

Proposal

Pinaleño Ecosystem Restoration Project (PERP)

The Safford Ranger District, Coronado National Forest is proposing the Pinaleño Ecosystem Restoration Project (PERP), located on the Pinaleño Mountains near Safford, Arizona. The 5,754-acre project area is located in Graham County, Townships 8 and 9 South, Ranges 23 and 24 East. The treatments proposed are on approximately 3,705 acres within the project area, and would consist of thinning dense forests, removing some standing dead trees and down woody debris, and using prescribed fire to begin restoring what was once a fire-adapted ecosystem (see attached map). These treatments would be carried out over the next 10 years. The proposal balances reducing the potential for damaging wildfire with retaining the forest structure needed for wildlife. This project is designed to provide long-term protection to the endangered Mount Graham red squirrel (*Tamiasciurus hudsonicus grahamensis*) and its habitat by reducing potential for insect and disease outbreaks and damaging wildfires, in accordance with the Mount Graham Red Squirrel Recovery Plan (USDI Fish and Wildlife Service 1993). Overall, the project is designed to improve long-term sustainability of the ecosystem and habitat for the species that depend upon it.

Background

The Pinaleño Mountains are a special place. With majestic Douglas-fir trees that are more than 700 years old, the mountains have been an important desert refuge for wildlife, Native Americans, early settlers, recreationists, and researchers. There is an increasing broad-based concern that the very attributes that make the Pinaleño's a special place are at an unacceptably high risk of loss from potential catastrophic wildfires and declining forest health, and that something urgently needs to be done to reduce the risks and scale of these types of potential losses.

The PERP project has been developed over several years in response to events that have occurred in the Pinaleño Mountains. Active fire suppression and other factors over the past 100 years have

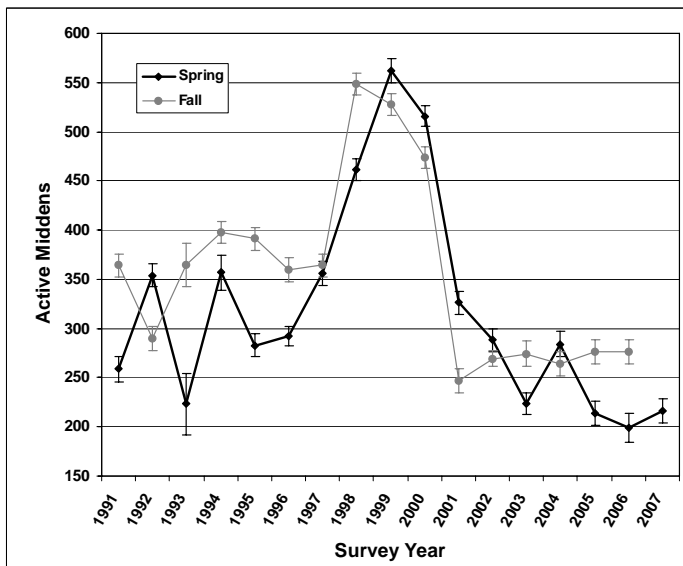


Figure 1. Mount Graham red squirrel population

drastically reduced the role of natural fire, causing the Pinaleño Mountain forests to become dense and filled with dead and down trees. These conditions have led to a very high potential for severe wildfires. In 1996 and 2004, large wildfires burned with active crown consuming fire and directly reduced red squirrel population numbers through habitat loss and mortality (Koprowski et al. 2006). Progressive insect infestations, beginning in 1996, began defoliating and killing trees in the spruce-fir and mixed-conifer forests. The tree mortality associated with these outbreaks has resulted in increased wildfire potential and a decline in the red squirrel population through habitat loss and decreased cone crops. Population numbers of the red squirrel are at their lowest average since censuses of the population began and

viability of the species is of paramount concern (Figure 1).

In response to these conditions, the Forest Service has worked closely with the State of Arizona Game and Fish Department and the U.S. Fish and Wildlife Service. This collaboration developed a proposed action that was distributed to the public in May 2005. Based on public input and continued population declines of the squirrel, the planning team determined that the project is inherently tied to protection and maintenance of red squirrel habitat, and treatment design should address ways to protect and perpetuate squirrels as a primary consideration. Additional collaboration with researchers, biologists, foresters, and wildland fire management experts developed actions that meet this new focus including the incorporation of Midden Protection Zones. This concept balances the long-term need to restore habitat for the squirrel while ensuring that no treatments will occur in currently occupied habitat considered necessary for the short-term protection of the species. The resulting proposal protects occupied habitat, reduces the potential for wildfire and insect and disease outbreaks, and manages for long-term sustainability of red squirrel habitat.

The Coronado National Forest Land and Resource Management Plan (LRMP), 1986 as amended, recognizes the importance of the Pinaleño Mountains unique social and natural resource values. It guides the management and vision for the project area. Actions proposed under the Pinaleño Ecosystem Restoration Project area are in LRMP Management Area 2 (dispersed recreation, mixed-conifer), Management Area 2A (wilderness values, enhanced wildlife) and Management Area 8 (research). The LRMP states that management for the Mt. Graham red squirrel is a primary objective. Wildlife-related sections of the LRMP that guide the project are:

Management Area 2

LRMP p. 51

“Monitor squirrel populations and habitat annually through inventory and analysis. Red squirrel habitat needs will supersede the needs of all other species.”

“Maintain and improve occupied habitat for: Mount Graham red squirrel... [and]...Mexican spotted owl”

“Improve old growth spruce-fir and mixed-conifer forest habitat for the Mount Graham red squirrel.”

LRMP p. 52

“Within suitable habitat for Mount Graham red squirrel (Pinaleño Mountains), dead and down material will not be removed for fuelwood except for on-site recreational use.”

LRMP p. 52

“Within suitable habitat for Mount Graham red squirrel (Pinaleño Mountains), Christmas trees will not be harvested.”

Management Area 2A (LRMP Amendment No. 4, January 1989, and Forest Plan Amendment No. 8, June 1996)

LRMP p. 54-2

“...Red squirrel habitat needs will supersede the needs of other species.”

“Improve current habitat for the endangered Mount Graham red squirrel and work toward delisting. Emphasize establishment and maintenance of old growth forests within the entire management area.”

LRMP p. 54-3 - Wildlife Habitat Maintenance (C09, C11) Non-game Habitat Improvement

“Improve old growth spruce-fir and mixed-conifer habitat conditions.”

“Within the Management Area, removal is limited to research, sanitation and salvage operations, and maintenance and improvement of wildlife habitat.”

“Use of down woody material for firewood is restricted to on-site recreational use within areas open to public use.”

LRMP p. 54-5

“Utilize prescribed fire to reduce risk from wildfire and enhance wildlife values with emphasis on red squirrel habitat.”

“Within other (non-wilderness) areas, outbreaks of insects or disease will be controlled using integrated pest management concepts when there is significant danger to the vegetation needed to sustain habitat for the Mount Graham red squirrel....”

Management Area 8

LRMP p. 75

“Maintain or improve occupied habitat for federally and state listed animals.”

“Delist threatened and endangered species and reoccupy historical habitat with other identified species following guidelines of approved recovery plans and memorandums of understanding.”

LRMP Amendment No. 8, June 1996, Regional Mexican Spotted Owl (MSO), Northern Goshawk (NGH) and Old Growth Amendment

LRMP p. 15 -18 – MSO

“(These standard and guides (S and Gs) are superseded by red squirrel S and Gs when necessary only in red squirrel habitat on Mount Graham in Management Area 2 or 2A.)”

“Management activities necessary to implement the Mount Graham red squirrel recovery plan, which may conflict with standards and guidelines for the Mexican spotted owl, will take precedence and will be exempted from the conflicting Mexican spotted owl standards and guidelines.”

LRMP p. 19 - NGH

“These S and Gs are superseded by red squirrel S and Gs when necessary only in red squirrel habitat on Mount Graham in Management Areas 2 or 2A. The northern goshawk standards and guidelines apply to the forest and woodland communities described below that are outside of Mexican spotted owl protected and restricted areas. Within Mexican spotted owl protected and restricted areas, the Mexican spotted owl standards and guidelines take precedence over the northern goshawk standards and guidelines.”

The Forest Plan is clear that the Mount Graham red squirrel recovery efforts take precedence over the Mexican spotted owl (*Strix occidentalis lucida*), northern goshawk (*Accipeter gentilis*) and old growth standards and guidelines. The primary guidance for the protection and recovery of the red squirrel is contained in the recovery plan for the species.

Guidance from the Mount Graham Red Squirrel Recovery Plan

Objective:

- “To increase and stabilize the existing Mount Graham red squirrel population by protecting existing habitat and restoring degraded habitats.” (p. iii)
- “Protection that may prevent the extinction of the squirrel includes: (1) establishment of habitat management zones (See Appendix A), ... (5) forest management to reduce the probability of habitat destroying fires, and...”(p. 16)
- “Protection and restoration of habitat. This is the most important factor for continued survival of the Mount Graham red squirrel. Because habitat is limited, further habitat losses could cause extinction in the near future. Many areas of potentially suitable habitat are degraded. Restoration of degraded areas is essential.” (p. 24)

Purpose of the Project

The purpose of the PERP project is to initiate forest restoration to protect the existing Mount Graham red squirrel habitat and key ecosystem components. By changing forest composition, structure, and density, the project is expected to reduce the potential for severe wildfires that could destroy red squirrel habitat. The project is also designed to reduce future insect and disease infestations, and to provide for the maturation and sustainability of future red squirrel habitat. Implementing the proposal would achieve the following goals:

- Initiate forest restoration efforts within the project area using guidelines provided in the Mount Graham Red Squirrel Recovery Plan
- Initiate the restoration of ecological processes, including the natural fire regimes (high-frequency and mixed-severity regimes)
- Improve forest health by improving the resiliency of overstory trees to insect and disease outbreaks
- Within the project area, reduce the risk of stand-replacing crown fire and its threat to the red squirrel and other important threatened and endangered wildlife habitat and forest ecosystems
- Protect or promote late-successional (old-growth) forest conditions
- Improve firefighter safety

Need for the Project

For the Forest Service and those studying the project area, it has been clear that the Pinaleños and its unique resources are at risk. Comparing the existing conditions in the project area to those as envisioned by the LRMP and the collaborative efforts of the planning team define the basis for a need to act in the project area.

Existing Conditions

As described in previous sections, the Pinaleño Mountains are currently susceptible to wildfire, insect and disease outbreaks, and the population of red squirrel has declined precipitously (Koprowski, Alanen and Lynch 2005).

Recent field observations of fuel-loading and forest stand examinations indicate that the Pinaleño forest ecosystem is characterized by a large quantity of dead trees and a dense understory of small- and medium-sized trees. Based on an inventory of stands (Table 1), the project area has a high average stand density index (SDI). SDI is an indicator of site occupancy by trees and is used as a measure of stress on trees in a stand. Tree mortality brought on from the stress of competition between individual trees for water, light, and nutrients is generally assumed to begin between 55 and 65 percent of maximum stand density, while individual tree health is best maintained when the forest densities are below 35 percent of the maximum (Liliehalm et al. 1994). The stands in the project area currently have a forest density averaging 73 percent of the maximum potential of a mixed-conifer forest.



Figure 3. Dense forested stands of the Pinaleños with insect mortality

Table 1. Forest stand averages of live and dead trees based on a 1996 inventory of the 214 stands within the project area

Species	Basal Area Live Trees (ft ² /ac)	Stand Density Index	Average Live Tree Diameter	Basal Area Dead Trees (ft ² /ac)	Average Dead Tree Diameter
White fir	31.9	64	10.6	5.2	15.4
Corkbark fir	13.3	30	7.1	5.5	11.5
Englemann spruce	18.2	37	10.3	3.6	13.9
Ponderosa pine	14.0	25	15.9	8.3	16.8
SW white pine	39.7	76	11.5	4.7	14.7
Aspen	17.0	38	8.8	3.5	11.4
Douglas-fir	82.1	153	14.6	13.5	22.4
Hardwoods*	2.1	12	5.4	0.3	5.1
Total	218.4	435	8.6	46.3	15.1

*Primarily locust, oak, and maple species.

Late-successional trees such as Engelmann spruce (*Picea engelmannii*), white fir (*Abies concolor*), and corkbark fir (*Abies lasiocarpa* var. *arizonica*) are now common in the understory, while many early successional tree species such as ponderosa pine (*Pinus ponderosa*) are dying in the overstory and not regenerating within the stands. The high stand densities within the mixed-conifer communities of the Pinaleños make the forest susceptible to further insect and disease outbreaks. Further, forest stand inventories show little or no regeneration of Douglas-fir, a key old growth tree species and a primary food source of the Mount Graham red squirrel (MGRS). The data also reveal that a greater proportion of larger trees are dying, which represents a serious long-term trend of degrading old growth forest characteristics. This loss is driven by stress from high stand densities, which were historically regulated by more frequent, mixed-severity wildfires in southwestern mixed-conifer forest ecosystems (Dieterich 1983, Graham et al. 1995).

The high stand densities and the amount of standing dead and down trees create a forest susceptible to uncharacteristic wildfire. In addition, insect activity and tree mortality have significantly increased in the Pinaleño Mountains in the past two decades (USDA Forest Service 1999, 2000, 2001, 2002, 2003, 2004, 2005). These insect outbreaks and the high-intensity fires that occurred have destroyed large areas of wildlife habitat, including critical habitat for the red squirrel (Koprowski, Alanen and Lynch 2005, Merrick et. al. 2007) and Mexican spotted owl. The fires increased the potential for soil erosion and flooding, diminished the scenic and recreational values of the forest, and damaged or destroyed public and private property.

Historic Condition

By examining the fire history of the area before European settlement, one can better understand why the vegetation structure and composition of the project area are significantly different today. Tree-ring studies conducted at Peter's Flat and Camp Point (Grissino-Mayer et. al. 1994) and later near Webb Peak show that widespread fires occurred frequently up until that time, but noticeably declined after. These studies also indicate that the forest consisted of stands of mixed-conifer species, primarily Douglas-fir (*Pseudotsuga menziesii*), southwestern white pine (*Pinus strobiformis*), and ponderosa pine (*Pinus ponderosa*), with inclusions of lesser amounts of white fir (*Abies concolor*), Engelmann spruce (*Picea engelmannii*), and corkbark fir (*Abies lasiocarpa* var. *arizonica*). The proposed project area historically experienced a frequent to mixed fire regime, with highly variable average fire return intervals, ranging from 3 to 60 years, depending largely upon each fire's location on the landscape (Swetnam, Baisan and Grissino-Mayer in press, Proceedings Mount Graham Red Squirrel Symposium). The result was a complex and highly diverse landscape with a mosaic of varying vegetation patterns. Fire created more openings and aspen groves, reduced the occurrence of fire-sensitive species, removed younger age classes of trees, and minimized the accumulation of dead trees on the forest floor. Fires tended to confine Engelmann spruce and corkbark fir to riparian areas, to moist pockets of mixed-conifer stands, and the highest elevations of the mountain.

Site-specific tree-ring data studies conducted in the Pinaleño Mountains indicate that the last widespread fires on the mountain occurred in 1879, and concluded that recent fire suppression had resulted in a current fuels buildup that is unprecedented for more than 500 years (Grissino-Mayer et al. 1994). This pattern of change is repeated in other mixed-conifer forest types in the Southwest (Dieterich 1983, White and Vankat 1993, Swetnam, Baisan and Kaib 2001, Fulé et al. 2003, Sakulich and Taylor 2007). From these studies and the 1996 data shown in Table 1, it can be concluded that far-reaching changes have occurred in forest stand densities, tree age-class distributions (shifts to smaller and younger trees), and in species composition of stands (shifts from

fire-tolerant to fire-intolerant species). Similar shifts have been documented in other southwestern forests (Cooper 1960, White and Vankat 1993, Fulé et al. 2003, Moore, et al. 2004).

Desired Condition

The Mount Graham Red Squirrel Recovery Plan (Appendix A, p. 34) defines the following desired conditions for excellent squirrel midden and foraging habitat in the spruce-fir and mixed-conifer vegetation associations on Mount Graham:

- Forest structure should consist of a nearly continuous multi-layered forest with overhead canopy closure greater than 80 percent.
- Basal area of live and dead trees of at least 65 m²/ha (275 ft²/ac) with groupings of 0.031 ha (0.078 ac) of large dominant trees greater than or equal to 40 cm (16 inches) diameter at breast height (dbh) associated with greater than or equal to 5 to 8 logs and 1 to 2 standing snags greater than or equal to 40 cm (16 inches) dbh (Mannan and Smith 1991).
- Snags 10 to 15 per ha (4 to 6 snags/ac) that are greater than or equal to 40 cm (16 inches) dbh.

Canopy Closure: the degree to which the canopy (forest layers above one's head) blocks the sunlight or obscures the sky.

Basal Area (ba): a measure of tree density determined by estimating the cross-sectional area of all trees (usually live trees only) at 4.5 feet above the ground. Basal area is expressed as square feet per acre (or square meters per hectare).

Snags: standing dead trees.

Recommended Red Squirrel Habitat Management Zones

Zone 1 areas are currently occupied, and have a high midden density. These areas are critical to the short-term survival of the squirrel. In Zone 1 areas, a maximum level of habitat protection is recommended by the Recovery Plan. This includes protection from catastrophic fire, and disease control.

Zone 2 contains suitable occupied habitat but with lower squirrel densities than Zone 1. Zone 2 is believed to include important dispersal corridors for the red squirrel. Management recommendations are for protection from habitat loss caused by fire and disease, and for necessary silvicultural treatments based on habitat analysis.

Zone 3 has currently suitable or potentially suitable habitat, but has more dispersed midden sites than Zones 1 or 2. The recovery plan recommends that this zone be managed to provide suitable habitat within 20 to 60 years through silvicultural techniques to improve the habitat.

Zone 4 has high long-term (100 to 200 years) potential as red squirrel habitat. Management recommendations for this zone include intensive silvicultural treatment to obtain the sites' full habitat potential.

- Logs, as many as possible, need to be maintained, especially those in the latter stages of decay.

Suitable habitat generally contains many but not all of the optimal characteristics, and habitat recommendations may be modified based upon results from further research and monitoring. Missing in this microhabitat description is an indication of forest and landscape-level parameters and the heterogeneous landscape mosaic typical of historical mixed-conifer forests. Instead, the plan partially deals with this through Habitat Management Zone descriptions, which are based on current and potential red squirrel habitat (see text box).

The Pinaleño Ecosystem Restoration Project area is primarily within Habitat Management Zones 1 through 4. The zone designations reflect whether an area is currently occupied by red squirrel, distribution of current habitat, and potential capacity of the forest to develop into the desired condition.

The implementation of these management zones is designated as a Priority 1 task in the Mount Graham Red Squirrel Recovery Plan under Task 121. A priority 1 task is defined by the Recovery Plan as an action that must be taken to prevent extinction or prevent the species from declining irreversibly in the foreseeable future.

Since the Recovery Plan was finalized in 1993, much of what was Zone 1 was affected by a series of insect outbreaks, which killed much of the Engelmann spruce and corkbark fir (Koprowski, Alanen and Lynch 2005), and the Nuttall-Gibson Fire Complex in 2004 (Koprowski et al. 2006). The moist mixed-conifer forest is now the primary remaining habitat for the red squirrel. These events both heightened the current concern for protecting remaining habitat, and raised the need for restoring degraded habitat.

Conclusion and Need Statements

1. **Project Need 1:** From these observations, it is estimated that today's fuel loads and stand densities are much greater than historic forest conditions, leaving the forest increasingly vulnerable to disease, insect infestations, and fire. The ecological implications of these shifts have led to increased susceptibility to insect outbreaks and stand-replacing fires (Dieterich 1983, White and Vankat 1993, Fulé et. al. 2004, Moore et. al. 2004).

Therefore, **there is a need to initiate a restoration effort that seeks to restore ecological processes and treat the causes of declining ecosystem health by reducing stand densities, changing understory species composition, and reducing fuel loading.** Restoration seeks to trend forests toward a condition that is self-sustaining and compatible with the conditions under which they naturally evolved (Friederici 2003), employing a strategy emphasizing ecological functions and processes (Falk 2006).

2. **Project Need 2:** According to the Mount Graham Red Squirrel Recovery Plan, the main threats to this subspecies are habitat loss and catastrophic wildfire. Over the past 20 years, approximately 50 percent of previously occupied red squirrel habitat has been rendered unsuitable due to insect outbreaks and fire (Koprowski 2005, Koprowski, Alanen, and Lynch 2005, Koprowski et al. 2006). Associated with this reduction in habitat, there is an accompanying decline in population size; the current population estimate is 216 squirrels (AGFD 2007, unpublished data). As such, the remaining habitat, most of which falls within the project area, is of high importance.

Therefore, **a need exists to protect red squirrel habitat within the project area from losses due to fire, insect outbreaks, and diseases, and to restore areas of degraded habitat for this subspecies.**

Proposed Action

To meet these needs, the Safford Ranger District proposes two general actions:

1. Reduce vegetation on approximately 3,705 acres using a combination of silvicultural or fuels reduction treatments or both.
2. Amend the Land and Resource Management Plan for the Coronado National Forest to allow regulated Christmas tree removal and public fuelwood gathering associated with treatment prescriptions and temporarily allowing exceptions to the visual quality objectives in the project area.

All actions include resource-specific design criteria that guide the manner in which the actions are implemented to minimize or reduce anticipated effects. These design criteria are listed in Attachment A. The entire project is expected to take 10 years to complete.

Proposed Action 1: Silvicultural and or Fuel Reduction Treatments

Silvicultural Treatments

The proposed action prescribes 59 different combinations of vegetative treatments. These combinations follow two general treatment strategies referred to as “Forest Restoration” or “Important Wildlife Areas.” Forest restoration treatments occur outside of known Mount Graham red squirrel midden areas and Mexican spotted owl core areas. This treatment strategy was designed to initiate forest restoration as described in Project Need 1 and restore areas of potential red squirrel habitat as described in Project Need 2.

The Important Wildlife Area treatment strategy is proposed in areas that contain Mount Graham red squirrel middens, Mexican spotted owl core areas, or both. This strategy is also designed to initiate forest restoration as described in Project Need 1 and to protect and restore degraded red squirrel habitats as described in Project Need 2.

As a means to protect areas with active red squirrel middens, biologists using the Mount Graham Red Recovery Plan, current research information and maps of active red squirrel middens established Midden Protection Zones, encompassing all but two isolated middens, which will be buffered individually. These protection zones will not be treated under this proposal.

During the project planning process, general treatment prescriptions (General Rx) were first developed for the two treatment areas. As a result of stand-by-stand analysis of stand data, tree mortality from insects and wildfires, access for treatments, and other resource concerns, the general treatment prescriptions for some treatment units were modified (Table 2). Treatments were organized into three components: silvicultural treatments, fuels treatments, and removal methods. Silviculture treatments refer to treatment of live and dead standing trees. Fuel treatments refer to treatment of down woody fuel (including that created by the silvicultural treatments). Removal methods refer to treatments that include removing down woody material off site.

Forest Restoration Treatment Area-General Prescription (General Rx)

This treatment is a combination of variable density thinning, thinning from below, and group selection. Within the confines of an 18-inch maximum cut diameter limit and a minimum 150 ft² per acre basal area (see text box) stand stocking level target, the thinning treatments would create forest stands that are very diverse in structure and stocking level. Figure 3 shows a forest stand (not in the project area) that is being managed under a group selection method that has a high degree of structural and stocking level diversity. The proposed treatments would create stands similar in appearance.

Specific design features for the treatment are (apply to General and Modified Prescriptions):

1. Using a group selection method, stands would be subdivided into five (5) size/age classes (not counting the grass-forb/seedling stage). The age/size classes would be based upon the vegetative structural stage (VSS) size-class breaks (see next page).
2. Individual groups would range in size from 0.25 to 1.25 acre.
3. Trees up to 18 inches in diameter-at-breast-height (dbh) could be cut.
4. Average stand stocking would be reduced to about 150 ft² basal area per acre (34 m²/ha).
5. The thinning would be variable density, in which some groups within the matrix are thinned to a wide spacing, and some groups are thinned to a close spacing or not thinned at all. In general, the widely spaced group density would range from 25 percent to 45 percent of the maximum stand density index (SDI) for Douglas-fir. The closed canopy groups would average greater than 45 percent maximum SDI for Douglas-fir.
6. Heavily thinned groups would be located around aspen clones, ponderosa pine patches, and relics of ponderosa pine patches, or old growth Douglas-fir patches. This would enhance the growth and vigor of, or regenerate these components, as well as reduce bark beetle risk to the conifers.
7. The ratio of closed canopy to open canopy groups would be 2 to 1.



Figure 3. Ponderosa pine stand managed under a group selection regime showing a variety of age/size class groups and stocking levels including openings

Table 2. Summary of silvicultural treatments proposed by treatment area

Treatment Area		Silvicultural Treatment	Acres
Forest Restoration	General Rx	Thin trees <18 in. dbh; Follows MSO restricted targets (150 ba and residual stocking proportioned over multiple VSS classes)	1,688
	Modified Rx 1	Reduce dead trees in snag pockets (0.25 to 1.25 ac group size) up to 18 in. dbh to 6 snags/acre; General Rx in remainder	85
	Modified Rx 2	Reduce dead trees in snag pockets (0.25-1.25 ac group size) up to 18 in. dbh to 6 snags/acre; No live tree thinning	112
	Modified Rx 3	Reduce dead trees in snag pockets (0.25-1.25 ac group size) up to 18 in. dbh to 6 snags/acre; Thin live <9 in. dbh in remainder	10
	Modified Rx 4	Thin trees <12 in. dbh; Follows MSO Restricted Targets (150 ba)	47
	Modified Rx 5	Thin trees <9 in. dbh; Follows MSO Restricted Targets (170 ba)	213
Important Wildlife Area	General Rx	Thin trees <9 in. dbh; Follows MSO Restricted Targets (170 ba and residual stocking proportioned over multiple VSS classes)	752
	Modified Rx 6	Reduce dead trees in snag pockets (0.25-1.25 ac group size) up to 18 in. dbh to 6 snags/acre; No live tree thinning	42
	Modified Rx 7	Reduce dead trees in snag pockets (0.25-1.25 ac group size) up to 18 in. dbh to 6 snags/acre; Thin live <9 in. dbh	67

Rx- Prescription
 ba: basal area
 dbh: diameter at breast height
 MSO: Mexican spotted owl
 VSS: Vegetation structural stage

Forest Restoration Areas-Modified Prescriptions

Rx 1. Reduce dead trees in snag pockets (0.25-1.25 acre group size) up to 18 inches dbh to 6 snags/acre; General Rx thinning in remainder

In these treatments, dead trees less than 18 inches in dbh would be removed from groups of large numbers of dead trees (snag pockets) of 0.25 to 1.25 acres in size. A minimum of 6 of the largest and soundest snags available would be retained per acre within the groups. Species that tend to have long snag longevity (such as Douglas-fir) would be favored for retention over those tree species that do not (such as aspen). Outside of the snag pockets, dead trees up to 9 inches in dbh would be cut. Live trees less than 18 inches dbh would be thinned as described above for the “Forest Restoration Treatment Area-General Rx” treatment. Following tree cutting, down woody material would be reduced to less than 15 tons per acre throughout the area. See Section “Removal Methods” (below) for methodologies that will be used to accomplish this prescription.

- Rx 2.** Reduce dead trees in snag pockets (0.25-1.25 ac group size) up to 18 inches dbh to 6 snags/acre; No live tree thinning

In these treatments, dead trees less than 18 inches in dbh would be removed from groups of large numbers of dead trees (snag pockets) of 0.25 to 1.25 acres in size. A minimum of 6 of the largest and soundest snags available would be retained per acre within the groups. Species that tend to have long snag longevity (such as Douglas-fir) would be favored for retention over those tree species that do not (such as aspen). Outside of the snag pockets, all dead trees up to 9 inches dbh would be cut. Following tree cutting, down woody material would be reduced to less than 15 tons per acre throughout the area. See Section “Removal Methods” (below) for methodologies that will be used to accomplish this prescription.

- Rx 3.** Reduce dead trees in snag pockets (0.25-1.25 ac group size) up to 18 inches dbh to 6 snags/acre; thin live trees less than 9 inches dbh.

In these treatments, dead trees less than 18 inches in dbh would be removed from groups of large numbers of dead trees (snag pockets) of 0.25 to 1.25 acres in size. A minimum of 6 of the largest and soundest snags available would be retained per acre within the groups. Species that tend to have long snag longevity (such as Douglas-fir) would be favored for retention over those tree species that do not (such as aspen). Outside of the snag pockets, dead trees up to 9 inches in dbh would be cut. Live trees less than 9 inches dbh would be

VSS Classes

The Vegetation Structural Stage (VSS) of a stand, group (2 to 4 acres), or clump (0.1 to 0.5 acres) is based on the predominate diameter class within the stand, group, or clump. These prescriptions will apply VSS classes primarily at the group and clump scale. The VSS classes are:

Grass-forbs/seedlings. Few trees greater than 1 inch dbh are present within the group. Total SDI is less than 10 percent of the maximum SDI for the forest type, or the basal area is less than 20 ft² per acre.

Saplings. Saplings, greater than 1 and less than 5 inches in dbh have the highest basal area of the six size classes represented.

Young forest. Trees greater than 5 inches and less than 12 inches dbh have the highest basal area within the group of the six size classes.

Mid-aged forest. Trees greater than 12 inches dbh and less than 18 inches dbh have the highest basal area of the six size classes.

Mature forest. Trees greater than 18 inches dbh and less than 24 inches dbh have the highest basal area of the six size classes.

Old forest. Trees greater than 24 inches dbh have the highest basal area of the six size classes.

thinned as described above for the “Forest Restoration Treatment Area-General Rx” treatment. Following tree cutting, down woody material would be reduced to less than 15 tons per acre throughout the area. See Section “Removal Methods” (below) for methodologies that will be used to accomplish this prescription.

Rx 4. Thin trees less than 12 inches dbh; follows MSO restricted targets (150 ba)

In these treatments, live trees less than 12 inches dbh would be thinned as described above for the “Forest Restoration Treatment Area-General Rx” treatment.

Rx 5. Thin trees less than 9 inches dbh; MSO restricted (170 ba)

In these treatments, live trees less than 9 inches dbh would be thinned as described above for the “Forest Restoration Treatment Area-General Rx” treatment.

Important Wildlife Treatment Area-General Rx

This treatment would be a combination of variable density thinning, thinning from below, and group selection. Within the confines of a 9-inch maximum diameter cut limit and a 170 ft² basal area minimum stand stocking level target, the thinning treatments would create forest stands that are diverse in structure and stocking level, but not as much so as those created by the Forest Restoration treatments. See Section “Removal Methods” (below) for methodologies that will be used to accomplish this prescription.

Specific design features for the treatment would be:

1. Using a group-selection method, the stands would be subdivided into five (5) size/age classes. The size/age classes would be based upon the vegetative structural stage size class breaks (as described above).
2. Individual groups would range in size from 0.25 to 1.25 acre.
3. Trees up to 9 inches dbh would be cut.
4. Average stand stocking would be reduced to about 170 ft² basal area.
5. The thinning would be variable density in which some groups within the matrix are thinned to a wide spacing, and some groups are thinned to a close spacing or not thinned at all. In general, the density of the wide spacing would range from 25 to 45 percent of the maximum SDI for Douglas-fir. The closed canopy groups would average greater than 45 percent of the maximum SDI for Douglas-fir.
6. Heavily thinned groups would be placed around aspen clones, ponderosa pine patches, relics of ponderosa pine patches, and old-growth Douglas-fir patches. This would enhance the growth and vigor of, or regenerate these components, as well as reduce bark beetle risk to the conifers.
7. The ratio of closed canopy to open canopy groups would be 2 to 1.

Important Wildlife Treatment Area-Modified Treatments

Rx 6. Reduce dead trees in snag pockets (0.25-1.25 ac group size) up to 18 inches dbh to 6 snags/acre; no live tree thinning

In these treatments, dead trees less than 18 inches in dbh would be removed from groups of large numbers of dead trees (snag pockets) of 0.25 to 1.25 acres in size. A minimum of 6 of the largest and soundest snags available would be retained per acre within the groups. Species that tend to have long snag longevity (such as Douglas-fir) would be favored for retention over those tree species that do not (such as aspen). Outside of the snag pockets, all dead trees up to 9 inches in dbh would be cut. Following tree cutting, down woody material would be reduced to less than 15 tons per acre throughout the area. See Section “Removal Methods” (below) for methodologies that will be used to accomplish this prescription.

- Rx 7.** Reduce dead trees in snag pockets (0.25-1.25 ac group size) up to 18 inches dbh to 6 snags/acre; thin live trees less than 9 inches dbh

In these treatments, dead trees less than 18 inches in dbh would be removed from groups of large numbers of dead trees (snag pockets) of 0.25 to 1.25 acres in size. A minimum of 6 of the largest and soundest snags available would be retained per acre within the groups. Species that tend to have long snag longevity (such as Douglas-fir) would be favored for retention over those tree species that do not (such as aspen). Outside of the snag pockets, dead trees up to 9 inches dbh would be cut. Live trees less than 9 inches dbh would be thinned as described above for the “Important Wildlife Treatment Area-General Rx” treatment. Following tree cutting, down woody material would be reduced to less than 15 tons per acre throughout the area. See Section “Removal Methods” (below) for methodologies that will be used to accomplish this prescription..

Fuel Reduction Treatments

Definitions used in this section are found on the following page.

In addition to the proposed silvicultural treatments, complementary fuels reduction treatments are proposed to meet Project Needs 1 and 2. In some units, the fuel treatments occur concurrently with the proposed silvicultural treatments, and in other treatment units the fuel treatments are the only proposed treatments. Table 3 displays proposed fuels treatment activity combinations; individual treatment activities are summarized in Table 4. Acreages for areas where a combination of “masticate” and “hand cut, pile, and burn” treatments are proposed include only the acreage total for “masticate” in Table 4. Acreage is displayed in this manner because hand cutting, piling, and burning would take place on only a very small portion of the area.

Table 3. Proposed fuels treatment activity combinations and acres

Fuels Treatment Activity Combinations	Acres
Lop-and-scatter	124
Lop-and-scatter; hand cut, pile, and burn	608
Lop-and-scatter; hand cut, pile, and burn; Follow-up underburn	1,004
Lop-and-scatter; underburn	1,356
Masticate	332
Masticate; hand cut, pile, and burn steep slopes; follow-up underburn	129
Underburn	153

Table 4. Proposed acres of individual fuels treatment activities

Fuels Treatment Activity	Acres
Lop-and-scatter	3,092
Hand cut, pile, and burn	1,612
Masticate	461
Underburn	2,642

Hand Cut, Pile, and Burn

Debris created by pruning, or tree thinning would be piled by hand and burned during conditions when risk of fire spread is low, and when smoke will be adequately dispersed. Where this treatment does not follow a silvicultural treatment involving thinning of live trees, then small standing dead trees less than 9 inches dbh, existing downed material, and pruned tree limbs (occasionally) would be treated. Hand piles would be placed away from downed logs greater than 16-inches dbh, be up to 6 feet high and 8 feet in diameter, and in order to prevent tree scorch, would be placed as far from the canopy drip-line of trees as possible. In addition to treatment units for which this activity is prescribed, it would also be applied within all treatment units along the Swift Trail (State Road 366, FS Road 803), Riggs Lake Road (FS Road 287), and the Bible Camp Road (FS Road 508). Along these roads, fuels would be cut, piled, and burned for a distance of up to 150 feet from the road edge. These treatments would not occur within red squirrel midden protection areas or in Mexican spotted owl core areas.

Lop and Scatter

Down trees and tree limbs would be cut by hand, and the material dispersed to reduce fuel concentrations. Where this treatment does not follow a silvicultural treatment, only small standing dead trees less than 9 inches dbh and existing down material would be treated.

Masticate

Standing and down trees as prescribed under the silvicultural treatments would be chopped, shredded, or chunked up by machine, and left on-site.

Underburn

Fuels would be reduced by prescribed burning with a low intensity-and-severity burn.

Pruning

Although not displayed in the tables above, trees would be pruned adjacent to the Swift Trail (State Road 366, FS Road 803), Riggs Lake Road (FS Road 287), and the Bible Camp Road (FS Road 508). Trees would be pruned to a height of 10-feet above the ground, or up to 1/3 of the tree height, whichever is less. Pruning distance from the road would be up to 150 feet from the road edge. This treatment would be applied only in the proposed treatment units along these roads and not in Mexican spotted owl cores.

Removal Methods

Trees would be removed from some treatment units and taken to collection points (landings) by a variety of methods and combinations of those methods (Table 5). The removal method proposed for a treatment unit depends upon a number of factors, including topography, availability of road

access, cost, and resource protection needs. Once material is removed from treatment units and taken to landings, it would be processed into sawlogs, firewood, or chips, and trucked from the project area or made available to the public. Some material may be piled and burned at the landing site. Descriptions of each removal method follow Table 5.

Table 5. Proposed removal methods (definitions follow)

Removal Methods	Acres
Whole-tree yard; hand cut; remove by ground-based equipment and cable	14
Whole-tree yard; hand cut; remove by ground-based equipment with cable	2
Whole-tree yard; hand cut; remove by skyline	944
Whole-tree yard; hand cut; remove by skyline and ground-based equipment with cable	96
Whole-tree yard; machine or hand cut; remove by ground-based equipment	1,178
Whole-tree yard; machine or hand cut; remove by ground-based equipment with cable	123
Whole-tree yard; machine or hand cut; remove by skyline	66
Whole-tree yard; machine or hand cut; remove by skyline and ground-based equipment	53
Whole-tree yard; machine or hand cut; remove by skyline and ground-based equipment with cable	36

Whole-tree Yard

Thinned trees would be transported from stump to the collection point or processing site (landing) with tops and limbs attached. Trees may be carried or dragged on the ground.

Hand Cut

Trees would be cut using hand-carried machines (e.g., chainsaws) to the desired stocking.

Remove by Ground-based Equipment with Cable

Thinned trees would be pulled from the site and taken to landings by a ground-based machine (skidder or tractor) equipped with a grapple or cable (chokers and winch). Ground contact by dragged material would occur.

Remove by Ground-based Equipment and Cable

Thinned trees would be pulled from the site to landings by a combination of a ground-based machine equipped with a grapple or cable (chokers and winch) for short distances and a small cable yarder or jammer (operating from existing roads or trails) for longer distances. No lateral skidding or material suspension would be required.

Remove by Skyline

Thinned trees would be transported from the site to landings by a skyline cable system. The stump end of trees being removed would be suspended, but in most cases the trees would not be fully suspended and ground contact would occur.

Remove by Ground-based Equipment

Thinned trees would be transported from the site to landings with a ground-based machine such as a skidder or forwarder.

Machine Cut

Thinned trees would be cut by a ground-based machine such as a track-mounted feller-buncher.

Proposed Action 2: LRMP Amendment

1. Opportunities exist to efficiently implement this project through stewardship contracting, volunteers, public fire wood collection, Christmas tree permits, local forest staff, timber sales, and service contracts. The Coronado LRMP limits activities that would allow the use of stewardship contracting and public fuelwood and Christmas tree utilization. Therefore, this proposal would amend the Coronado LRMP in the following sections to allow these activities:

LRMP page 52 – Management Area 2, Timber Sales Preparation and Administration

Current Plan: “3. Within suitable habitat for the Mount Graham red squirrel (Pinaleño Mountains), dead and down material will not be removed for fuelwood except for on-site recreational use.”

Proposed Change: “3. Within suitable habitat for the Mount Graham red squirrel (Pinaleño Mountains), dead and down material will not be removed for fuelwood except for on-site recreational use except within the boundaries of the Pinaleño Ecosystem Restoration Project (PERP) area in the Pinaleño Mountains during the active life of this project.”

And,

Current Plan: “4. Within suitable habitat for the Mount Graham red squirrel (Pinaleño Mountains), Christmas trees will not be harvested.”

Proposed Change: “4. Within suitable habitat for the Mount Graham red squirrel (Pinaleño Mountains), Christmas trees will not be harvested except within the boundaries of the Pinaleño Ecosystem Restoration Project (PERP) area in the Pinaleño Mountains during the active life of this project.”

2. Although the proposed project will better meet visual quality objectives for the long-term, treatments may not meet visual quality standards and guidelines in the LRMP in the short-term. Specifically, treatments in the foreground along Sensitivity Level 1 and 2 travelways and near developed recreation areas are not likely to meet the visual quality objective of “Retention.” Vegetation removal (and associated slash, stumps, stacked logs, and skid roads) and blackened vegetation and tree trunks from fuel reduction treatments will be visible to casual visitors. Therefore, this proposal would amend the LRMP in the following sections to allow these activities:

LRMP page 50 - Management Area 2, Management Emphasis and Intensity

Current Plan: "Visual quality objectives will be met"

Proposed Change: "Visual quality objectives will be met, except in areas within the Pinaleño Ecosystem Restoration Project (PERP) area in the Pinaleño Mountains designated as "Foreground Retention." In the PERP project area, during the active life of the project, a broad interpretation of this visual quality objective will be used. During the active life of the PERP project, visible evidence of thinning and underburning resulting from implementation of the PERP prescriptions will be allowed within the following constraints:

- (a) A visual mosaic of forest conditions, large trees, and small patches of more open ("park-like") stands may be created
- (b). Slash, stumps, logs, and skid trails in foreground areas along system roads and trails will generally be cleaned up within 1 year.
- (c) Effects from prescribed fire (blackened, scorched vegetation and tree trunks) may be visible for up to 3 years following treatments."

LRMP page 54 - Management Area 2a, Management Emphasis and Intensity

Current Plan: "Visual quality objectives will be met"

Proposed Change: "Visual quality objectives will be met, except in areas within the Pinaleño Ecosystem Restoration Project (PERP) area in the Pinaleño Mountains designated as "Foreground Retention." In the PERP project area, during the active life of the project, a broad interpretation of this visual quality objective will be used. During the active life of the PERP project, visible evidence of thinning and underburning resulting from implementation of the PERP prescriptions will be allowed within the following constraints:

- (a) A visual mosaic of forest conditions, large trees, and small patches of more open ("park-like") stands may be created
- (b). Slash, stumps, logs, and skid trails in foreground along system roads and trails will generally be cleaned up within 1 year.
- (c) Effects from prescribed fire (blackened, scorched vegetation and tree trunks) may be visible for up to 3 years following treatments."

LRMP page 59 - Management Areas 3a and 3b, Management Emphasis and Intensity

Current Plan: "Visual quality objectives will be met"

Proposed Change: "Visual quality objectives will be met, except in areas within the Pinaleño Ecosystem Restoration Project (PERP) area in the Pinaleño Mountains designated as "Foreground Retention." In the PERP project area, during the active life of the project, a broad interpretation of this visual quality objective will be used. During the active life of the PERP project, visible evidence of thinning and underburning resulting from implementation of the PERP prescriptions will be allowed within the following constraints:

- (a) A visual mosaic of forest conditions, large trees, and small patches of more open ("park-like") stands may be created.

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(b) Slash, stumps, logs, and skid trails in foreground along system roads and trails will generally be cleaned up within 1 year.

(c) Effects from prescribed fire (blackened, scorched vegetation and tree trunks) may be visible for up to 3 years following treatments."

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Attachment A

Project Design Features

Note: Design Features that apply to specific units are detailed in the project record by unit number.

Resource And Design Number	Project-wide (P) Site-Specific (S)	Design Feature
Wildlife		
Wildlife P1	P	Retain all hardwoods of all sizes, unless removal is necessary for use as staging/landing sites or for equipment passage.
Wildlife P2	P	Allow regeneration of all tree species by leaving some smaller than the diameter cut limit.
Wildlife P3	P	In any area where treatments (cutting or fire or removal of dead/down) are planned, that area must be swept for squirrel middens before the treatment. If middens are found, a biologist must consider whether to extend the Midden Protection Zone to include this midden (or these middens). At the very minimum, a 92-foot buffer will be provided around any midden site.
Wildlife P4	P	In areas where most effective, require MCH pheromone treatment after broadcast burning in mixed conifer stands.
Wildlife P5	P	Don't treat more than 50% of the Important Wildlife Treatment units within the first 5 years.
Wildlife R1	S	Retain a minimum of 6 of the largest logs per acre; if 6 logs per acre not available, consider using felled snags as logs (if burning, consider dropping snags after burn).
Wildlife R2	S	Retain 6 of the largest snags per acre.
Wildlife W1	S	Retain ALL logs greater than 16 inches in diameter; if there are not at least 6 logs per acre of greater than 16 inches, then leave 12 inch logs; if still not 6 logs per acre, then stack logs or leave slash piles at least 2 per acre.

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Resource And Design Number	Project-wide (P) Site-Specific (S)	Design Feature
Wildlife W2	S	Retain ALL snags greater than 9 inches.
Wildlife W3	S	Road Buffer: Within owl MSO core areas, default back to standard Wildlife Emphasis Area treatment.
Wildlife W4	S	MSO Core: No work will be conducted within owl core areas between March 1 and August 31.
Wildlife W5	S	MSO Cores, if prescribed for underburning, unit must first meet MSO retention standards per microhabitat monitoring in adjacent PAC
Wildlife WR1	S	After treatment is applied (allowing for snag and log retention based on site prescription), remove or treat slash within one year (pile and burn during cool season, October to March)
Wildlife WR2	S	Prior to Rx burning, create blackline or scratchline along boundary with Midden Protection Zones; burnout from Midden Protection Zone (if possible); rehabilitate lines after the burn
Wildlife WR3	S	In those areas where skid roads will be created, all roads will be rehabbed through re-contouring, re-seeding, dragging brush over them, and blocking further entry for public use. Downed trees will be placed perpendicular to and across the skid trails to allow for red squirrel travelways.
Wildlife WR4	S	Rehab landing piles and landing zones left after removal operations.

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Resource And Design Number	Project-wide (P) Site-Specific (S)	Design Feature
Recreation and Visuals/Scenery Management		
Recreation 1 and Visual Quality 1	P	Protect trees and vegetation to remain from damage, especially along roads and trails, and near recreation areas. (Select experienced operators to minimize damage).
Recreation 2 and Visual Quality 3	P	Avoid removing or burning vegetation that screens unsightly elements (especially buildings and utility structures) or provides screening of roadways from popular developed and dispersed recreation areas.
Visual Quality 2	P	Select trees to cut [near recreation sites, trails, and roads] with care to protect visual quality. Remove trees in irregular patches, avoiding treatments that result in linear edges. Remove trees in a way that retains natural "clumpiness" (groups of trees) rather than removal to obtain even spacing of trees. Leave many big trees, especially in the foreground along Swift Trail.
Recreation 3 and Visual Quality 4	P	Cut stumps visible from roads, trails, and recreation areas low (flush with ground if possible), and angle faces away from views. A second cutting of the stump to reach desired height may be necessary. Stumps adjacent to recreation areas should be scored or roughened to aid decomposition, and covered with a shovel of dirt or ash.
Recreation 4 and Visual Quality 5	P	Minimize the number of felled trees to remain on the ground [near roads, trails, and recreation sites]. If any felled trees are left, place them so the cut end faces away from viewing areas.
Recreation 5 and Visual Quality 6	P	Where possible, build slash piles away from travelways, and burn or chip them as quickly as possible. Avoid burning slash in a way that it burns surrounding vegetation to remain.
Recreation 6	P	Whenever possible, [near roads, trails, and recreation sites] avoid burning or blackening large trees and other major vegetation to remain.

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Resource And Design Number	Project-wide (P) Site-Specific (S)	Design Feature
Recreation 7 and Visual Quality 8	P	Obliterate all temporary roads and fire lines visible from system roads, trails, and recreation areas. Naturalize all disturbed ground in these areas by restoring grades if necessary, then tilling and seeding with native species. Place logs or boulders where needed to discourage people from driving vehicles into new openings. Boulders shall be placed in a random, non-linear fashion and partially buried to appear natural.
Visual Quality 7	P	Whenever possible, avoid burning or blackening large trees and other major vegetation to remain, especially along the Swift Trail.
Recreation 8 and Visual Quality 9	P	Interpret project activities. Place interpretive signs along the Swift Trail and/or within recreation areas where treatment is visible.
Recreation 9	P	Minimize delays for forest visitors. Schedule work that will require periodic road closures on days when roads are closed and/or days when fewer visitors will be traveling (i.e., weekdays, etc.).
Recreation 10	P	Protect visitors from hazards during project activities and from conditions following work.
Visual Quality 10	P	Where treatments along Swift Trail are highly visible (i.e., where numerous logs, debris, or slash piles are seen, or where blackened areas from fire is obvious), try to avoid treating over 1 continuous mile in any one year.
Recreation 11	P	Reconstruct trails damaged by project activities; ensure that project activities do not negatively affect planned trail work.
Visual Quality 11	P	Complete tree pruning along Swift Trail with care; utilize proper pruning techniques that preserve tree form.
Recreation 12	P	Where treatments near recreation sites would significantly change the character of the vegetation, leave some individual trees, clusters of trees, and/or islands of vegetation if this will not pose a ladder fuel risk.
Visual Quality 12	P	Along Swift Trail, encourage aspen, “park-like” conditions in Ponderosa Pine forest (widely spaced mature trees), and recovery of previously burned areas.
Recreation 13	P	Along trails, within 50 feet on both sides of trail, retain more understory vegetation.

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Resource And Design Number	Project-wide (P) Site-Specific (S)	Design Feature
Visual Quality 13	P	Reduce long-term effects of marking paint along roads and trails, and near recreation sites.
Visual Quality 14	P	Where clearings for landings or staging areas are visible from roads, trails, or recreation sites, remove vegetation in a way that mimics natural openings.
Visual Quality 15	P	If after 1 year, piles or lines around piles are still visible from Swift Trail, rehabilitate by scattering slash or covering with duff to reduce visual impact.
Watershed Management		
Watershed 1	S	Identify streamside management zones and protect as required.
Watershed 2	S	Use proper skid pattern management including locating skid trails to avoid stream courses and restricting skidders to designated trails. Two complementary methods of complying with water standards when tractor skid trails are designed: a. Endlining b. Felling to the Lead
Watershed 3	S	Do not locate landings in streamside management zones.
Watershed 4	S	Skid trails and landings will be treated by spreading slash or wood chips or by placing logs on portions of skid trails and landings.
Watershed 5	S	Skid trails and landings will be treated by scarifying the soil and the applying native seed mixtures.
Watershed 6	S	Stream course crossings must be designated prior to construction.
Watershed 7	S	Equipment shall not operate within streamside management zone. Streamside management zone boundaries may be modified by the sale administrator to meet unforeseen operation conditions.
Watershed 8	S	Logs will be endlined out of streamside management zones.

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Resource And Design Number	Project-wide (P) Site-Specific (S)	Design Feature
Watershed 9	S	Logs will be fully suspended in cable log harvesting operations within the streamside management zone.
Watershed 10	S	Construct water bars in firelines
Watershed 11	S	Reduce fuel loading in drainage channels.
Watershed 12	S	Maintain the integrity of the streamside management zone.
Watershed 13	S	Retain or plan for sufficient groundcover to prevent erosion of the burned site.
Silviculture		
Silv 1	P	General species retention preference for thinning conifer trees would be: ponderosa pine, Douglas-fir, southwestern white pine, white fir, Engelmann spruce and corkbark fir in descending order of preference. This order of preference may be modified for individual stands to take into account site specific factors and that order of preference given in design criteria, or stand/unit prescriptions supersedes this order.
Silv 2	P	No live hardwoods would be cut, except as needed for safety and operational purposes.
Silv 4	S	Where possible, slash created by thinning operations should be pulled from around aspen stems and scattered for underburning away from the aspen, or hand piled and burned no closer than 15 feet from the stem.
Silv 5	S	During underburning, fire ignition should be halted outside of aspen regeneration and then a backing fire allowed to burn through the regeneration.
Silv 6	P	During thinning operations, trees should be directionally felled outside of the clone and where necessary pulled out from the clone by cable to minimize mechanical damage to the aspen.
Silv 8	P	No trees over 18 inches dbh should be cut unless they are considered a safety hazard or as needed for purposes associated with equipment or implementation operations.

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Resource And Design Number	Project-wide (P) Site-Specific (S)	Design Feature
Silv #9 - #17 Design Criteria are the Modified Prescriptions Detailed in the Proposed Action.		
Silv 18	P	In units planned for lop-and-scatter of slash prior to underburning, slash concentrations should be pulled back from around the bases of leave trees.
Silv 19	P	<p>Tree selection Tree selection during thinning would be based upon treatment objectives as well as tree hazard rating, health and vigor, species, and size/age in descending order of importance. These factors would all be weighed when selecting cut and leave trees for thinning</p> <p>Hazard Trees All dead or dying trees that have the potential to fall into or roll onto campgrounds, roadways, utility lines, structures, facilities or other improvements would be considered hazard trees and removed. Green trees would be considered a hazard if (1) they lean more than 20 degrees from vertical and are leaning toward and are within reach of an area to be protected, (2) 1/3 or more of their supporting roots are exposed, rotten, or damaged, and the trees are leaning toward and within reach of areas to be protected, or (3) they have evidence of stem rot and are leaning toward and within reach of areas to be protected. This applies to trees of all sizes and species.</p> <p>Tree Health and Vigor Trees should be considered for removal if vigor is low and declining as indicated by a partially dead and/or fading crown, they have fresh bark beetle activity, are damaged, or are infected by dwarf or leafy mistletoe at undesirable levels. This applies to trees less than 9 or 18 inches in dbh depending upon the prescription being applied. Trees that exhibit the following characteristics would be removed:</p> <p><u>Pine Trees</u>: Trees with at least 50 percent of the live crown exhibiting current, active, contiguous, crown fade or dieback from the top. Trees with less than 50 percent of the live crown exhibiting current, active, contiguous, crown fade or dieback from the top with one or more of the following:</p> <p>Pitch tubes: numerous (>10) pink to reddish pitch tubes over at least 50% of the circumference of the bole, at or above 3 feet from the ground and extending for some distance up the bole. Do not include trees with only whitish pitch tubes that are not colored by pinkish or reddish boring dust. Note that because of</p>

Pinaleño Ecosystem Restoration Project

Resource And Design Number	Project-wide (P) Site-Specific (S)	Design Feature
		<p>drought stress, pitch tubes may or may not be present in trees currently infested with bark beetles. Boring dust or frass: pink to reddish, fine granular to dust-like boring dust or frass collected in bark crevices, webbing along the bole, or at the tree base, present over at least 1/3 of the bole circumference. Do not include trees that only have boring dust or frass associated with old wounds or fire scars. Criteria 2a and 2b do not include basal attacks by the red turpentine beetle. Red turpentine beetle attacks are characterized by very large pitch tubes with coarse boring dust that are generally restricted to the lower 2 to 3 feet of the bole. Note that during periods of stress such as droughts, red turpentine beetle attacks may extend above the 2 to 3 foot level along the bole.</p> <p><u>Douglas-fir and True Fir Trees:</u> Trees with at least 50% of the live crown exhibiting current, active, contiguous, crown fade or dieback from the top.</p> <p>Trees with less than 50% of the live crown exhibiting current, active, contiguous, crown fade or dieback from the top with whitish, fibrous, boring dust in bark crevices and/or webbing along the bole and around at least 75 percent of the bole circumference.</p> <p>Mechanical Damage: Trees on which bark has recently been removed from 25 percent or more of the bole.</p> <p>Mistletoe Infection Levels: Trees which have a “Hawksworth Rating” of two or greater, mistletoe in the upper 2/3 of the crown, or have mistletoe infections of the bole at least 16 feet above the ground and greater than ¼ the boles circumference (Figure 1).</p>

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		<p>INSTRUCTIONS</p> <p>STEP 1. Divide live crown into thirds.</p> <p>STEP 2. Rate each third separately. Each third should be given a rating of 0, 1 or 2 as described below.</p> <p>(0) No visible infections.</p> <p>(1) Light infection (1/2 or less of total number of branches in the third infected).</p> <p>(2) Heavy infection (more than 1/2 of total number of branches in the third infected).</p> <p>STEP 3. Finally, add ratings of thirds to obtain rating for total tree.</p>	<p>EXAMPLE</p>  <p>If this third has no visible infections, its rating is (0).</p> <p>If this third is lightly infected, its rating is (1).</p> <p>If this third is heavily infected, its rating is (2).</p> <p>The tree in this example will receive a rating of $0 + 1 + 2 = 3$.</p>
Silv 20	P	<p>Figure 1. The Hawksworth six-class dwarf mistletoe rating system (Hawksworth 1977).</p> <p>In areas where dwarf mistletoe infected trees in the overstory pose a high risk of infecting the understory, species preferences for retaining during thinning may be adjusted to favor non-host species.</p>	

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Fire and Fuels Management		
Fuels 1	P	Hand piles will be no larger than 6 feet high and 8 feet in diameter.
Fuels 2	P	Hand piles will be placed as far from the canopy drip-line of trees as possible to prevent scorch.
Fuels 3	P	Individual hand piles or groups of hand piles may be handlined or wetlined to minimize fire creep.
Fuels 4	P	If handlines are constructed they can be up to 3 feet in width and down to mineral soil.
Fuels 5	P	Handlines will be rehabbed which may include water baring, pulling woody debris and duff litter over the lines, etc.
Fuels 6	P	A Prescribed Burn Plan would be developed and approved prior to initiating any burning operation. The Burn Plan generally includes several elements, a unit description, specific prescribed burn objectives, public notification procedures, coordination with other resource specialists, hazard analysis, contingency plans, firing procedures, risk assessment, mitigation measures, estimated fire behavior, acceptable weather variables and prescribed burn organization.
Fuels 7	P	Snags and down logs identified for retention may be handlined or wetlined as necessary to prevent them from burning.
Fuels 8	P	Encourage the removal, such as whole tree yarding of activity generated woody debris, to reduce that amount of material to be treated on site.
Fuels 9	S	Existing dead and activity generated fuels down to 1 inch in diameter will be piled and burned. Trees will be pruned no higher than 10 feet or one third the tree height whichever is less. This treatment would be applied for a distance not to exceed 150 feet from the roads edge. This would be applied in treatment units along the following roads: The Swift Trail (State Road 366, FS Road 803), Riggs Lake (FS Road 287), and the Bible Camp Road (FS Road 508). Adhere to the snag and log criteria in the wildlife treatment areas within the MSO protected areas. This treatment will not occur within midden protection areas or MSO core areas.

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Heritage Management		
Her1	P	Survey treatment units per Section 106 and Forest guidelines.
Her2	P	If unanticipated resources are discovered during project implementation, all work will stop in the vicinity until cleared by a professional cultural resources manager.
Her3	P	Protect all unevaluated sites and eligible sites per 36 CFR 800.
Her4	P	Evaluate each site for proactive protection measures (design criteria) or site avoidance. The heritage resources within the project area are at risk from wildfire, wildfire suppression activities, and ground-disturbing project activities. Certain site types are also at risk from prescribed fire (e.g. historic sites with wood or other flammable materials, rock art, and sandstone or limestone shelters). Not treating sites would create untreated vegetative “islands” in treated stands. Such stands may affect the overall treatment goal of wildfire risk reduction, and may increase the potential for vandalism.
Her5	S	Allow thinning within the following heritage site boundaries, provided: cutting is accomplished using hand tools only (no mastication, pile burning or ground disturbance within heritage site boundaries); no mechanized equipment or staging of equipment within site boundaries; large diameter trees are felled away from all features; and thinned material is hand carried outside site boundary. Existing roads can be used for hauling or skidding within site boundaries.
Her6	S	Avoid treatment activities within heritage site boundaries.