

**Burnt Corral Vegetation Management Project Proposed Action  
March, 2015**

**I. Project Area and Background:**

The Burnt Corral Vegetation Management Project is the first in a series of efforts to restore forest health, beneficial fires regimes, and wildlife habitat in the ponderosa pine belt on the west side of the Kaibab Plateau. Inspiration for the project stems from the 2009 Kaibab Forest Health Focus (KFHF), a collaborative landscape assessment that identified priority management areas for each of the Kaibab National Forest's three districts, and from its 2014 Land and Resources Management Plan. The overarching goal of this effort is to improve forest health and vigor, while improving habitat conditions which are more resilient to change in the event of wildfire and/or other climatic condition changes. In working toward this goal, the project also seeks to work collaboratively with diverse stakeholders to reach a general consensus on recommendations and approaches to guide management and develop and sustain public support for on-the-ground restoration actions.

General Project Location:

The Burnt Corral project area, about 28,060 acres in size, lies within the southwest portion of the Kaibab Plateau, south-southwest of Lookout Canyon and Forest Service Road (FSR) 22, on the North Kaibab Ranger District (NKRDR), of the Kaibab National Forest (KNF). The project lies within Townships 35-37 North, Ranges 1 West -1 East, in Coconino County, Arizona, Gila and Salt River Baseline and Meridian. Within the proposed project area, the majority of the ponderosa pine vegetation type is located west of FSR 22, with the project area bounded by FSR 447 to the north, FSR 226 to the east, FSR 203/203A and the FSR 425 to the south, and FSR425 and 427 to the west.

The majority of the Burnt Corral project area falls within a Priority Landscape identified by the KFHF, encompassing the western ponderosa pine belt of the Kaibab Plateau. This led the KNF to select Burnt Corral as the first phase the larger, landscape-level restoration approach based on a collaborative, science-based assessment of forest composition and predicted fire behavior data<sup>1</sup>. The western edge of the Burnt Corral project corresponds to the ecotone between ponderosa pine forest and the pinyon-juniper- oak woodland area, with approximately 7,530 acres in the west-northwest portion overlapping into the 1996 Bridger Knoll Fire area. The Bridger Knoll Fire area is now dominated by patches of oak, New Mexico locust and open areas supporting bunch grasses and other low-lying vegetation. Some salvage activity along with some ponderosa pine reforestation (about 1,550 acres) has been completed since the 1996 fire. The Mill Fire (2008) area (1,710 acres) also lies within the northeast corner of the Burnt Corral planning area. There is less than 400 acres of Mexican Spotted Owl Recovery Habitat in the southeast corner of the project area. The project area is currently open to firewood gathering by permit.

The majority of the Burnt Corral project area lies within the Grand Canyon National Game Preserve, the Kaibab Squirrel National Natural Landmark, and Arizona Game and Fish Game Management Unit 12A west. The lower elevations of the project area on the west side of the Kaibab Plateau are a key asset to the NKRDR due to heritage/cultural, range, recreation and wildlife resource values.

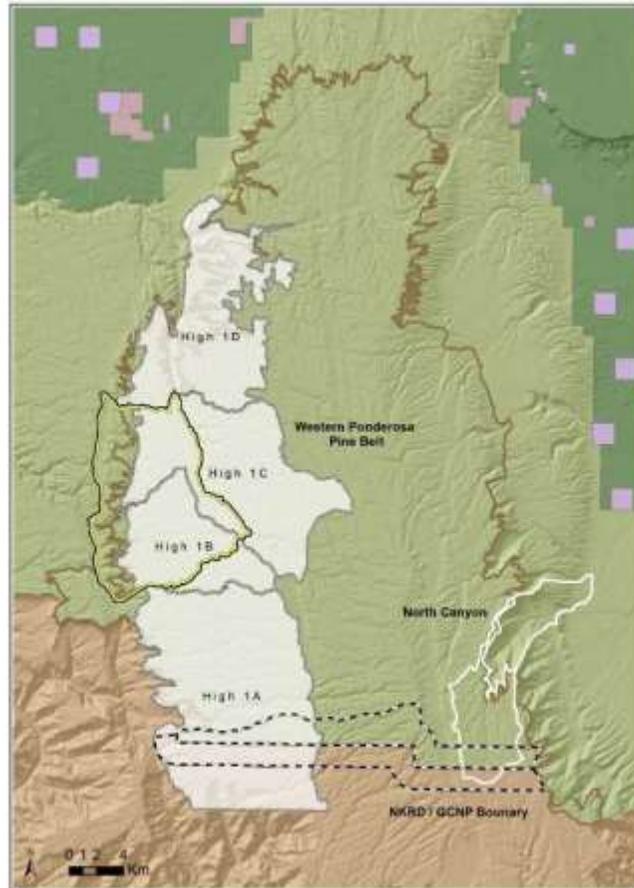
Planning Effort:

In September 2009, the Kaibab Forest Health Focus recommended vegetation management treatments designed to reduce fuels and increase canopy spacing, thereby lessening the risk to potential loss of

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<sup>1</sup> [http://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5120031.pdf](http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5120031.pdf)

ecosystem components due to uncharacteristic high severity stand replacement fire. The KFHF collaborative group viewed this ponderosa pine portion of the NKRD as a single priority area divided into four priority treatment areas (“High 1A-1D”), each of which would receive a configuration of treatments that most efficiently meet ecological restoration goals, including the return of natural fire regimes (Figure 1). In addition, the group expressed an interest in moving towards a forest structure in the pine type that favors the groups or clumps of multi-storied, uneven aged stands<sup>2</sup>. The group recognized that the western ponderosa pine belt of the Kaibab Plateau represents a significant management challenge and that conditions are sufficiently variable to demand more detailed guidance when performing project-level planning, as the 2009 Forest Health Focus was more landscape oriented.



*Figure 1.* The Burnt Corral project area lies within the areas of the ponderosa pine belt prioritized by the 2009 Kaibab Forest Health Focus. The western project boundary extends beyond the priority area in order to utilize an existing road to facilitate logistics and fire management.

Project level planning is the mechanism for Forest Plan implementation and translates the desired conditions and objectives of the Forest Plan into proposals that identify specific actions, design features, and monitoring efforts. The proposal development for projects should address site-specific needs developed locally, with input from experts and stakeholders, and the most current and relevant information. If warranted, project level decisions and modifications may be made following public

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<sup>2</sup> Uneven-aged forests, as defined in the Kaibab National Forest Plan, are composed of three or more distinct age classes of trees, either intimately mixed or in small groups.

involvement and analysis. This process follows the new “Project-Level Pre-Decisional Administrative Review Process” (36 CFR 218).

The Burnt Corral Vegetation Management project was initially included in the U.S. Forest Service’s *May 2011 North Kaibab Ranger District (NKR) 5-year Vegetation Management Plan*, a tool used for future resource planning and allocation purposes. The area was selected because it was identified as a priority in the KFHF, and modest adjustments to boundaries and location were made in order to conform with NKR priorities and related, recently completed and ongoing projects (Figure 2).

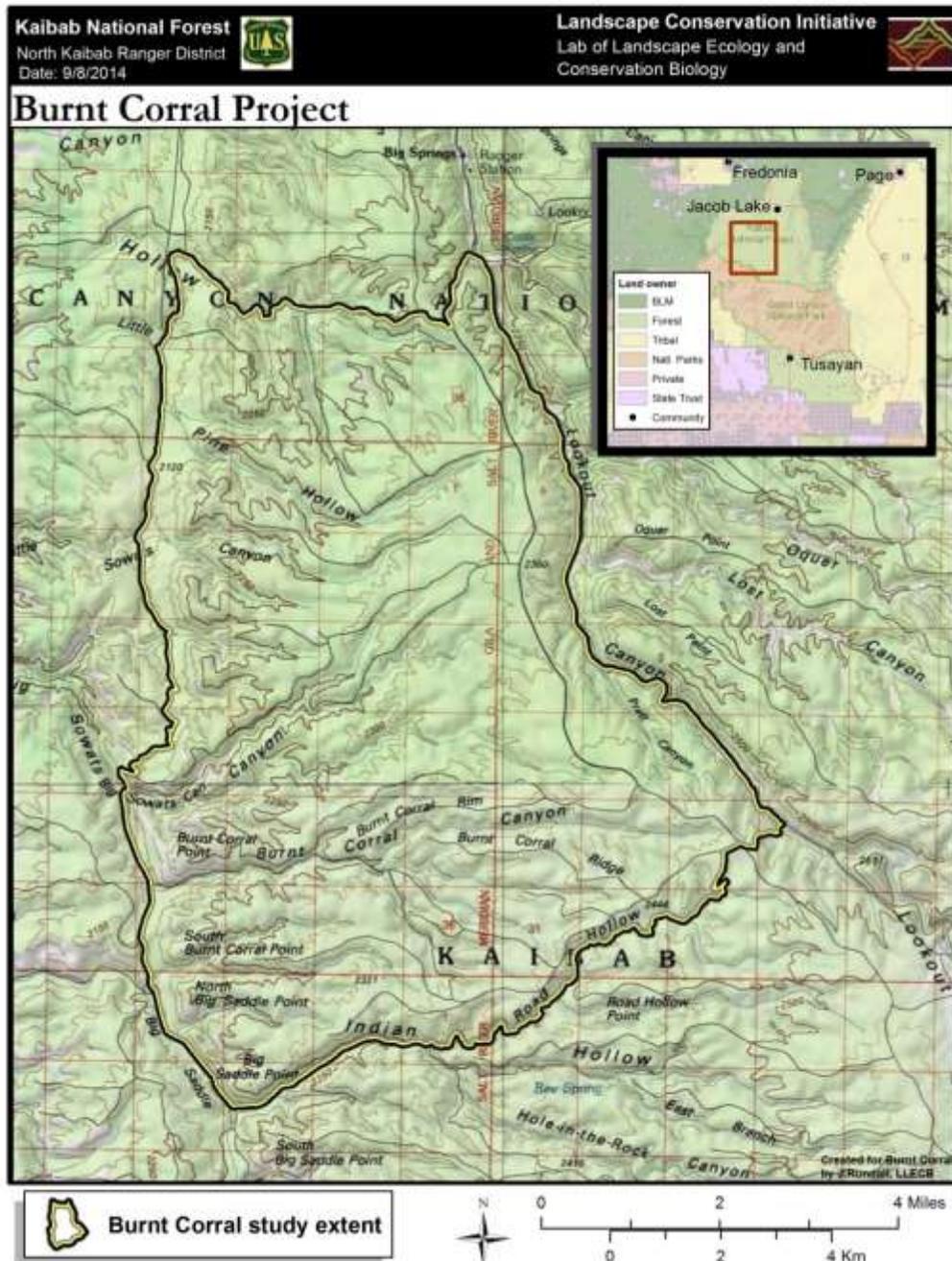


Figure 2. The Burnt Corral project area is about 28,060 acres.

Within the project area, the ponderosa pine forest vegetation community occurs at elevations ranging from 6,800 to 7,800 feet. Topography within the project area ranges from the flatter, higher elevation areas of the Kaibab Plateau, located in the eastern portion of the project area, to lower-elevation bench areas on the western side. The project area contains numerous canyons and ridgelines, most of which trend in an east-to-west direction. Steep sloped areas (i.e., greater than 40 %) and sensitive soils are present along most of the ephemeral drainages in the western half of the project area. A large component of the forest within the Burnt Corral project area (approximately 21,200 acres) is typed as Ponderosa pine (Figure 3). The ponderosa pine vegetation type (“pine component”) is generally denser and more continuous across all developmental states than forest structures characteristic of reference conditions<sup>3</sup>.

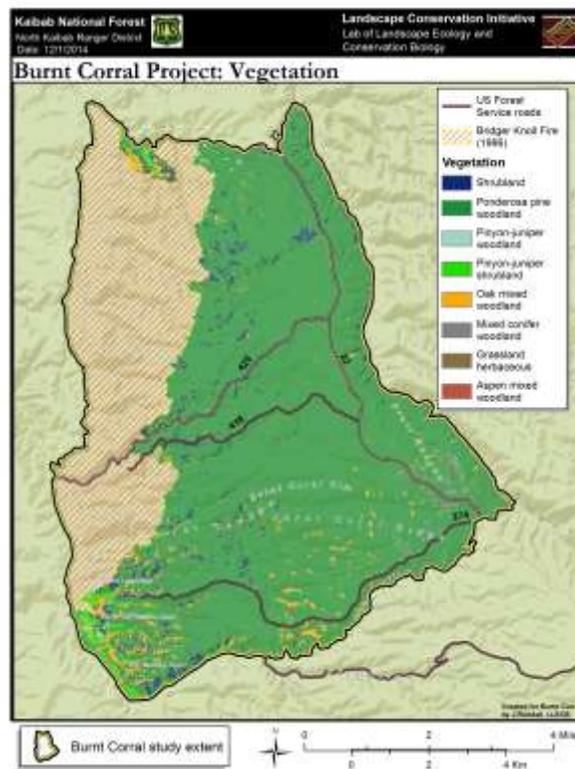


Figure 3. Vegetation types across the project area. Predictive vegetation map created using 2010 Landsat imagery by the Lab of Landscape Ecology and Conservation Biology for the Kaibab National Forest monitoring project, with support from the Grand Canyon Trust. (Note: Acreages for vegetation types are estimates that may be adjusted based on stand data and field verification for specific vegetation types. Acreages presented in this Proposed Action may differ modestly from acreages utilized in the environmental analysis.)

<sup>3</sup> Reference conditions are environmental conditions that infer ecological sustainability. When available, reference conditions are represented by the characteristic range of variation (not the total range of variation) prior to European settlement and under the current climatic period. For many ecosystems, the range of variation also reflects human-caused disturbance and effects prior to settlement. It may also be necessary to refine reference conditions according to contemporary factors (e.g., invasive species) or projected conditions (e.g., climate change). Reference conditions are most useful as an inference of sustainability when they have been quantified by amount, condition, spatial distribution, and temporal variation.

Building on the spirit and outcomes of the KFHF, the Burnt Corral project was convened in mid-2014 by the KNF and Northern Arizona University's Landscape Conservation Initiative (LCI) as a collaborative project-level planning effort to develop a Proposed Action to guide the pre-scoping phase of the project, which will inform National Environmental Policy Act (NEPA) analysis. The purpose of the collaborative was to address key pre-scoping issues prior to the actual scoping phase of the Proposed Action for the project. During the NEPA analysis each resource area will evaluate past, present, and reasonably foreseeable activities (including fires) which may influence this and other future treatment options within the Burnt Corral planning area. The Purpose and Need statements below, as well as the Proposed Action, were derived from a basic outline that was reviewed and refined by the collaborative, and represents a Proposed Action that benefitted from considerable deliberation, vetting, debate and compromise. Throughout, the KNF and LCI strived to craft a Proposed Action that was acceptable to all parties.

#### Forest Plan:

The new Forest Plan (i.e., Land and Resource Management Plan for the Kaibab National Forest, March 2014) places emphasis on restoring the ponderosa pine component of the forest, which has departed significantly from desired conditions and, therefore, constitutes a priority need for change (see Forest Plan, pp. 16-20, 30-32, & 191-192). Projects in ponderosa pine should be aimed at restoring forest structure as well as processes such as low-intensity fire, natural levels of disturbance, and nutrient cycling. Design features may increase diversity within treatment areas by promoting aspen and oak (see Forest Plan, "Aspen" - pp 27-29; "Oak" – pp 39-40), and openings and understory production. While treatments strive to mimic the structure and patterns of reference conditions, they can also reflect other desired conditions and objectives. As a result, reconstructed reference conditions are general guides rather than rigid restoration prescriptions.

The Forest Plan (USDA FS 2014) briefly discusses the existing and desired conditions of the ponderosa pine forest as follows:

"Ponderosa pine forests on the Kaibab NF are generally denser and more continuous across all developmental states than in reference conditions. The open, park-like stands characteristic of the reference conditions for ponderosa pine forests promoted greater floral and faunal diversity and fire resilience than the dense stands of today. Accumulations of forest litter and woody debris are much higher than would have occurred under the historical disturbance regime. Lack of fire disturbance has led to increased tree density and fuel loads that heighten the risk of uncharacteristically intense wildfire and drought-related mortality. When fires occur under current (2014) conditions, they tend to kill a lot of trees, including the large and old trees. These trees take longer to replace, moving the Kaibab NF further from desired conditions, and increasing the time it would take to return to desired conditions. There is currently a moderate risk of insect and/or disease outbreak, which is also a function of increased tree density." (Forest Plan, pg. 16)

In ponderosa pine, reintroduction of fire as the primary disturbance agent is critical to restoration. Due to capacity and efficiency needs, mechanical thinning and burning treatments are often needed to effectively progress toward the desired conditions, including the return of historical fire regimes, and insure that those conditions can be retained for at least 20 years. Tools for creating desired stand conditions and openings include a variety of treatments and uneven-aged cutting methods, such as single tree and group selection, limited even-aged regeneration cutting, thinning, and managed fire (i.e., wildfires managed for both protection and resource management objectives). Besides presenting the

desired conditions at various scales (i.e., fine, medium, and landscape), the Forest plan (pp. 19-20) presents a “Management Approach” for the ponderosa pine component. Listed below is part of the rationale for treatment within the Burnt Corral planning area, which is an area that is at moderate risk and scheduled for treatment now instead of the future:

“Restoration activities would be prioritized in the areas identified by the Kaibab Forest Health Focus (KFHF; NAU 2009) and then move to other areas of high risk and high value. The KFHF was a multi-stakeholder collaborative process that prioritized areas most in need of treatment. Primary indicators were related to high risk and high value such as those with closed canopies containing large trees. These areas were identified as high priority for restoration because they already contain many components of the desired condition and a single treatment may come close to meeting the desired condition, but if lost, would take centuries to replace. The KFHF report can be accessed at [http://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5120031.pdf](http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5120031.pdf).

## **II. Purpose and Need for Action:**

The overall objective of the Burnt Corral vegetation management project, which is consistent with the Forest Service’s mission statement, is to improve ecosystem resilience and function at the landscape scale in order to sustain healthy forests and watersheds for future generations.

Based on collaboration efforts and internal Forest Service review, the following comprise the purposes and needs identified for the Burnt Corral project:

Purpose 1: Make progress toward desired conditions defined in the Forest Plan (USDA FS, 2014) and consistent with prioritized areas, as identified by the Kaibab Forest Health Focus (KFHF; NAU 2009), with an emphasis on:

- a) Improving forest health and vigor, while enhancing habitat conditions to make them more resilient to change in the event of wildfire and other changes in climate or related stressors (i.e., drought, large bark beetle infestations). To achieve this, there is a need to:
  - Return ponderosa pine forest to a Fire Adapted Ecosystem (i.e., high frequency – low intensity surface fires).
  - Manage fire in first entry and follow-up prescribed fire treatments (i.e., maintenance burns for secondary treatment).
  - Retain large and old ponderosa pine trees while reducing heavy fuel loads and overly dense stands of smaller trees present in many portions of the project area.
  - Restore forest structure and process (including natural disturbances such as low-severity fire, watershed function, and nutrient cycling). More specifically this entails:
    - Reducing the risk of uncharacteristic and undesirable wildland fire effects (i.e., either active or passive crown fire), with an emphasis on restoring and maintaining desirable plant community attributes, including fuel levels, fire regimes, and other ecological processes.
    - Maintaining and restoring upland area vegetation, and reducing erosion within the ephemeral drainage system (i.e., within drainages and bare ridgelines that drain to the west and southwest and comprise a significant part of the Kanab Creek watershed).
    - Improving watershed conditions and reducing road-related impacts to natural and cultural resources. To achieve this, there is a need to:
      - ✓ Increase diversity in forest stand structure and species composition.
      - ✓ Increase native grasses forbs and shrubs within openings throughout the project area.

✓ Maintain existing system of roads and prevent development of new roads.  
Reduce the acres of non-native vegetation, and allow for native vegetation succession.

- b) Restoring the ponderosa pine forest type to increase resilience to disturbance, improve forest health, and improve habitat. To achieve this, there is a need to:
- Reduce tree density and Stand Density Index (SDI) to the lower range of site occupancy, about 35 – 40% of max SDI in ponderosa pine.
- c) Meet KNF Forest Plan objectives at the mid-scale for desired basal area ranges in the 60 – 80 sq. ft. per acre range with larger trees (i.e. > 18 inches in diameter) contributing the greatest percent of the total basal area, with some areas containing 10 to 20 percent higher basal area in mid-aged to old tree groups than in the general forest (e.g. goshawk post-fledging family areas Mexican spotted owl nesting/roosting habitat, drainages, and steep north-facing slopes).
- Mechanically thin up to about 15,000 acres.
  - In up to about 5,000 additional acres, perform hand thinning and light mechanical treatment using low-ground pressure equipment for preparation thinning for use and management of prescribed fire and managed wildfire
  - Stimulate oak regeneration.
  - Stimulate aspen regeneration in the project area especially where it currently exists and at the head of draws, ephemeral streams, and hollows.
  - Retain remnant, surviving pine trees in the overlap of the burned area left over after the 1996 Bridger Knoll fire (about 60,000 acres burned).
  - Protect existing ponderosa pine plantations that have been established from the reforestation programs following the Bridger Knoll salvage timber sales.
  - Reduce the risk of hazardous, stand-replacing crown fire events in the entire project area, especially portions of the project area that have received no timber treatments nor experienced fire events in the last 25 years.
  - Promote uneven-aged forest where lacking, maintain current uneven-aged forest, and create openings in even-aged older stands with patch cuts from one-half to four acres distributed randomly across the landscape.
  - Restore fire-prone stands to more open, historic condition
  - Establish fuel breaks along major forest roads like FSR422, 255, and 425 to provide public safety and protection for firefighters if a high intensity, fast moving crown fire event occurred.
  - Create openings (utilizing “Group Selection” cuts), which range in size from ½ acre, up to 4 acres, with a maximum width of 200-feet for any opening 2 acres or greater in size. Openings would be laid out in a random mosaic pattern within treatment units. Selected seed trees would be left in openings greater than 2 acres to maintain and promote desired or healthier genetic traits.
- d) Maintain and promote a ponderosa pine/frequent fire forest vegetation community that is a mosaic of forest conditions composed of structural stages ranging from young to old trees.  
Existing Condition: The current condition of the majority of blackjack<sup>4</sup> stands within the Burnt Corral project area is represented by dense patches of young ponderosa pine trees in even-aged condition. Many of these are in an unhealthy condition because natural ground fires and mechanical tree thinning and active forest management have been absent for decades. These stands support more

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<sup>4</sup> Blackjacks are young trees which possess all the biological advantages of youth. They are characterized by a dark almost black bark, a pointed or rounded top and ascending upper branches.

than four times the number of trees identified in the statement of desired condition, and some show signs of competition-induced mortality (SDI >57% of Max), and have high susceptibility to disease. Often, the forest floor is a thick layer of pine needles and duff with very little forage growth and no regeneration of ponderosa pine seedlings. Tree growth is suppressed, and vigor is low; these trees are susceptible to attack from *Dendroctonus* bark beetles, especially Mountain Pine beetle and the Western Pine beetle. Given these conditions, desirable ground fire could quickly move into the tree crowns and run through the stand, causing higher than desired tree mortality.

Desired Condition: The ponderosa pine forest vegetation community is a mosaic of forest conditions composed of structural stages ranging from young to old trees. The forest is generally to be uneven-aged and open. Groups of old trees are mixed with groups of younger trees. Occasional areas of even-aged structure are present. Denser tree conditions exist in some locations, such as north-facing slopes, canyons, and drainage bottoms. Desirable ponderosa pine stands include a mix of age and tree sizes, openings available for forage and grass production, space between groups that break up the continuity of the canopy, fire resistance, and a young forest component to help ensure sustainability.

The desired condition within the ponderosa pine is to move towards an uneven aged structure that is somewhat open. To achieve this, there is a need to:

- Balance age / size classes (3 classes minimum) to achieve an un-even aged structure;
  - Reduce basal area stocking by thinning the matrix through the size classes that are in excess, to promote or increase forest health and vigor;
  - Establish clumps and groups in a fashion that forms more of a mosaic at the fine and mid-scale;
  - Improve forest health and availability of moisture, nutrients, and light;
  - Increase production of forage;
  - Create more openings;
  - Create gaps in the canopy so natural surface fire will tend to remain on the forest floor;
  - Enhance tree vigor and growth conditions to produce large, thick-barked fire-resistant ponderosa pine trees; and
  - Create more healthy wildlife habitat capable of supporting a variety of animal species.
- e) Improve forest habitat for wildlife species. To achieve this, there is a need to:
- Manage for or retain habitat elements required by the Mexican Spotted Owl Recovery Plan (2012) for 358 acres of Recovery Habitat within the Burnt Corral project area. These elements include hardwoods, large snags (>18 inches dbh), large downed logs (>18 inches diameter at any point), and large trees (>18 inches).
  - Create grass-forb-shrub interspaces within an uneven-aged forest structure to create habitat for goshawk prey species as well as various other wildlife including but not limited to songbirds and deer.
  - Protect Northern goshawk nest areas, which should be denser than the surrounding forest with large trees being dominant, but not homogenous, and have interlocking crowns.
  - Maintain or improve the variety of vegetation types and structures to provide a range of habitats for wildlife species including but not limited to:
    - Merriam's turkey roost sites (ponderosa pine groups)
    - Gambel oak as a transition habitat for Mule deer and forage for Merriam's turkey
    - Interspersed trees ranging from 8-18 inches dbh, with some continuous areas of interlocking crowns, as quality pine habitat for Kaibab squirrel (*Sciurus aberti kaibabensis*)
    - Maintain snags around waters for bat roosts

### Consideration of Secondary or Related Activities and Benefits:

Related Activity / Benefit 1: Maintain and/or improve current motorized public transportation system:

- Roads – approximately 20% of the roads within the project area are logging roads which were not included as part of the Travel Management System, these road may be utilized under the administrative use rules within TMR, but will remain closed to public motorized use.
- No new roads should be created, and administrative use should be used with discretion. The goal is to prevent resource damage from both administrative and public use.

Related Activity / Benefit 2: Manage recreation uses with an emphasis on maintaining scenic integrity while providing for visitor safety.

Related Activity / Benefit 3: Desired condition is to reduce the risk of damage to fire-sensitive cultural resource sites in the event of a high intensity wildland fire, and to provide for the sustainability of archaeological sites, traditional cultural properties, sacred sites, forest resources and areas associated with traditional practices. To achieve this, there is a need to:

- Reduce fuels on fire-sensitive cultural resource sites.
- Control erosion affecting cultural resource sites.
- Provide local tribes continued access to forest resources and opportunities to engage in traditional practices.

Related Activity / Benefit 4: Manage cheatgrass with an emphasis on reducing spread and eradicating localized populations, while enhancing the conditions for the reestablishment of native vegetation.

- Reduce and/or control cheatgrass, with objectives and methods based on field survey data.

Related Activity / Benefit 5: Offset treatment costs and benefit local rural economies. There is a need to:

- Use wood products from restoration treatments, where appropriate.

Related Activity / Benefit 6: Identify baseline carbon stocks and consider this information in management of the Forest in accordance with the 2012 Planning Rule and the Forest Service's Climate Change Performance Scorecard (i.e., Utilize information gathered to help understand how much carbon is currently stored in forest ecosystems and harvested wood products.)

The desired conditions for this project are based upon the Land and Resource Management Plan for the Kaibab National Forest, (USDA Forest Service, Feb. 2014) and the Kaibab Forest Health Focus (KFHF; NAU 2009) (See Attachment B of the Proposed Action for specific plan sections, or the full plan here: [http://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprd3791580.pdf](http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprd3791580.pdf)).

### **III. Proposed Action**

The USDA Forest Service (FS), Kaibab National Forest, North Kaibab Ranger District, through a collaborative process with interested stakeholders, proposes to mechanically thin up to about 15,070 acres and use wildland fire (including, for this project, both managed and prescribed fire) alone or in conjunction with mechanical treatment on up to about 28,060 acres. This proposed action is based on consultation with diverse stakeholders and guided by a quantitative exploration of existing data that allowed explicit consideration of multiple values and perceived risks associated with this project and the 2009 Kaibab Forest Health Focus. In pursuing this stakeholder process, the NKR D has endeavored to integrate the broad experience and expertise of stakeholders into a proposed action that will achieve

project objectives at multiple scales, consistent with the results from the Kaibab Forest Health Focus and the Forest Plan.

A preliminary map of the strata used to address proposed treatments across the project area and tables of treatment types and estimated acres are provided below, for illustrative purposes only. Formal analysis under the National Environmental Policy Act will follow a public scoping period, thus the estimated acreages and the locations of proposed treatments presented here should be seen as a means for identifying treatment categories and approximate areas to guide the development of this Proposed Action. Acreages presented here are based on preliminary Geographic Information Systems (GIS) analysis and may vary based on field verification and review performed during NEPA analysis planned for 2015. Based on that analysis, refined acreages will be presented in a Draft Environmental Analysis.

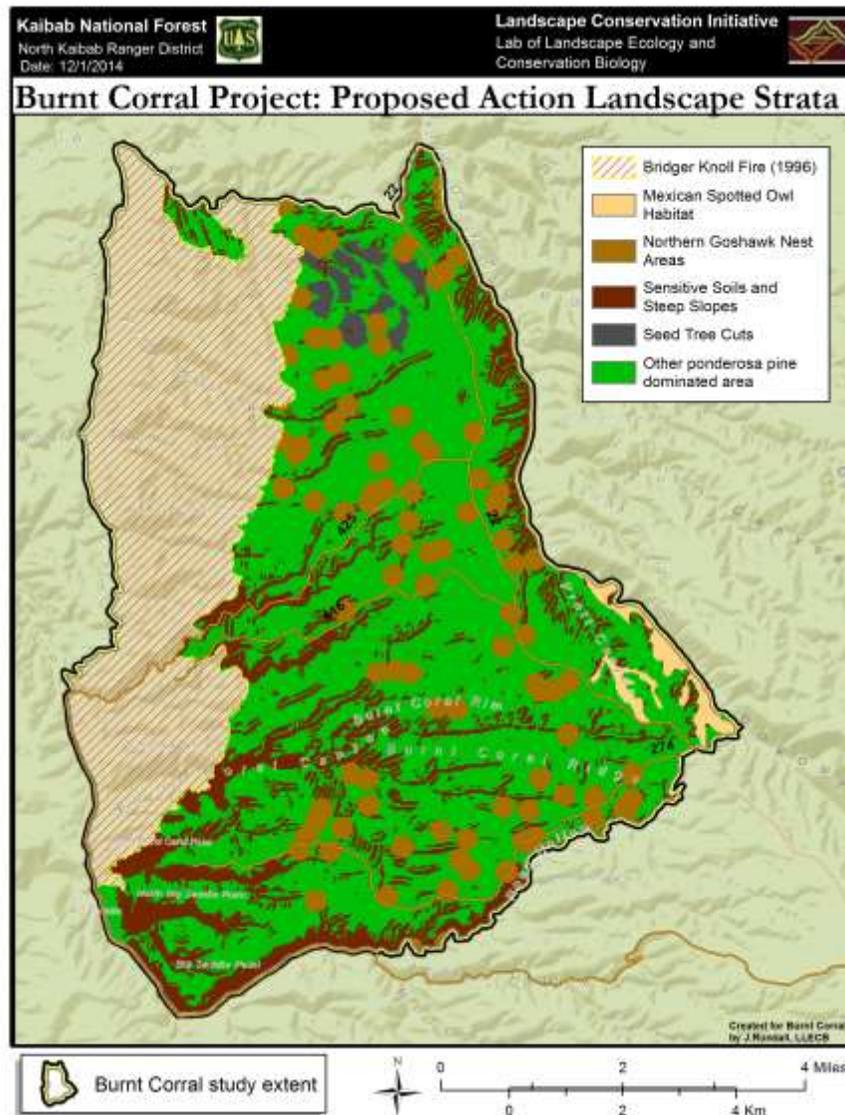


Figure 4. Preliminary map of landscape strata selected for particular treatments, as stipulated in the preceding table. Not depicted: approximately 2,600 ac of 'Old Growth Patches', yet to be identified spatially, but for which characteristics and general approach for identification were agreed upon during the stakeholders' meeting in Kanab, UT, Oct. 22-23, 2014.

This Proposed Action is stratified based on treatment types and relevant vegetation. The proposed treatments, including some fire-only treatments and some treatments using both mechanical treatments and fire, are as follows:

Treatment Type(s) Proposed	Relevant Strata	Maximum Estimated Acreage
<b>Wildland Fire</b>		
Fire only <sup>1</sup>	Bridger fire area, sensitive soils, steep slopes, seed cuts approaching desired conditions	12,990
<b>Mechanical Thinning and Wildland Fire:</b>		
Thin from below to 14"	Northern Goshawk nest areas	2,580
Limited treatment reduce fire risk	Old growth patches	2,600
Group selection cuts	Remaining ponderosa pine	9,530
Thin mixed conifer from below to 12" to reduce fire risk	Mexican Spotted Owl habitat	358
<b>Total Project Area</b>		<b>28,060</b>

<sup>1</sup> Note: This includes activities such as preparation thinning and other light mechanical and hand thinning treatments associated with appropriate use and management of prescribed fire and managed wildfire

## Wildland Fire

Treat up to 12,990 acres using wildland fire management. Throughout this document, wildland fire refers to prescribed fire as well as managed wildfire, and includes activities such as preparation thinning (typically achieved through hand thinning and/or the use of mastication head or similar small, low-ground pressure equipment), the construction of control lines, and other treatments associated with appropriate use and management of prescribed fire and managed wildfire.

### 1. Actions in the Bridger Fire Area (up to about 7,560 acres)

- Use wildland fire and spot treatments of prescribed fire, as needed, to achieve management objectives
- Protect existing regenerating trees from fire and mechanical activities as appropriate to meet management objectives
- Minimize seed-dispersing agents and soil disturbance activities to lessen or avoid the spread of cheatgrass.
- Monitor and implement control measures for invasive species, such as cheat grass
- Develop burn plans in consultation with the Arizona Game and Fish Department to ensure wildlife habitat objectives are met

### 2. Sensitive Soils and Steep (40% or greater) Slopes (up to about 5,010 acres)

- Use wildland fire to burn when needed to achieve management objectives
- Where fuel loading could result in undesirable fire effects, use preparation thinning (either hand thinning or small, low-ground pressure equipment) and piling in preparation for wildland fire
- Mitigate and avoid negative impacts to sensitive areas by using best management practices and design criteria for soils protection

### 3. Ponderosa Pine Seed Tree Cuts Approaching Desired Conditions (up to about 420 acres)

- Use wildland fire to burn when needed to achieve management objectives

## **Mechanical Thinning and Wildland Fire**

Treat up to 15,070 acres using both mechanical thinning and fire.

### **4. Ponderosa Pine Forest: Northern Goshawk Nest Areas (up to about 2,580 acres).**

Within areas designated for Northern Goshawk nests or replacement nest areas, about 415 acres are also areas of steep slopes and sensitive soils and would be treated under those guidelines.

#### *4.1 Mechanical Treatment*

- Where needed to protect and/or enhance nesting habitat, thin from below up to 14" dbh in goshawk nest areas
- Manage for or retain snags, downed logs, woody debris and old trees, whenever possible

#### *4.2 Wildland Fire*

- Where possible, use wildland fire in preference to or in coordination with mechanical treatments
- Wildland fire use may occur pre-or-post mechanical treatment, and multiple fire entries may occur over the project life

### **5. Ponderosa Pine Forest: Old Growth Patches (up to about 2,600 acres<sup>5</sup>)**

This is a significant portion of the project area that supports relatively dense stands of pre-European settlement trees and retain conditions consistent with pre-European settlement ponderosa pine ecosystems. Some of these areas have been identified as candidate old growth protection sites (henceforth "old growth patches"). However, currently available data are not sufficient for mapping the locations of old growth patches. Access to Forest Service stand data, combined with field validation of both stand data and LCI forest structural models will allow spatially explicit depiction of these patches during NEPA analysis. Preliminary analysis based largely on previous LCI models and guidance provided at the Kanab meeting of the Burnt Corral Stakeholders Group, suggest that a combined area of approximately 2,600 acres would capture most continuous patches of ponderosa pine forest exhibiting old growth conditions. The intent of identifying these old growth patches is to protect areas recognized as current and future reservoirs of old growth forest composition, structure and function. These areas will be managed in conjunction with design features for retaining old and large trees, generally (see below), to ensure the adequate representation of the composition, structure and function of old growth stands, including their living and non-living components, into the future.

#### *5.1 Mechanical Treatment*

- Conduct limited mechanical treatments that thin post settlement trees less than 16 inch dbh trees as necessary to reduce ladder fuels
- Retain structural diversity
- Retain old growth components including large snags, downed logs, large coarse woody debris, and large and old trees

#### *5.2 Wildland Fire*

- Use wildland fire in coordination with mechanical treatments
- Wildland fire use may occur pre or post mechanical treatment, and multiple fire entries may occur over the project life

### **6. Ponderosa Pine Forest: Remaining Area (Up to about 9,530 acres)**

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<sup>5</sup> Note: Estimated acreage which may be adjusted with further analysis and reconnaissance work in the project area.

For the remaining acres of ponderosa pine, including Northern Goshawk PFAs (about 9,320 acres), the following actions are proposed:

#### *6.1 Mechanical Treatment*

- Use group selection cuts varying in shape to create openings that are an irregular and heterogeneous forest mosaic, characterized by treatments from ¼ to 4 acres in size, with a maximum width of 200 feet. The intent of these selection cuts is to manage for current and future uneven-aged conditions while reducing fuel loads and fuel continuity, without creating an homogeneous stand structure or a regular or repetitive “cookie cutter” structure of alternating dense stands and openings.
- Strategically place treatments and vary the sizes of thinned areas on the landscape, taking advantage of topography and roads, particularly East-West roads, to achieve fire management objectives
- Generally, treat more intensively on south-facing slopes and areas upwind of NOGO nest areas, old growth patches, and other areas of denser trees of particular value or vulnerability to fire
- Generally forego mechanical treatment in areas where fire models predict passive surface fire
- Develop and/or maintain structural diversity, including some areas with interlocking crowns and wildlife hiding cover at the stand level
- Develop and/or maintain at least 3 age classes in roughly even proportions across any 100-1,000 acre subunit

#### *6.2 Wildland Fire*

- When possible, use wildland fire in coordination with mechanical treatments
- Wildland fire use may occur pre- or post-mechanical treatment, and multiple fire entries may occur over the project life

### 7. Mexican Spotted Owl Habitat (Up to 358 acres)

Three hundred and fifty eight acres of the project is designated as Mexican spotted owl Recovery Habitat and will be managed consistent with the Mexican Spotted Owl Recovery Plan (2012). About one hundred eighty acres of Recovery Habitat overlap with steep slopes and sensitive soils. Any guidelines developed for steep slopes and sensitive soils will be used as operational guidance and will conform to the Recovery Plan. All treatments will move the habitat towards Nesting/Roosting Habitat desired conditions within the Recovery Plan (Table C.3, pg. 278).

#### *7.1 Mechanical Treatment*

- Thin from below up to 12” DBH, in some cases thinning may only occur up to 9” DBH to meet desired conditions.
- Multiple mechanical entries may be required during the life of the project to meet desired conditions.
- Retain Mexican spotted owl key habitat elements required by the Recovery Plan. These elements include hardwoods, large snags (>18” DBH), large downed logs (>18” DBH at any point), and large trees (>18” DBH).
- Maintain the Primary Constituent Elements (PCEs) of Mexican spotted owl Critical Habitat. Areas outside of Recovery Habitat (i.e. Ponderosa pine) will be treated to protect the habitat from uncharacteristic high intensity wildlife and other natural disturbances.

### 7.2 *Wildland Fire*

- Wildland fire will be implemented as appropriate to retain the key elements mentioned above in 7.1 as well Critical Habitat PCEs.
- Prescribed fire may occur pre- or post-mechanical treatment. Multiple fire entries may occur over the life of the project within Recovery Habitat to meet desired conditions.

### **Other Included Actions**

- Encourage reestablishment of aspen in ponderosa pine-dominated stands by centering thinning efforts in areas with remaining aspen trees, when feasible
- Retain existing stands of Gambel oak, including all oak >8 inches diameter at root collar. Encourage reestablishment in ponderosa pine-dominated stands by centering thinning efforts in areas with oak
- Install artificial bat barks near permanent and ephemeral water sources throughout the project area.
- Work in collaboration with Arizona Game and Fish Department to evaluate existing water developments and, where appropriate, refurbish for the purpose of enhancing wildlife habitat.
- Reduce fuels and control erosion at fire-sensitive cultural resource sites.
- Provide local tribes continued access to forest resources and opportunities to engage in traditional practices.

### **IV. Design Features**

Through surveys and group discussion, a number of issues and concerns were identified for consideration in the project. Many of these issues address how treatments are designed and implemented, such that they maintain or augment desired conditions across the project area, and avoid or minimize possible undesirable impacts. These design features refer to consistent practices implemented across the entire project area.

Of the many issues identified, several were discussed in detail during the collaborative process and synthesized into proposed action language by the LCI: wildlife habitat, old trees and large trees, as well as the protection of sensitive ecosystems and wildlife habitat. We describe the design features discussed in-depth, though not always agreed upon, during the collaborative process, and offer language that we believe best captures the “sense of the collaborative”. We have also attached relevant Kaibab Forest Plan sections including guidelines for management actions applicable to a number of stakeholder concerns (e.g. threatened species, smoke impacts, climate change, recreation), and the Design Features and Specifications, including Mitigation Measures and Best Management Practices used by the North Kaibab Ranger District across projects (Attachment A & B).

### **Old Growth Protection**

In addition to the identified old growth patches (Section III, proposed action item 5, above), all old growth, as defined in the Forest Plan Vegetation Management Guidelines (Attachment B) will be retained with the following exceptions:

1. Where removal is required for reasons of public safety
2. Specific operational considerations (e.g., landing areas)
3. Large contiguous areas that have not been impacted by timber harvest, where fire exclusion has created forest structure conditions that are distinctly outside of the natural range of variability for the Kaibab Plateau, and where current predicted fire behavior suggests high risk of unnaturally severe wildfire and/or other degradation or desired characteristics.

In these areas, if old (“pre-European settlement”) trees are cut, they will be retained on site to provide understory dead and down components consistent with old growth characteristics, except in cases where doing so would result in conditions that are clearly outside the desired range identified in the Forest Plan. Firewood gathering and other thinning activities should be managed and/or restricted in these areas, so as to retain all old growth components, including dead and downed material.

### **Large tree retention**

Across the project area, large trees, those greater than 18” diameter at breast height (dbh), will be retained except where ecological restoration and biodiversity objectives cannot otherwise be met. Extensive deliberation, informed by existing data and incorporating diverse experience in managing these forests suggests that existing conditions across the project area will make it difficult to meet objectives over extensive areas without thinning some large trees. Thus, this design criterion is not a so-called “diameter cap” but rather a threshold that, when reached, requires that the removal of trees larger than 18” dbh be justified based on site-specific analysis of current conditions and their departure from desired conditions. This issue of large tree retention is arguably the most contentious aspect of forest management in the Burnt Corral project area, and the proposed threshold and practices are intended as a compromise that will allow management actions necessary for meeting landscape-level objectives, while providing site-specific reassurance to stakeholders who question the need for large tree removal. It is hoped that successful implementation of the Burnt Corral project, including monitoring the outcomes with respect to large tree retention, will provide reassurance now, while pursuing an adaptive approach that will inform and improve future projects in the ponderosa pine forests of the Kaibab Plateau. Areas where desired conditions might require removal of trees larger than 18” dbh, include the following:

- Aspen groves or oak stands where enhancement is desired
- Areas where within-stand openings are desirable to regain structural heterogeneity
- Areas where heavily stocked stands with high basal area are characterized by a preponderance of large, young (“post-European settlement”) trees
- Encroached meadows, riparian areas, or other rare or sensitive habitats

Recognizing that desired intensity and configuration of treatments will significantly influence how this large tree retention policy plays out, treatments will be designed to restore, wherever possible, pre-European settlement composition, structure, and function, while taking into account the likelihood of continued drought and probable climate warming. Treatments will also be informed indirectly by data from reference sites across the North Rim, such as Powell Plateau and other sites that have been subject to less interrupted or altered fire regimes.

### **Wildlife habitat**

Across the project area, maintain screening and hiding cover wherever possible:

- Where mechanical thinning and wildfire result in significantly reduced tree density, maintain and stimulate well distributed patches of cover. Proximal to roads but not continuous with old growth patches and other areas where management objectives call for the retention of denser stands with interlocking crowns, encourage regeneration stands for cover
- Use natural landforms and existing topography when thinning or revegetating to create hiding cover for wildlife
- When feasible and where beneficial, maintain strategically placed slash piles and unlopped slash for turkey cover and nesting in treated areas until post-treatment vegetation response provides natural cover and nesting sites
- Across the project area, refer to habitat parameters for Merriam's turkey (Shaw and Mollohan 1992) and mule deer guidelines (Western Association of Fish and Wildlife Agencies Mule Deer Working Group 2009)

Across the project area, retain a variety of vegetation types and structures to provide a range of habitats for wildlife species, including:

- Merriam's turkey roost sites (Ponderosa pine groups of 5-9 ponderosa pine 15" dbh)
- Gambel oak as a transition habitat for Mule deer and forage for Merriam's turkey
- Interspersed trees ranging from 8-18 inches dbh, including areas of interlocking crowns, as quality pine habitat for Kaibab squirrel
- Snags around waters for bat roosts, nesting birds and other species

Across the project area, encourage a diverse understory of native grasses, forbs and shrubs to increase primary productivity and enhance the food web to benefit biodiversity

- Consider seeding with appropriate native species using reliable seed source partnerships

### **Roads**

Maintain existing system of roads and prevent development of new roads. The existing system of open and administrative roads provides adequate access for project implementation. No need for new roads is anticipated, and no new permanent roads will be constructed to access the treatment units or stands. However, temporary roads or permanent road improvements (i.e., gravel overlay) may be considered or included as part of NEPA analysis, if deemed necessary. Any existing closed roads that are reopened temporarily to access treatment units will be closed following project completion. Some roads may be temporarily closed during project implementation as a public safety measure.

### **Protection of sensitive areas**

Across the project area, mitigate and avoid negative impacts to sensitive areas by using best management practices and design features such as buffers from heavy equipment around:

- Caves and karst features, including sinks
- Heritage/cultural sites
- Recreation opportunity and scenic objective areas
- Springs, seeps and draws
- Plants of cultural importance
- Sensitive soils and steep slopes; reduce active headcuts or downcuts in ephemeral drainages
- Areas of recreational interest
- Experimental or research study areas (i.e. Kane Ranch and silvicultural test plots).

**V. Attachments:**

Attachment A. Design Features & Specifications: Mitigation Measures & Best Management Practices

Attachment B. Relevant selections from the Kaibab Forest Plan