, clean all equipment before leaving the project site. To minimize time spent cleaning equipment, time all work in infested areas last and concurrently. Designate a parking lot where project vehicles working in the infested area may be parked for the duration of the project. This area should be monitored in followup mitigation and should be near a “clean” vehicle/equipment lot. Identify sites where equipment and vehicles can be cleaned before leaving the site at the end of the project. Incorporate during implementation.</p>
<p>Retain native vegetation in and around project activity and minimize soil disturbance.</p>	<p>Minimize soil disturbance to no more than needed to meet vegetation management objectives. Incorporate during implementation.</p> <p>Minimize soil disturbance with appropriate logging techniques. The amount of disturbance from logging techniques varies with equipment and methods. Incorporate during implementation.</p>
<p>Where project disturbance creates bare ground, establish vegetation to minimize favorable conditions for weeds.</p>	<p>Treat disturbed soil (except surfaced projects) in a manner that optimizes native plant establishment for that specific site. Incorporate during implementation.</p> <p>Examples of revegetation techniques include but are not limited to topsoil replacement, native seedbank promotion, planting, seeding, fertilization, and/or weed seed-free mulching as necessary. Use local native material where appropriate and feasible (or specifically identify why not used). Use certified weed-free and weed seed-free hay or straw. Incorporate during implementation.</p> <p>Use local seeding guidelines to determine detailed procedures and appropriate mixes. To avoid weed contamination, a certified seed laboratory needs to test each lot against the Forest noxious or invasive weed list, and provide documentation of the seed inspection test. Seed lots labeled as certified weed seed-free at time of sale may still contain some weed seed contamination. Incorporate during</p>

Objective	Best Known Practice
	implementation.
<p>Manage fire as an aid in control of weeds to prevent new weed infestations and the spread of existing weeds.</p>	<p>Pre-inventory project area and evaluate weeds present with regard to the effects on the weed spread relative to the fire prescription. Surveys conducted by field crews prior to NEPA analysis. Analysis was conducted during NEPA Analysis in Botany Specialists Report and incorporated into Environmental Assessment.</p> <p>Burn noninfested areas first before entering weed infested sections of the burn. Clean all equipment when project is completed. Or treat and burn all infested areas first to remove seed source then clean equipment and proceed to uninfested areas. Incorporate during implementation.</p> <p>Time burns to promote native species and to hinder weed species germination. Incorporate during implementation.</p> <p>Mitigate the effects of pile burning by monitoring pile sites after burning and controlling noxious and invasive weeds on slash pile sites as necessary. These effects were addressed in the Botany Specialists Report.</p>
<p>Avoid or remove sources of weed seed and propagules to prevent new weed infestations and the spread of existing weeds.</p>	<p>Treat weeds on contracted projects, emphasizing treatment of weed infestations on existing landings, skid trails before activities commence. Incorporate during implementation.</p> <p>Use standard timber sale contract clauses such as WO-C/CT 6.36 to ensure appropriate equipment cleaning. Incorporate during implementation.</p>
<p>Retain native vegetation in and around project activity and minimize soil disturbance.</p>	<p>Minimize period from end of logging to site preparation, revegetation, and contract closure. Incorporate during implementation.</p> <p>Recognize the need for prompt growth of native vegetation, long-term restoration and weed suppression where forested vegetation management</p>

Objective	Best Known Practice
	<p>has created openings. Incorporate during implementation.</p> <p>Allow natural seedbank to provide vegetation if possible, next preference is for native seed grown from local collections. All seed must be certified weed seed-free for all species on the forest noxious or invasive weed list. The Forest will provide a current list to potential seed suppliers to facilitate the certification process. Incorporate during implementation.</p>
<p>Minimize roadside sources of weed seed that could be transported to other areas.</p>	<p>Avoid acquiring water for dust abatement from weed-infested areas. Incorporate during implementation.</p> <p>For road maintenance and decommissioning include contract language for equipment cleaning such as in WO-C/CT 6.36. Incorporate during implementation.</p> <p>Schedule and coordinate all earth-moving or soil-disturbing activities (such as pulling of noxious or invasive weed-infested roadsides or ditches) in consultation with the local weed specialist. Do not blade or pull roadsides and ditches that are infested with weeds unless doing so is required for public safety or protection of the roadway. If the ditch must be pulled, ensure the weeds remain onsite. Blade from least infested to most infested areas. When it is necessary to blade weed-infested roadsides or ditches, schedule the activity when seeds or propagules are least likely to be viable and spread. Minimize soil surface disturbance and contain bladed material on the infested site. Incorporate during implementation.</p>

## Best Management Practices

### Herbicide Treatments

These practices only apply to herbicide treatments. If herbicides are selected for use in the project, the following Best Management Practices will be incorporated in project implementation. These Best Management Practices have been developed for this project and are designed to minimize any potential water quality problems with approval of herbicide use in the project area. All Best Management Practices are considered standard procedure and do not constitute deviation from normal planning or implementation processes. These practices are also listed in the Soil and

Water Conservation Handbook (2509.22) and comply with the requirements of the Federal Water Pollution Control Act.

- 21.11: Pesticide Application According to Label Directions and Applicable Legal Requirements — All approved herbicides will be applied according to label instructions to avoid water contamination. Directions found on the label of each herbicide are detailed and specific and include legal requirements for use. These constraints will be incorporated into individual project plans and contracts. Responsibility for in-service projects rests with the Forest Service’s project supervisor who shall be a certified applicator. For contracted projects, it is the responsibility of the contracting officer or the contracting officer’s representative to ensure that label instructions and other applicable legal requirements are followed.
- 21.12: Pesticide Application Monitoring and Evaluation — the objective of this BMP is to determine whether pesticides were applied safely, restricted to intended target areas, and deposited at the right rates. It is also designed to evaluate if non-target species were impacted. Another component is also to provide early warning of possible hazardous conditions and determine the extent, severity, and duration of any potential hazard that might exist. Monitoring methods include spray cards, dye tracing, and direct measurements of herbicides on plants or near water. Monitoring of existing herbicide concentrations will be conducted prior to any treatments in riparian corridors where perennial water is found.
- 22.13: Pesticide Spill Contingency Plan — The objective of this BMP is to eliminate contamination of water or the soil resource that may occur from accidental spills.
- 24.14: Cleaning and Disposal of Herbicide Containers — This BMP is designed to prevent water contamination from cleaning or disposal of herbicide containers. The cleaning and disposal of these items will be done in accordance with Federal, State, and local laws. The forest or district pesticide use coordinator will approve proper rinsing procedures in accordance with State and local laws and regulations, and arrange disposal of containers when in service personnel apply the product. When a contractor applies the herbicide, the contractor is responsible for proper container disposal in accordance with label instructions.
- 21.16: Controlling Pesticide Drift during Spray Application — The objective of this BMP is to minimize risk of pesticides falling directly into water or non-target areas. The spray application of herbicides is accomplished according to a prescription which accounts for terrain and that specifies the following: spray exclusion areas, buffer zones, and factors such as formulation, equipment, droplet size, spray height, application pattern, flow rate, and the limiting factors of wind speed and direction, temperature, and relative humidity. On in service projects, the Forest Service project manager supervisor is responsible for ensuring the prescription is followed, whereas if contracted, the contracting officer is delegated the responsibility.

Additional Best Management Practices established by the FEIS for herbicide use include:

- Establish 1-mile limited spray zones adjacent to communities, private lands, recreation sites, trailheads, and scenic overlooks. Non-herbicidal treatment methods will be prioritized in these areas; only if these treatments are not successful will herbicides be used on deep-rooted perennial weeds.

- No mixing, loading, and equipment cleaning will be done within the limited spray zones, nor within 300 feet of the limited spray zones or private land.
- Application personnel will be trained by, and all application will be under direct supervision of, a Forest Service certified pesticide applicator (Region 3 Supplement 2100-98-1). All applicators must wear protective clothing as described on the label.
- All herbicide applications will follow EPA label requirements, USDA policy, and Forest Service direction (e.g., FSM 2150 Pesticide Use Management and Coordination; FSH 2109.11 Pesticide Project Handbook; FSH 2109.12 Pesticide Storage, Transportation, Spills, and Disposal Handbook; and FSH 2109.13 Pesticide Project Personnel Handbook).
- Herbicides will be transported daily to the project site under the following conditions: (a) transport only the quantity needed for that day's work, and (b) transport concentrate only in containers in a manner that will prevent tipping or spilling, and in a compartment that is isolated from food, clothing, and safety equipment.
- Mixing, loading, and equipment cleaning must be done onsite and at least 300 feet from the edge of a "Limited Spray Zone" or from private land (unless the owner is cooperating in the project), open water, known wellheads, or sensitive areas. Mixing and cleaning water must be transported to the site in labeled containers that are separate from water used for other purposes.
- Safety and spill plans will be written for each project.
- All herbicide containers will be disposed of in accordance with label, State, and Federal requirements.

## **Required Protection Measures Herbicide Treatments in Identified Species Habitats**

Appendix B of the Final Environmental Impact Statement (FEIS) for Treatment of Noxious and Invasive Weeds, Coconino, Kaibab and Prescott National Forests, and Coconino, Mohave and Yavapai Counties, Arizona (2005) includes required protection measures for threatened, endangered and sensitive species (TES) as well as for migratory birds, including management indicator species, partners in flight and Region 3 sensitive species. Only one herbicide treatment, for a population of camelthorn (see table below) is proposed for the project. No TES species, management indicator species or migratory bird species are known to exist on the site of the camelthorn infestation. Therefore, the Required Protection Measures for Herbicide Treatments that were included in the draft EA for this project have been removed. The reader should refer to the noxious and invasive weed FEIS if they wish to review the measures.

## Noxious Weeds Management Recommendations

The following table lists possible activities to eradicate or contain/control weed populations that may be affected by proposed thinning and burning treatments in the project area. These activities may change depending on current conditions of weed populations before, during, or after thinning and burning. Proposed weed treatment methods may change as well if new methods are available that have similar effects on the environment and meet species' objectives listed in the Forest Plan.

Treatments are listed in order of priority from Forest Plan direction. Thinning and burning implementation is likely to occur up to 10 years and should be conducted according to these priorities, where possible.

Species	Priority	Species objective <sup>3</sup>	Location/ Site	Treatment Proposed in Area	Size of infestation (acres)	Proposed Weed Treatment Method	Timing	Notes
Yellow Starthistle	1	Eradicate	289/2	Hand thin and prescribed burn	0.4	Hand Pull	Treat before implementation. Monitor post-treatment	
Camelthorn	2	Contain/ Control	247/4	Mechanical thin and prescribed burn	1	Herbicide	Visit to confirm species identification and population size before implementation. Treat before Implementation. Monitor after herbicide treatment.	Treatment of this species within the limited spray zone is permitted in the Weed EIS. Manual treatment (hand pulling) will not effectively control species and no biocontrol insects are currently available.
Musk thistle	3	Eradicate	281/12 and 271/01	Prescribed burn	2.6	Hand pull	Visit to confirm species identification and population size before implementation.	

<sup>3</sup> Treatment Objectives are derived from Forest Plan direction.

Species	Priority	Species objective <sup>3</sup>	Location/ Site	Treatment Proposed in Area	Size of infestation (acres)	Proposed Weed Treatment Method	Timing	Notes
Diffuse knapweed	4	Contain/ Control	281/4, 278/2, 260/3, 260/15	Mechanical thin and prescribed burn	unknown	Biocontrol insects	Locate appropriate release sites, introduce biocontrol insects to infestations after fuel treatments have occurred, and release insects. Monitor after introduction for two years	These infestations are within the limited spray zones, less than 1 mile from private property and recreation sites. Therefore use of herbicide is restricted and other control methods should be used first.
Diffuse knapweed	5	Contain/ Control	278/13, 255/2	Hand thin and prescribed burn	unknown	Biocontrol insects	Locate appropriate release sites, introduce biocontrol insects to infestations after fuel treatments have occurred, and release insects. Monitor after introduction for two years	These infestations are within the limited spray zones, less than 1 mile from private property, recreation sites, etc. Therefore use of herbicide is restricted and other control methods should be used first.

Species	Priority	Species objective <sup>3</sup>	Location/ Site	Treatment Proposed in Area	Size of infestation (acres)	Proposed Weed Treatment Method	Timing	Notes
Diffuse knapweed	6	Contain/ Control	271/01, 271/10, 300/10, 300/2, 289/8, 255/3, 270/3, 206/18	Prescribed burn	unknown	Biocontrol insects	Monitor previously introduced biocontrol insects Before implementation - evaluate site and mitigate effects to biocontrol agents if needed Monitor after introduction for two years	These infestations are within the limited spray zones, less than 1 mile from private property, recreation sites, etc. Therefore use of herbicide is restricted and other control methods should be used first
Dalmatian toadflax within habitat of Flagstaff Pennyroyal	7	Contain/ Control	318/2, 314/10, 314/9, 314/6, 314/4, 314/8, 314/7, 314/11, 314/2	Mechanical thin and prescribed burn	unknown	Biocontrol insects	Post-treatment of thinning and burning. Monitor after introduction for two years	
Dalmatian toadflax within habitat of Flagstaff Pennyroyal	8	Contain/ Control	120/17, 317/10, 318/3, 318/7	Hand thin and prescribed burn			Post-treatment of thinning and burning. Monitor after introduction for two years	
Dalmatian toadflax within habitat of Flagstaff Pennyroyal	9	Contain/ Control	120/9, 120/10, 120/12, 120/13, 12/15, 120/22, 314/4, 314/9, 314/12, 316/12, 317/2, 317/3	Prescribed burn			Post-treatment of thinning and burning. Monitor after introduction for two years	

