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Department of  
Agriculture



Forest  
Service

# Environmental Assessment

## CHEROKEE PARK PROJECT

Canyon Lakes Ranger District, Arapaho and Roosevelt National Forests  
Larimer County, Colorado

February  
2015



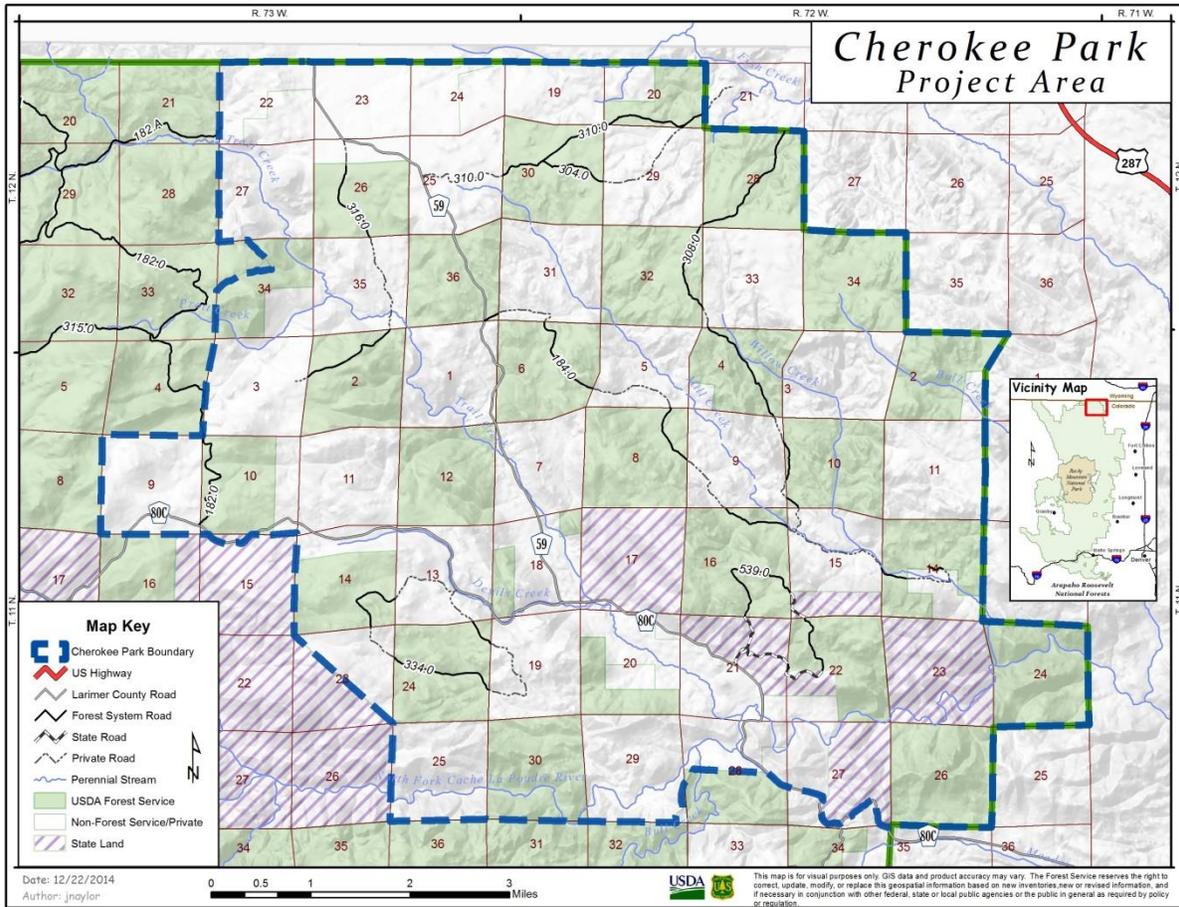
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Map 1. Cherokee Park project area overview.



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## **1.0 INTRODUCTION & BACKGROUND**

The Canyon Lakes Ranger District (CLRD) of the Arapaho and Roosevelt National Forests is proposing vegetation treatments within the Cherokee Park project area for the purpose of reducing hazardous fuels adjacent to private land and improving forest health. In addition, the project proposal includes aspen and meadow enhancement treatments and recommended changes to the road system. Specifically, some roads are proposed to be closed while others are proposed to be added to the Forest system of roads that previously were not recognized as Forest Service roads.

The Cherokee Park project area is located in the northeast portion of the Canyon Lakes Ranger District, Arapaho and Roosevelt National Forests and Pawnee National Grassland (See Map 1). The entire project area encompasses 33,547 acres. However, because of the checkerboard ownership pattern, less than half of the area (13,977 acres) is under National Forest Service (NFS) ownership. County Roads 59 and 80C intersect the middle of the project area. The subdivisions of Mill Creek, Poudre River Ranch and Diamond Creek, as well as other private parcels are located within the project area. Two Community Wildfire Protection Plans (CWPPs) have been developed within the Cherokee Park project area: the Upper Cherokee Park CWPP and the Cherokee Meadows CWPP.

### **PURPOSE & NEED FOR ACTION**

Many of the forest stands in the project area, principally the ponderosa pine and mixed conifer forests, do not exhibit characteristics typical of the fire regimes and condition classes expected at this elevation and location, and are considered outside the historic range of variation due to fire suppression activities. The combination current fuels conditions and trees killed by mountain pine beetle (MPB), can produce uncharacteristically severe wildfire behavior that would threaten improvements on private property and affect natural resources on National Forest system lands. Action is needed within the Cherokee Park project area to minimize the probability of crown fires that threaten values-at-risk, including homes, structures, wildlife habitat, watersheds and to restore the ecosystems to a more natural regime.

As a means of reducing the threat from wildfire created by these conditions, many property owners have completed, or are in the process of creating, defensible space around their structures. To meet the project's purpose and need of increasing the effectiveness of fuel reduction efforts on private lands and reducing the potential for destructive wildfires, the U.S. Forest Service proposes to reduce the amount of hazardous flammable fuels on National Forest system lands within the Cherokee Park project area. In addition, there is a need to enhance aspen stands and montane meadows within the project area. Conifers have encroached into both of these ecosystems. In meadows, fire suppression in recent decades is partially responsible for this conifer encroachment. Aspen stands and meadows can provide defensible areas for firefighters.

Unmanaged travel within the project area has resulted in unauthorized roads on NFS lands not engineered to minimize erosion, nor planned with the larger travel system of the area in mind. These roads threaten forest resources, soil and water specifically. Escalating maintenance costs for forest roads and the aforementioned road network impacts to forest resources have prompted the need to determine which forest roads are necessary. By combining road system modifications with hazardous

fuels reduction and other vegetation management in the Cherokee Park area, significant costs savings are afforded: planning efforts are more efficient, administrative costs are reduced and heavy equipment mobilized for vegetation treatments are available to improve, modify or decommission roads simultaneously.

## **PUBLIC INVOLVEMENT & ISSUES**

The Cherokee Park project was first published to the Schedule of Proposed Actions (SOPA) on April 1, 2013. A letter about the project proposal and upcoming meeting was sent to a mailing list of two hundred individuals and organizations. A legal notice announcing the public scoping and comment period was published in the Coloradoan on May 1, 2014 as well as on the project website. A press release and twitter feed also announced the scoping/comment period and meeting. An open house style public meeting was held on May 15, 2014 and twenty-one members of the public attended. A total of eighteen comments were received in reference to the project proposal.

Issues identified by the public included public notification before project implementation, access to private land and proposed treatment units, recreation access and vegetation management prescriptions. The majority of comments were from private landowners concerned about proposed changes to roads in the area and potential changes to access of private land. These access issues were tracked through the analysis and considered in the proposed action, an addendum to the travel analysis and the project design criteria (see pages 27-34). No other unresolved conflicts were identified through scoping that would indicate a need for additional alternatives.

Using comments from the public, local governments, permittees, and from within the Forest Service, the project interdisciplinary team developed a list of issues to address. The following list of issues helped to guide the impact analysis and development of design criteria for the proposed action:

### **Proposed road system modifications/access**

- One comment letter expressed concern that the public scoping letter did not accurately reflect the project scope to include road system modifications. The three page letter that was mailed during the public scoping period included a half page of explanation about proposed road changes as well as a link to the project website where the public could view maps and tables depicting proposed road system changes.
- There was concern about proposals to convert some undetermined roads to administrative-only access. Routes proposed for conversion to system roads with administrative access only have historically and currently been used for access for permitted uses such as by grazing and utilities permittees on the forest. Therefore, it was not practical to consider decommissioning these roads.
- A comment was received suggesting that roads proposed for closure are considered for conversion to system trails instead and that these trails would account for recreationalist displaced as a result of flooding in 2013. Recreational use in the Cherokee Park area is very limited given that the majority of FS land is inaccessible to the general public due to the checkerboard public-private land ownership pattern. For this reason, adding trails to the system

were not considered a viable alternative for this area. Additionally, the majority of routes proposed for decommissioning were user created, unauthorized routes.

- A comment was received about opening the project area to full public access. As stated above, public access to FS parcels in Cherokee Park is limited due to the land ownership pattern. Locked gates prevent the public from driving through private land to access FS land in some areas. The Forest Service will seek to acquire easements from private landowners (and in some cases reciprocating Forest road easements to private landowners or associations). Where the FS acquires easements on system roads, ‘full rights’ would be requested (per FS policy) which may include the potential for a road to be open to the public.
- It was suggested the district ensure effective closure methods are utilized for roads proposed for decommissioning so that routes are not re-opened. Design criteria have been developed for road decommissioning activities in an effort to use the most effective road closure methods.
- A number of comments were received about roads not being accurately portrayed on the maps included in the proposed action. Also, many comments were received from landowners and permittees regarding access across Forest Service land to private property. Some of these roads do not have proper authorizations in place. FS road maps have been updated and a second version of the travel analysis was completed to include new information received as a result of scoping and those roads not previously analyzed.
- Concern was expressed about lynx, bighorn lambing areas and elk production areas as related to travel system modifications. It was suggested that seasonal closures instead of road decommissioning be employed so as to preserve recreational access to those roads. Wildlife habitat was an element that was considered in the travel analysis, but because lynx, elk and bighorn habitats are considered minor in this area, this element was not a driving factor for roads proposed for decommissioning. No suitable lynx habitat exists within the project area. Lodgepole stands within Cherokee park are dry single story stands that do not provide horizontal cover preferred by lynx. There are some elk production areas in the project area but there is only a very small overlap with proposed vegetation treatment and temporary displacement only is expected as a result of the proposed action. There are no bighorn lambing areas in Cherokee Park. See wildlife specialist report in the project file for further discussion on these three species in more detail.

### **Vegetation treatments**

- There was concern about placement and longevity of burn piles that would be created as a result of vegetation treatments. In the eastern portions of the project area (generally east of CR59), slash pile creation is not allowed because of lack of reliable winter snowpack. Additionally design criteria were developed to address visual and watershed resource concerns related to slash piles.
- Concern was expressed about constructing roads as part of the proposed action. No new permanent roads are included in this proposal. Any temporary roads used or created for the purpose of vegetation management activities would be decommissioned following project completion.

- A comment was received encouraging utilization of as much of the wood products as possible. Vegetation treatments accomplished with mechanical equipment will allow forest products to be removed from units. A majority of the Cherokee Park units can be harvested using heavy equipment. However, there are several units that are constrained by steep slopes, proximity to water or other resource concerns that would need to be treated by hand with chainsaws. In this case, slash will be piled and burned. See proposed treatment Table 1 for specific units.
- There was concern about beetle-killed trees that have blown down onto private property from FS land. Proposed vegetation units were situated in many cases along private land boundaries to provide the most effective fuels treatment. Blow down onto private land will be ameliorated by this project. However, it is not feasible to treat all private-public land boundary in the project area.
- A comment was received about the potential for heavy equipment damage on county roads. The Forest Service does not have authority over county roads. However, it has been our experience in past projects that heavy equipment transport and log hauling on county roads have not caused significant damage. On FS roads, maintenance during project implementation and post-hauling road restoration once the project is completed is required. When potential damage to county roads is expected, the FS, county and contractor coordinate closely.
- Concern was expressed about removal of mistletoe from infected trees of all sizes. During unit layout, areas with heavy mistletoe infestation are included for treatment. The healthiest trees are retained on-site.
- A comment was received suggesting that the diameter size of conifers removed from meadows be increased from 8 inches to 12 inches. It was also suggested that trees could be piled in meadows to create wildlife habitat. In general, conifers growing in meadows in the Cherokee Park area are 8 inch dbh or smaller and spread out. Larger diameter trees are rare. The proposed meadow enhancement treatments do not preclude removal of larger conifers from meadows but describes that the majority will be smaller trees. The spread out arrangement of conifers is not conducive to piling. Secondly, it may not be aesthetically desirable to construct piles in meadows.
- Concern was expressed about larger diameter trees being removed from the treatment units. As the proposed action states, the oldest and largest live and healthy trees would be retained. As operationally necessary (i.e. at landing sites), occasionally large trees could be removed.
- A comment was received urging the Forest Service not to construct new roads as part of the proposed action. No new permanent roads are proposed as part of this project. Temporary roads may be utilized to accomplish the proposed fuel reduction treatments, but would be obliterated following project completion.
- There was concern about recruitment and retention of old growth ponderosa and old growth forest characteristics in general. The Cherokee Park proposal was developed with consideration to old growth forest within the project area and adheres to Forest Plan standards related to old growth. The proposed action states for Ponderosa pine ‘retain oldest and largest trees in both clumps and individuals to maintain or develop old growth characteristics’ (see pages 9-14 of the proposed action and page 31 of the project design criteria).

- Comments were received regarding snag and down wood retention for wildlife benefit. Design criteria have been developed for this project consistent with Forest Plan standards specifically addressing these issues (see page 29).
- A comment was received requesting that timing of vegetation management activities be coordinated so as to limit impact on recreational activities in Cherokee Park. Design Criteria #11 addresses this concern, and as stated earlier, recreation use in the project area is limited based on lack of public access.
- A comment was received urging the FS to allow firewood collection by adjacent private land owners. Firewood collection is allowed, under permit, by the general public in areas where public access is available. On a case-by case basis, private landowners may secure firewood permits for those parcels of FS land that are otherwise inaccessible.

#### **Public notification**

- Some commenters requested coordination with local emergency services and notification prior to project implementation. Local emergency service agencies were included in scoping efforts for this project. Access to treatment units will be negotiated on a case-by-case basis with landowners. Smoke sensitive or any interested individuals will be contacted prior to prescribed burning of piles. The district sends out press releases prior to project implementation and as necessary during the project in order to alert the public.

## **2.0 PROPOSED ACTION**

This section describes the proposed action alternative. When there are no unresolved conflicts concerning alternative uses of available resources (NEPA, section 102(2)(E)), the EA need only analyze the proposed action and proceed without consideration of additional alternatives (36 CFR 220.7(b)(2)(i)). The effect of taking no action is considered in the effects analysis by contrasting the impacts of the proposed action alternative with the current condition and expected future condition if the proposed action alternative were not implemented (36 CFR 220.7(b)(2)(ii)).

The Forest Service proposes to reduce hazardous fuels and restore the historic forest structure in the vicinity of Cherokee Park, Colo. on approximately 3,124 acres of NFS land (See Appendix A and Map 1). Vegetation management on Forest Service lands would complement work completed on neighboring private lands. The extent of treatments could vary in scope depending on the current level of mountain pine beetle-caused mortality and other stand characteristics at time of implementation. All of these treatments would lessen possible effects of a wildfire to communities-at-risk, while improving the wildlife habitat and resiliency of National Forest system lands in the project area.

Approximately 299 acres of aspen and 1,705 acres of grassland/meadow enhancement have been identified for potential treatment across the project area. These proposed treatments may occur both within identified treatment units (211 acres) and outside of identified units (1,793), but within the project boundary on NFS lands. Competing conifers within and sometimes surrounding the aspen clone would be removed. This would be done to perpetuate and to improve the health and vigor of the aspen

clone. Some meadows could have encroaching conifer trees cut to maintain plant communities unique to these systems.

Principal objectives of this project are to reduce hazardous fuels, maintain and enhance wildlife habitat, and move stands towards desired condition. Desired condition for all lodgepole pine stands would be to accelerate development of stand structures that will eventually emulate old growth conditions. The desired condition within mixed conifer forests is to perpetuate or create a heterogeneous stand structure characterized by clumps of live trees interspersed by areas of individual live trees and openings. As many as possible of the live oldest and largest ponderosa pine and occasionally Douglas fir trees would be retained. Most of the smaller diameter trees currently functioning as ladder fuels would be removed. Some smaller diameter open grown younger trees (seedlings, saplings and poles) and larger diameter dead standing trees (snags) would be retained. These desired stand structures would increase the resiliency to future disturbances by decreasing hazardous fuels while moving stands towards their natural regime and improving wildlife habitat.

For this project, an adaptive management approach would be used to ensure that forest resources are adequately protected and project objectives are met. Monitoring would be carried out during and following project implementation for this purpose. If monitoring demonstrates objectives are not being met, resources are not being protected adequately or if conditions within the project area have changed since time of project planning (e.g. adjustments in restoration prescriptions in ponderosa pine stands, innovative approaches to forest management in light of climate change, land ownership changes), treatment approaches could be modified to better meet the project purpose and need.

Forest Service lands in this area are intermingled with private and state lands in a checkerboard pattern. To gain access to many of the Forest Service parcels in the Cherokee Park project area, travel through private land would be required in most cases by Forest Service personnel or private contractors in order to complete the project. These locations would be identified prior to beginning the vegetation treatment activities and the conditions for access would be established on a case-by-case basis.

#### **PROPOSED VEGETATION TREATMENTS BY VEGETATION TYPE**

Proposed vegetation treatments for this project would primarily occur in the lower and upper montane vegetation zones, with ponderosa pine being the dominant forest type in Cherokee Park. The implementation of Cherokee Park vegetation treatments would be accomplished by private contractors and/or Forest Service employees. In most areas, either mechanized equipment or hand crews with chainsaws may be used to complete the treatments. However in some areas, such as units in steep or rocky terrain and within meadow enhancement areas, treatment would be limited to hand crews only. Where mechanized equipment is used, forest products would most likely be removed in the form of logs, chips or firewood. Firewood could also be removed from the hand treatment units.

#### **Ponderosa Pine and Mixed Conifer (Units: 1-6, 8, 10-15, and 17-24)**

*Description:* Proposed treatment units are dominated by ponderosa pine, Douglas fir with inclusions of limber pine, lodgepole pine, Rocky Mountain juniper and aspen. Trees of all sizes and age classes are

present. The understory has a mix of bitterbrush, common juniper, sage and a variety of grasses and forbs. The number of trees per acre varies throughout the units ranging from relatively dense patches to only a few trees per acre and areas void of trees altogether, but generally averages 480 trees per acre. Forest structure has been influenced by logging that has occurred since settlement, insect epidemics and fire suppression. Mountain pine beetle have been active in the area since 2009 evidenced by the patches of standing dead ponderosa and lodgepole pine trees. The mortality is approximately 30-50 percent in the stands due to beetle activity. Mountain pine beetle populations in the units are now believed to be at endemic levels with relatively few newly infested trees found.

The historic fire regime associated with ponderosa pine and mixed conifer stands similar to those found in Cherokee Park is thought to have been characterized by fires of variable intensity, severity and size, including some large areas affected by high intensity and high severity crown fires. Fires typically occurred on average every 8 to 25 years, but a range from 1 to 125 years has been recorded in this system along the Front Range of Colorado. This mixed-severity fire regime combined with heterogeneous environmental conditions, created a patchwork of both naturally dense areas and more open park-like stands throughout the landscape. There is no evidence indicating that mixed severity fires have occurred within the area for 100 to 120 years. As a result there are significantly more Douglas fir in the understory, fire pruning of lower branches of the dominant trees has not occurred and there is robust growth of shrubs which greatly increases the chances for high-intensity, stand-replacing crown fires.

Vegetation treatments in ponderosa pine and mixed conifer forest types would result in a heterogeneous stand composed of (1) a matrix of trees clumped together, (2) individual trees, (3) and openings to facilitate an uneven-aged condition. Clumps would vary in size depending on current stand structure and favor older and larger diameter ponderosa pine in a dominant canopy position. Individual trees retained would be older and larger diameter. Openings would be created where most of the trees will be removed. Openings would be located first where trees have been killed by MPB. The size of these openings would be determined by the extent of tree mortality that is present. In areas where continuous tree cover exists and MPB tree mortality is infrequent, then live trees would be removed. In this case, the openings would not exceed two acres in size. Tree density would vary across the treatment units and depend mostly on moisture availability, aspect and elevation. For wildlife habitat, the Forest Service would retain untreated patches in each treatment unit. To the extent practical, these wildlife retention patches would be dispersed across each unit and contain a higher density of live trees, often of smaller size classes. Regeneration patches would be thinned, retaining the best quality and healthiest trees, to promote future clumps. The proposed treatment would remove the standing dead and give stands a higher degree of variability in forest structure including more open forest conditions while maintaining a range of residual stand densities and age classes. Following vegetation treatment, the risk of loss to catastrophic fires should decrease while also increasing the resiliency of the residual stand.

Treatment objectives in ponderosa pine and mixed conifer stands would generally be as follows:

- Reduce hazardous fuels (remove ladder fuels and reduce surface fuel loading).

- Improve stand resilience to future disturbances to reduce potential impacts to wildlife habitat.
- Maintain or develop old growth characteristics (retain current mature and old growth stand characteristics and develop late successional forest habitat attributes in young stands).
- Remove standing dead trees (create openings).
- Restore stands to a pre-settlement reference condition (create clumps, openings, and individuals).
- Basal area (BA) densities could range from a low of 30 ft<sup>2</sup>/acre on drier sites and as high as 70 ft<sup>2</sup>/acre on moister sites. Within each treatment unit an average residual density within this range will be prescribed with emphasis on variability.

The following guidance would be used when treating ponderosa pine and mixed conifer stands:

- Remove standing dead trees to create openings. Create openings, not exceeding 20 percent of the unit.
- Remove all trees functioning as ladder fuels within 10 feet of the edge of the residual tree canopy.
- Retain ponderosa pine over Douglas fir.
- Retain oldest and largest trees in both clumps and individuals to maintain or develop old growth characteristics.
- Retain 10 percent of each unit as untreated in 0.5 to five acre patches (to provide some horizontal screening, hiding cover and habitat diversity for wildlife habitat). These patches should be focused on clumps of dense, live trees, often of smaller size classes, but also can include denser patches of taller or larger trees.
- Thin areas of regeneration to spacing of 6 to 16 feet between trees.
- Treat created and existing slash by mastication and/or piling and burning.

#### **Mature Lodgepole Pine (Units: 7, 73, and 92-93)**

*Description:* Proposed units are predominately mature lodgepole pine, averaging 5-8 inches in diameter and 209 trees per acre, with occasional patches of live seedling and sapling size lodgepole pine growing in where gaps in the canopy existed. Most of the lodgepole pine stands within the project area are even-aged. Approximately 40-60 percent of the mature trees have been killed by mountain pine beetle. Mountain pine beetle populations within the project area are believed to now be at endemic levels.

The lodgepole pine dominated stands within the project are believed to have been created by stand-replacing fires. Because large fires occur so infrequently in this vegetation type, it is not likely that a few decades of fire suppression has significantly altered lodgepole pine stand dynamics. Historically these stands were dense and had infrequent, but high severity and intense fires that resulted in active crown fires.

Proposed vegetation treatments in mature lodgepole pine would remove only standing dead trees. Standing live trees would only be removed if necessary for logging operations. The proposed treatment would allow the remaining live stands to reach late successional and old growth structure more quickly.

Treatment objectives in mature lodgepole pine stands would generally be as follows:

- Reduce hazardous fuels (remove standing dead and reduce surface fuel loading).
- Maintain or develop old growth stand characteristics in stands (retain existing live large tree structure).

The following guidance would be used when treating mature lodgepole pine stands:

- Remove standing dead trees.
- Remove live trees only when operationally necessary.
- In Units 7 and 92, retain 10 percent of each unit as untreated in one to five acre patches, consisting of both live and dead trees. These patches should be focused on areas with higher density of live trees. The intent is to retain a small portion of each unit with dense live and dead tree structure for habitat diversity.
- Retain all Englemann spruce.
- Treat created and existing slash by piling and burning.

### **Immature Lodgepole Pine (Units: 9, 71-72, and 91)**

*Description:* Proposed treatment units encompass previously treated clearcuts that have regenerated with lodgepole pine. Some of the stands have been previously thinned and contain high surface fuel loading. The trees are relatively dense, averaging 432 trees per acre, and approximately five inches in diameter. The stands are even-aged and are within an old growth development area.

Proposed vegetation treatments in this forest type would thin the existing stands to reduce the number of trees per acre. Thinning the stands would allow the remaining trees to accelerate in growth and ultimately develop desired old growth attributes.

Treatment objectives in immature lodgepole pine stands would generally be as follows:

- Reduce hazardous fuels (reduce surface fuel loading).
- Improve wildlife habitat and develop old growth stand characteristics.

The following guidance would be used when treating immature lodgepole pine stands:

- Thin 85 percent of each unit, using a range of bole spacing, generally 10-15 feet, retaining the tallest and healthiest trees.
- Retain 15 percent of each unit as untreated in 1 to 5 acre patches.
- Retain all Englemann spruce.
- Reduce stand density to 200-475 trees per acre.
- Treat created and existing slash by mastication and/or piling and burning. Create small openings, when needed, to facilitate pile construction if thinned by hand crews.

### **Aspen**

*Description:* Aspen can occur over a wide variety of sites ranging from dry, high-elevation grasslands to poorly drained meadow sites. Over time, conifers often become established and decrease the available light for the sun-loving aspen. As the stand grows, and shade on the site increases, conifer species may eventually replace the aspen. Colorado's aspen forests provide essential wildlife habitat and are second only to riparian areas in terms of biodiversity richness. While aspen's thin, living bark makes it prone to a

host of insect pests and diseases, the primary threats to Colorado’s aspen forests are fire suppression, chronic browsing (e.g. by elk and cattle) of young aspen shoots, and more recently a wave of aspen die-off (referred to as “sudden aspen decline”) due to long-term drought. The objective of aspen enhancement treatments would be to improve aspen vigor by reducing shading and competition created by conifer encroachment. In addition, removing conifers slows the natural successional pattern allowing for a longer retention of aspen on the landscape.

Proposed vegetation treatments in this forest type could take place within identified treatment units or on other NFS lands within the project area. The treatment would primarily cut smaller diameter conifers (e.g. ponderosa pine, lodgepole pine, Douglas fir, and Rocky Mountain juniper) from aspen stands generally greater than 0.25 acre in size. Encroaching conifers could also be removed from small aspen stands (less than 0.25 acre in size) outside of fuels treatment units. Map 3 generally shows aspen areas that may be treated.

Treatment objectives in aspen stands would generally be as follows:

- Improve aspen vigor by reducing shading and competition created by conifer encroachment.

The following guidance would be used when treating aspen stands:

- Treatment could be accomplished by hand or by using mechanical equipment within treatment units, but hand felling only would be required in areas outside treatment units.
- Conifer trees up to 12 inches in diameter may be felled, except for Engelmann and blue spruce for which trees up to 10 inches may be cut.
- Conifers could be removed, lopped and scattered, or felled and left in place.

## **Meadows**

*Description:* Montane meadows can occur as small habitats within surrounding forested stands or as large meadow and grassland habitats. Conifer invasion into mountain meadows is common in the western United States mainly because of fire suppression. Meadow habitat was historically maintained by natural fire. Over time, conifer encroachment can reduce meadow and grassland habitats as well as the habitat diversity they provide within montane meadow ecosystems.

Proposed vegetation treatments in this vegetation type could take place within identified treatment units or on other NFS lands within the project area. The objective of vegetation treatment in meadows would be to maintain meadow habitat by removing encroaching conifers. In order to maintain grassland/meadow areas, smaller diameter conifers (e.g. ponderosa pine, lodgepole pine, Douglas fir, and Rocky Mountain juniper) encroaching into grassland/meadow areas would be cut. Map 3 generally shows grassland and meadow areas that may be treated.

Treatment objectives in meadows would generally be as follows:

- Maintain meadow habitat by removing encroaching conifers.

The following guidance would be used when treating meadows:

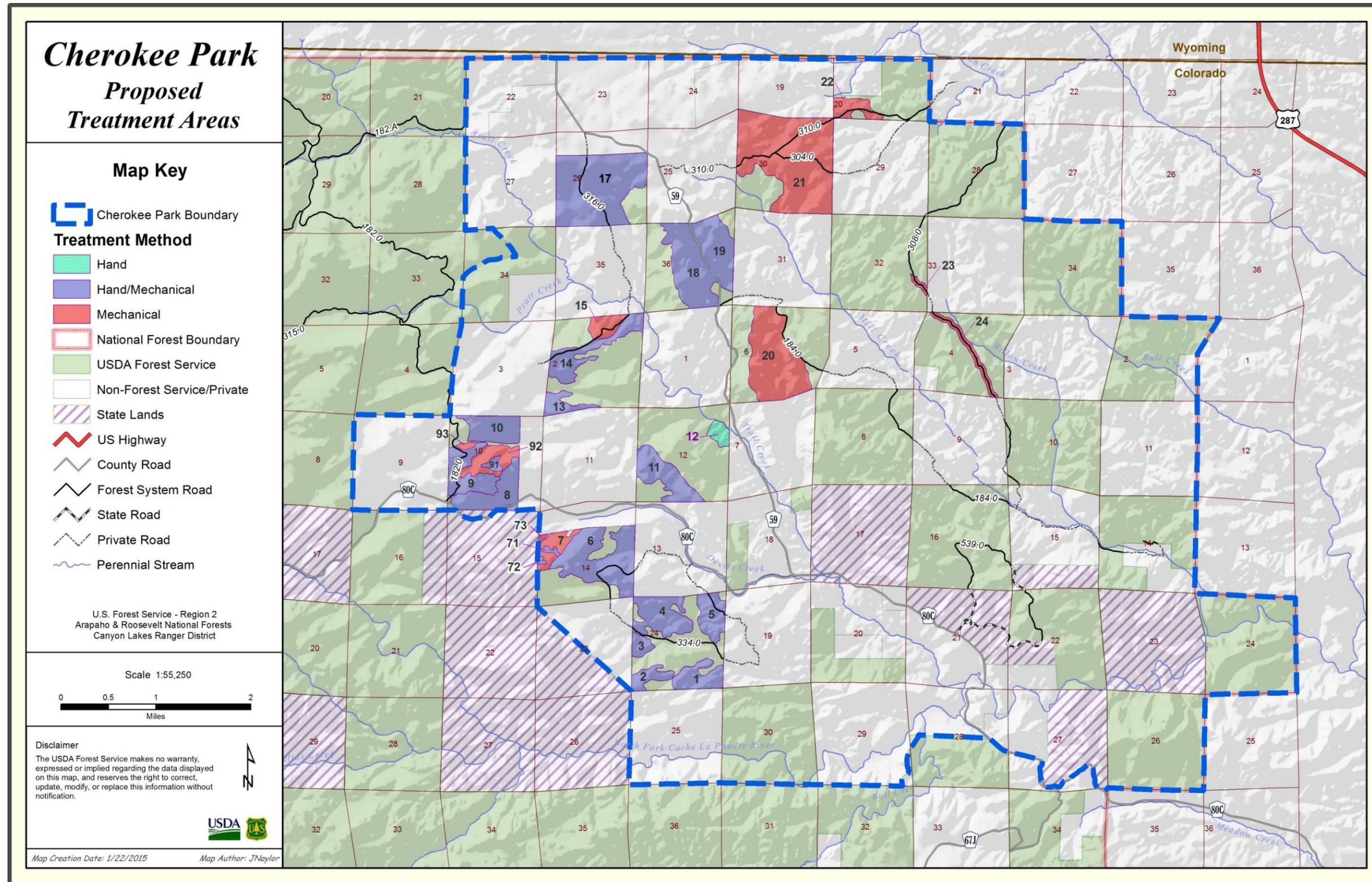
- Generally, trees to be cut within meadows would be seedling, sapling, and pole size trees, primarily less than 8 inches in diameter, with the large majority being much smaller.
- Large mature and old growth conifers would be retained if present.
- Hand felling only would be used outside of fuel treatment units.
- Conifers could be removed, lopped and scattered, or felled and left in place.

Table 1. Cherokee Park Proposed Treatment Units

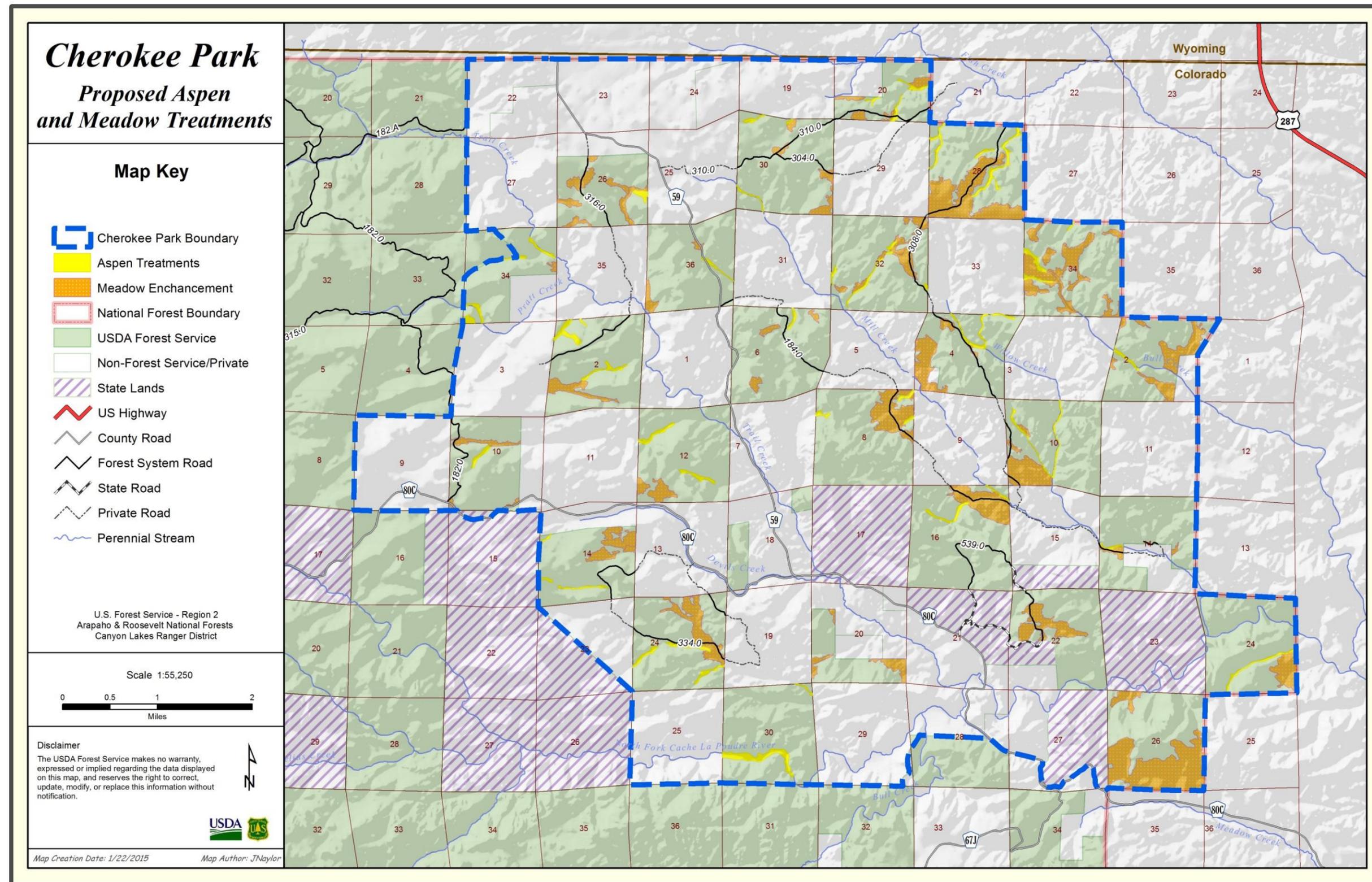
Unit	Vegetation Type	Proposed Vegetation Treatment	Treatment Method	Acres	Slash Treatment
1	Ponderosa/Mixed Con	Remove dead; create clumps and individuals	Hand/Mechanical	76	Pile & burn
2	Ponderosa/Mixed Con	Remove dead; create clumps and individuals	Hand/Mechanical	41	Pile & burn
3	Ponderosa/Mixed Con	Remove dead; create clumps and individuals	Hand/Mechanical	27	Pile & burn
4	Ponderosa/Mixed Con	Remove dead; create clumps and individuals	Hand/Mechanical	126	Pile & burn
5	Ponderosa/Mixed Con	Remove dead; create clumps and individuals	Hand/Mechanical	78	Pile & burn
6	Ponderosa/Mixed Con	Remove dead; create clumps and individuals	Hand/Mechanical	251	Pile & burn
7	Lodgepole	Remove dead	Mechanical	50	Pile & burn
8	Ponderosa/Mixed Con	Remove dead; create clumps and individuals	Hand/Mechanical	120	Pile & burn
9	Lodgepole	Thin	Hand/Mechanical	110	Pile & burn
10	Ponderosa/Mixed Con	Remove dead; create clumps and individuals	Hand/Mechanical	99	Pile & burn
11	Ponderosa/Mixed Con	Remove dead; create openings, clumps and individuals	Hand/Mechanical	124	Pile & burn
12	Ponderosa/Mixed Con	Remove dead; create clumps and individuals	Hand	29	Pile & burn
13	Ponderosa/Mixed Con	Remove dead; create clumps and individuals	Hand/Mechanical	44	Pile & burn
14	Ponderosa/Mixed Con	Remove dead; create clumps and individuals	Hand/Mechanical	119	Pile & burn
15	Ponderosa/Mixed Con	Remove dead; create clumps and individuals	Mechanical	46	Pile & burn
17	Ponderosa/Mixed Con	Remove dead; create clumps and individuals	Hand/Mechanical	403	Pile & burn
18	Ponderosa/Mixed Con	Remove dead; create openings, clumps and individuals	Hand/Mechanical	202	Pile & burn
19	Ponderosa/Mixed Con	Remove dead; create clumps and individuals	Hand/Mechanical	138	Pile & burn
20	Ponderosa/Mixed Con	Remove dead; create clumps and individuals	Mechanical	290	Masticate/firewood
21	Ponderosa/Mixed Con	Remove dead; create clumps and individuals	Mechanical	543	Pile & burn
22	Ponderosa/Mixed Con	Remove dead; create clumps and individuals	Mechanical	51	Pile & burn
23	Ponderosa/Mixed Con	Remove dead; masticate shrubs	Mechanical	9	Masticate/firewood
24	Ponderosa/Mixed Con	Remove dead; masticate shrubs	Mechanical	43	Masticate/firewood
71	Lodgepole	Thin	Hand/Mechanical	6	Pile & burn
72	Lodgepole	Thin	Hand/Mechanical	4	Pile & burn
73	Lodgepole	Remove dead	Mechanical	3	Pile & burn
91	Lodgepole	Thin	Hand/Mechanical	13	Pile & burn
92	Lodgepole	Remove dead	Mechanical	72	Pile & burn

Unit	Vegetation Type	Proposed Vegetation Treatment	Treatment Method	Acres	Slash Treatment
93	Lodgepole	Remove dead	Mechanical	7	Pile & burn
Aspen/Meadow Enhancement	Aspen/Meadow	Remove conifers	Hand/Mechanical	1,793	Lop & scatter/pile & burn
<b>Total Acres</b>				<b>4,917</b>	

Map 2. Proposed vegetation treatment units, Cherokee Park



Map 3. Proposed aspen and meadow treatment areas, Cherokee Park



### Road System Modifications

A transportation analysis (TA) was prepared during the initial phases of the Cherokee Park project and documents a route-by-route analysis of all NFS roads and known unauthorized routes within the project area. The TA recommends the transportation system necessary for public access, motorized recreation and forest management while taking into account the effects of roads on natural resources. It recommends changes to the forest transportation system to meet current and future management objectives. These recommendations are based on an analysis of the physical, biological, social, and economic risks and benefits of every system road. Unauthorized roads not under a current permit or easement may be decommissioned as part of this project. During implementation of vegetation treatments, these roads could be utilized but then decommissioned once the project is completed. Roads outside of treatment units could also be decommissioned as part of a watershed restoration project.

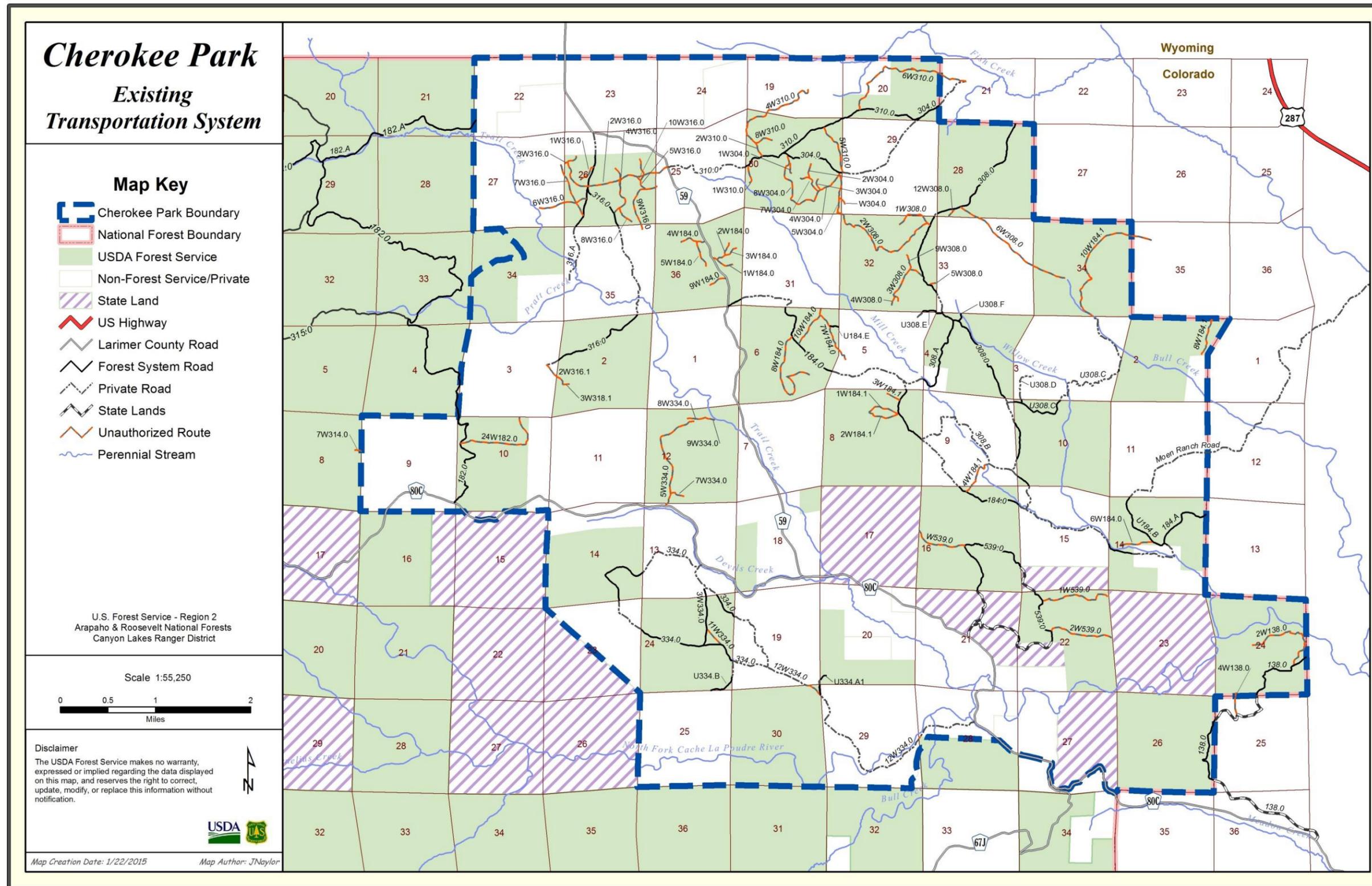
During public scoping for this project, many private landowners submitted comments pertaining to the proposed changes to roads in Cherokee Park. Due to the alternating private-federal land ownership pattern, a significant number of landowners gain access to their property via FS lands. Many of these road segments travelling through FS land are not currently under a proper authorization (road authorizations are discussed in greater detail in the 3.0 Lands section of this document). While these roads may exist on the ground, they have not been considered part of the FS system of roads to date and will effectively increase the number of miles of system roads if accepted as part of the FS system road inventory.

Given the feedback received during scoping, an addendum to the travel analysis was prepared in order to take into account the new information. Road recommendations are presented below and differ from what was considered in the initial proposed action.

Proposed changes to the Cherokee Park FS road system are summarized below (see Table 2 and Maps 4 & 5 for route-by-route recommended changes):

- (1) Maintain most forest system roads in the project area, totaling 26.29 miles.
- (2) Decommission 4.56 miles of forest system roads identified as not necessary for forest management nor used to access private lands.
- (3) Convert 5.71 miles of undetermined routes to system roads with administrative access only. These are road segments that are utilized by grazing and utility permittees and these routes would be identified in individual permits.
- (4) Consider conversion of 3.51 miles of undetermined routes to FS system routes, pending application from landowner for road authorization and if determined there is no alternative access across private land. These are roads used to access private land.
- (5) Decommission remaining undetermined routes in the project area totaling 18.57 miles considered not needed for forest management or private land access.
- (6) Decommission newly identified or currently unknown unauthorized or user-created routes.

Map 4. Existing Transportation System, Cherokee Park





**Table 2.** Proposed changes to road system for Cherokee Park Project Area.

Recommendations and road miles vary from that presented in original proposed action (see also Cherokee Park TAP Addendum). Recommendations that are different are in **BOLD ALL CAPS** in the Post-Scoping Recommendation column. \*Recommendation is contingent upon receiving an application for road authorization, otherwise unauthorized routes are proposed for decommissioning.

Road Number	Road Name	FS Miles	Initial Proposed Action Recommendation	Post-Scoping Recommendation	Notes
<b>Forest System Roads</b>					
138.0	TURKEY ROOST	0.77	Maintain if needed	Maintain	Segment in S. 26
		0.83	Maintain if needed	<b>DECOMMISSION</b>	Segment in S. 24
182.0	PRATT CREEK	9.44	Maintain	Maintain	Used by grazing permit holder.
182.A		1.90	Maintain	Maintain	
184.0	MILL CREEK ROAD	2.98	Maintain	Maintain	Used by grazing permit holder.
184.A	MILL CREEK SPUR	0.70	Maintain	<b>DECOMMISSION</b>	Used by PVREA and grazing permit holder. Very old road that has since grown over and primarily used as a cattle trail and/or by ATV to administer grazing permit
304.0	KELSEY LAKE SPUR	1.00	Maintain	Maintain	Used by grazing permit holder.
308.0	WILLOW CREEK TR	4.00	Maintain	Maintain	
308.A	THREE CREEK TR	0.56	Maintain	Maintain	
308.B	HAYSTACK ROCK CIR	1.50	Decommission	<b>NO RECOMMENDATION</b>	Road exists solely on private land.
310.0	KELSEY LAKE	2.10	Maintain	Maintain	Used by grazing permit holder.
316.0	DIAMOND PEAK	0.90	Maintain	Maintain	PVREA uses northern portion of this route.
		1.00	Maintain	<b>DECOMMISSION</b>	Section 2 road segment is not utilized, maintained
316.A		0.42	Maintain if needed	<b>MAINTAIN</b>	Recommendation in Proposed action is switched around. Should recommend maintain for 316.A
334.0	DEVILS GULCH	2.22	Maintain	Maintain	Used by PVREA and CenturyLink.
539.0		2.03	Maintain if needed	<b>DECOMMISSION</b>	Not maintained or used, grown over and washed out. Illegal OHV use observed.
<b>TOTAL</b>		<b>32.35</b>			
<b>Roads previously not considered in TAP/not on FS map</b>					
U184.B	MOEN RANCH ROAD	0.61	Not identified in proposed action	<b>CONSIDER ADDING TO SYSTEM*</b>	Located in N ½ of S. 24, previously not included in FS road system. Provides access to private property in Section 14.
U308.E0.04	HIDDEN ROCK LANE	0.23	Not identified in proposed	<b>CONSIDER ADDING TO</b>	Used as access to private land

Road Number	Road Name	FS Miles	Initial Proposed Action Recommendation	Post-Scoping Recommendation	Notes
			action	<b>SYSTEM*</b>	
U308.C	BULL CREEK PASS	0.65	Not identified in proposed action	<b>CONSIDER ADDING TO SYSTEM*</b>	Located in NE ¼ of S. 10, provides access to private land
U308.F	Spur Driveway North end of 308.0	0.10	Not identified in proposed action	<b>CONSIDER ADDING TO SYSTEM*</b>	Access to private land in S. 33 from road 308.0
U184.E	Spur Driveway off of 7W184.0	0.10	Not identified in proposed action	<b>CONSIDER ADDING TO SYSTEM*</b>	Used as access to private land
U308.D	CANYON OVERLOOK	0.04	Not identified in proposed action	<b>CONSIDER ADDING TO SYSTEM*</b>	Used as access to private land
U334.A1		0.20	Not identified in proposed action	<b>CONVERT TO SYSTEM ROUTE WITH ADMIN. ONLY ACCESS</b>	North off of 12W334.0 Cherokee Hills Drive, access to S. 20. Used by grazing permittee
U334.B		0.31	Not identified in proposed action	<b>CONVERT TO SYSTEM ROUTE WITH ADMIN. ONLY ACCESS</b>	South off of 334.0 access to S. 24. Used by grazing permittee
<b>TOTAL</b>		2.24			
<b>All other Undetermined/Unauthorized Routes</b>					
10W184.0	ELK MOUNTAIN ROAD	0.46	Convert to System Route with Admin. Only access	<b>CONSIDER ADDING TO SYSTEM*</b>	Larimer County has as a named street. Used as access to private land
10W184.1		1.0	Convert to System Route with Admin. Only access	Convert to System Route with Admin. Only access	Used by grazing permit holder.
10W316.0		0.5	Decommission	Decommission	
11W334.0		0.22	Decommission	Decommission	Used by grazing permit holder, can use 3W334.0 instead
12W308.0		0.11	Decommission	Decommission	
12W334.0	CHEROKEE HILLS DRIVE	0.22	Decommission	<b>CONVERT TO SYSTEM ROUTE WITH ADMIN. ONLY ACCESS</b>	Used by grazing permittee
1W184.0		0.25	Decommission	Decommission	
1W184.1		0.26	Decommission	Decommission	
1W304.0		0.13	Decommission	Decommission	
1W308.0		0.43	Decommission	Decommission	
1W310.0		0.20	Decommission	Decommission	
1W316.0		0.21	Decommission	Decommission	
1W539.0		0.77	Decommission	Decommission	

Road Number	Road Name	FS Miles	Initial Proposed Action Recommendation	Post-Scoping Recommendation	Notes
24W182.0		1.02	Convert to System Route with Admin. Only access	<b>CONSIDER ADDING TO SYSTEM*</b>	Used by grazing permit holder. Used as access to private land
2W138.0		1.00	Decommission	Decommission	
2W184.0		0.25	Decommission	Decommission	
2W184.1		0.43	Decommission	Decommission	
2W304.0		0.16	Decommission	Decommission	
2W308.0		1.37	Decommission	Decommission	
2W310.0		0.2	Convert to System Route with Admin. Only access	<b>DECOMMISSION</b>	Not used by grazing permit holder.
2W316.0		1.41	Decommission	Decommission	
2W316.1		0.12	Decommission	Decommission	
2W539.0		0.69	Decommission	Decommission	
3W184.0		0.16	Decommission	Decommission	
3W184.1		0.16	Decommission	Decommission	
3W304.0		0.14	Convert to System Route with Admin. Only access	<b>DECOMMISSION</b>	Not used by grazing permit holder.
3W308.0		0.42	Decommission	Decommission	
3W316.0		0.04	Decommission	Decommission	
3W318.1		0.07	Decommission	Decommission	
3W334.0		0.61	Convert to System Route with Admin. Only access	Convert to System Route with Admin. Only access	Used by grazing permit holder and PVREA. Access to private land
4W138.0		0.24	Decommission	Decommission	
4W184.0		0.08	Decommission	Decommission	
4W184.1		0.45	Decommission	Decommission	
4W304.0		0.43	Decommission	<b>CONVERT TO SYSTEM ROUTE WITH ADMIN. ONLY ACCESS</b>	Used by grazing permittee
4W308.0		0.10	Decommission	Decommission	
4W310.0		0.48	Convert to System Route with Admin. Only access	<b>DECOMMISSION</b>	Not used by grazing permit holder.
4W316.0		0.58	Decommission	Decommission	
5W184.0		0.29	Decommission	Decommission	
5W304.0		0.43	Convert to System Route with Admin. Only access	Convert to System Route with Admin. Only access	Used by grazing permit holder.
5W308.0	THREE CREEK	0.08	Decommission	<b>CONSIDER ADDING TO</b>	Used as access to private land

Road Number	Road Name	FS Miles	Initial Proposed Action Recommendation	Post-Scoping Recommendation	Notes
	TRAIL			<b>SYSTEM*</b>	
5W310.0		0.54	Decommission	Decommission	
5W316.0		0.47	Decommission	Decommission	
5W334.0		1.18	Convert to System Route with Admin. Only access	Convert to System Route with Admin. Only access	Used by grazing permit holder.
6W184.0		0.35	Convert to System Route with Admin. Only access	Convert to System Route with Admin. Only access	Used by grazing permit holder.
6W308.0		0.22	Convert to System Route with Admin. Only access	Convert to System Route with Admin. Only access	Used by grazing permit holder.
		0.37	Convert to System Route with Admin. Only access	<b>DECOMMISSION</b>	Segment in S. 34 not needed/non-existent
6W310.0		0.19	Convert to System Route with Admin. Only access	Convert to System Route with Admin. Only access	Used by grazing permit holder - First segment of road from 310.0 to the north
		0.57	Convert to System Route with Admin. Only access	<b>DECOMMISSION</b>	Segment that travels east/west in NE quarter of S20
6W316.0		0.25	Decommission	<b>CONSIDER ADDING TO SYSTEM*</b>	Located in SW ¼ S. 26. Used as access to private land
7W184.0	ELK MOUNTAIN ROAD	0.43	Decommission	<b>CONSIDER ADDING TO SYSTEM*</b>	Used as access to private land
7W304.0		0.29	Decommission	Decommission	
7W314.0		0.07	Decommission	Decommission	
7W316.0		0.49	Decommission	Decommission	
7W334.0		0.16	Convert to System Route with Admin. Only access	Convert to System Route with Admin. Only access	Used by grazing permit holder.
8W184.0		1.19	Decommission	Decommission	
8W184.1		0.41	Convert to System Route with Admin. Only access	Convert to System Route with Admin. Only access	Used by grazing permit holder.
8W304.0		0.81	Decommission	Decommission	Not needed by grazing permittee, not passable
8W310.0		0.20	Convert to System Route with Admin. Only access	<b>DECOMMISSION</b>	Not used by grazing permittee
8W316.0		0.21	Decommission	Decommission	
8W334.0		0.19	Decommission	Decommission	
9W184.0		0.20	Decommission	Decommission	
9W308.0		0.34	Decommission	Decommission	
9W316.0		0.45	Decommission	Decommission	

Road Number	Road Name	FS Miles	Initial Proposed Action Recommendation	Post-Scoping Recommendation	Notes
9W334.0		0.11	Decommission	Decommission	
W304.0		0.03	Decommission	Decommission	
W539.0		0.58	Decommission	Decommission	
<b>TOTAL</b>		<b>26.01</b>			

## 2.1 PROJECT DESIGN CRITERIA

The following list of design features will be followed during project implementation to offset potential impacts to forest resources and ensure best management practices are adhered to. Some criteria are directly from the Forest Plan or are required by law, policy or Forest Service direction, while others have been developed specifically for this project.

### ALL PROJECT ACTIVITIES (GENERAL DESIGN CRITERIA)

1. Prior to project implementation, areas will be surveyed that contain habitat for Threatened and Endangered (TE) plant species as well as medium- to high-quality habitat for Sensitive plant species. If found prior to or during project implementation, TE plants will be avoided such that there would be no adverse impacts to plants. Sensitive plants would be avoided or project actions mitigated to ensure that adverse impacts would not cause a trend toward listing under the Endangered Species Act (ESA) or decreased viability across the planning unit.
2. Prior to entering the project area, equipment would be cleaned to minimize risk of noxious weed introduction and spread. This applies to all contract and Forest Service equipment used off road for this project (not including service trucks or other vehicles that remain on roadways). Equipment would be free of mud, dirt, plant parts, seeds, or other debris that could contain or hold seeds or propagative plant parts. Equipment would be considered free of soil and other debris when a visual inspection does not disclose such material. Equipment would be re-cleaned prior to transfer to a unit where noxious weeds are known to be present into a unit where noxious weeds are not known present. Disassembly of equipment components or specialized tools is not required.
3. In order to prevent the spread of whirling disease, off road equipment must avoid stream crossings or cross via designated stream culverts. (Skidding or yarding equipment will not make open water crossings.)
4. A Class II (sample) Cultural Resource Inventory will be completed in consultation with the Colorado State Historic Preservation Office (SHPO) prior to project implementation. Implementation will not begin until the SHPO has concurred with a determination of no historic properties affected or no historic properties adversely affected.
5. Previously undiscovered heritage sites encountered during the course of project activities would be avoided until they can be evaluated by an archaeologist. If affected properties are discovered after project activities are completed, the Forest would document any damage and consult with SHPO and Council pursuant to 800.13(b).
6. Prior to implementation of projects where access is required across non-Federal land, contact the landowner in advance to negotiate the proper authorization and timeframe. If access is acquired (either temporary or long-term) road conditions should be assessed and documented with the landowner prior to and after implementation.
7. For all utility lines contact utility company (Poudre Valley REA, CenturyTel, etc.) prior to any project implementation and/or provide for notification in any contracts.

8. Delineate all infrastructure (ex: fences, gates, signs, water tanks) on treatment area maps during layout phase to protect them from damage from treatment activities. If damaged, repair or replace.
9. Coordinate operations with livestock grazing permittee before the grazing season to make necessary modifications to allotment use.
10. As determined by the District Range Staff, fence extensions may be needed in areas where dense trees that currently limit livestock movement are removed by treatment.
11. Implementation schedules for project activities will be provided to the District Recreation Program Manager for coordination with Visitor Information Services and outfitter and guide permittees.
12. Treatment units that have Forest Service road access for motorized public use should include one or more of the following to prevent off-road vehicular use: A buffer zone between the road and the treatment area, a fence constructed along the road, and/or a sufficient quantity of down woody material left to prevent off-road vehicular use into the treatment unit. Consult with recreation specialist to determine specific areas where this treatment should be carried out.
13. All aboveground and underground utilities will be located and identified on contract map during layout phase for protection.
14. Roads, trails, and disturbed sites would be stabilized and maintained during and after project implementation to control erosion.
15. Locate vehicle service and fuel areas, chemical storage and use areas, and waste dumps and areas on gentle upland sites, away from surface water.
16. Install contour berms and trenches around vehicle service and refueling areas, chemical storage and use areas, and waste dumps to fully contain spills.
17. For raptor nest site protection, a seasonal restriction on project activities (i.e. noise disturbance and human encroachment) from March 1 through August 31 will be implemented within one-quarter mile of known raptor nest sites in proximity to units 20 and 24. Additionally, treatment in portions of units 20 and 24 in proximity to active raptor nest sites may need to be excluded to maintain the integrity of the nest stand. If necessary, exceptions to this criterion may occur after consultation with the District Wildlife Biologist.
18. If raptor nesting activity (e.g. nesting behavior, nest sites, or fledglings) is detected within treatment units or areas potentially impacted by proposed project activities prior to or during implementation, a Forest Service wildlife biologist would be contacted as soon as possible to ensure Forest Plan guidelines for raptor protection are met.
19. If a federally listed or Forest Service sensitive wildlife species is identified within treatment units or areas potentially impacted by proposed project activities prior to or during implementation, a Forest Service wildlife biologist will be contacted as soon as possible to ensure Forest Plan guidelines are met.

### All Harvest Treatments

20. Jackstrawed bole wood 6 inches diameter or greater, created by treatment, and left in the unit must be scattered, and be fully in contact with the ground. Individual boles of 6 inches or greater diameter can be left unbucked.
21. Applicable for all treatment units. All trees of all species, both live and dead, with a stump diameter greater than 20" will be retained as much as possible or practical. Retained dead trees will apply toward the project required number of snags per acre.
22. Unit boundary and tree marking: When located within the view corridor (two chains (132') of the viewers on Larimer County roads 59 & 80C-the road corridor) leave trees shall be repainted when work is complete with a color sympathetic to the tree bole when the contract is closed.
23. Harvest areas shall achieve a natural appearing shape as determined by the Landscape Architect. Units shall mimic the scale of natural openings where feasible. Units shall strive to prevent the appearance of uniform tree spacing. Harvest area boundaries shall be natural or natural-appearing edges whenever possible to avoid any straight line unit boundaries. Straight line boundaries shall be treated by 'feathering' and 'scaloping'.
24. Whenever possible, flush cut stumps (4 inch height at highest point) in Larimer County roads 59 & 80C road corridor.
25. At a minimum, retain an average of 3 snags per acre within all treatment units. Snags may be retained in a mix of both clumps and individuals. Criteria for snag selection will be specified in the silviculture prescription with emphasis on retaining the largest diameter snags present. If the minimum number of snags is not available, then live, green replacement trees will be selected for future snags and, again, should be the largest trees available.
26. Within 100 feet of riparian vegetation along stream channels identified by the wildlife biologist that provide Preble's mouse habitat (Trail Creek, Willow Creek), retain all existing downed woody material with a minimum of 5 inches or greater diameter. New slash from the thinning may be burned, piled, lopped, and/or scattered.
27. Retain existing down wood distributed randomly across the unit with a large-end diameter greater than 10 inches for a target of 3-5 logs per acre and minimum of 50 linear feet per acre. Live trees would not be cut to meet this criterion.
28. For portions of thinning units 12 and 24 along stream channels identified by the wildlife biologist that provide Preble's mouse habitat (Trail Creek, Willow Creek), only chainsaw thinning would be allowed within 100 meters (328 feet) of each side of the stream, and tracked or wheeled machinery would not be allowed within this 100-meter (328 feet) buffer.
29. Burn piles would be located 50 feet or outside the inner gorge, whichever is less, for intermittent and ephemeral streams.
30. Lopped and scattered slash would be removed from the stream channel of perennial and intermittent streams.

### Hand Treatments

31. In hand units, pile all sound existing and/or created slash material, 1 to 6 inch diameter and 2 feet long or longer. Alternatively, any slash that must be moved more than 50 feet to meet minimum required pile size may be lopped and scattered to a maximum depth of 18 inches.

32. Tree cutting can occur to the edge of the stream bank for perennial, intermittent and ephemeral streams. For shading and bank stability, retain 50 percent of forested vegetation along the banks of perennial and intermittent streams. No riparian vegetation will be cut.
33. Burn piles would be located at least 50 feet from perennial streams, wetlands, fens, and wet meadows. Ditches and canals are considered perennial streams if they carry water outside of runoff season or storm events and/or they support riparian vegetation.
34. Retain effective ground cover to prevent accelerated on-site soil loss and sediment delivery to streams according to the appropriate slope gradient ranges in a unit as follows: 0-25 percent slope retain 30 percent ground cover, 25-40 percent slope retain 40 percent ground cover, 40-75 percent slope retain 50 percent ground cover, over 75 percent slope retain 70 percent ground cover.
35. In treatment units where slash is piled by hand, leave 2 piles per unit acre for wildlife habitat. Piles should be randomly distributed throughout the unit, except that piles would not be located within 50 feet of open roads or private property boundaries.

### **Mechanical Operations**

36. Revegetate following the cessation of ground disturbing activities on any area where effective ground cover is removed or obliterated (e.g. skid trails and landings).
37. Units 1-8, 10-19, and 21-22 (mechanically-treated units), whole tree logging and/or piling within the unit is required. Slash take back is only allowed in areas adversely impacted (i.e., skid trails), for soil stabilization, and to a maximum depth of 18 inches.
38. All activity slash material, 1 inch to 6 inch diameter, must be reasonably gathered and placed into piles. If more than 50 percent of a treatment unit has continuous slash depth greater than 6 inches after initial treatment, additional piling is required.
39. Retain effective ground cover (slash or vegetation) according to the amount of disturbance to prevent erosion: within generalized cutting areas, retain an average of 40 percent ground cover; within more disturbed areas (i.e. skid trails, landings, temporary roads) and where slope exceeds 35 percent, retain 50-60 percent average ground cover. When necessary, slash left on disturbed areas should be evenly distributed, include both fine and coarse debris and have a minimum depth of 12 inches up to a maximum of 18 inches.
40. If mechanical equipment (not including chainsaws) is used to implement thinning treatments, then all National Register of Historic Places (NRHP) eligible or unevaluated sites within the units proposed for such treatments would be flagged on the ground for avoidance during implementation. No thinning or slash treatments would occur within these flagged areas, unless determined to be appropriate by the Project Archaeologist.
41. For mechanized treatments, known noxious weed populations may be flagged on the ground for avoidance during layout. No thinning or slash treatments would occur within these flagged areas, unless determined to be appropriate by the District weed coordinator.
42. For areas accessible to the public, no operations on the weekends from 5 pm Friday to 6 am Monday from June 1st to November 30 unless waived by the recreation specialist. This applies to Units 8, 9, 18, 19, 92 and 93.

43. Applicable for all Ponderosa Pine and Mixed Conifer Treatment Units (units 1-6, 10-15 and 17-24): the oldest live trees, generally in the dominant and co-dominant canopy class will be retained as much as possible or practical. The retention of these trees will be considered when approving the location of temporary roads, landings and skid trails.
44. All trees of all species, both live and dead, with a stump diameter greater than 20 inches will be retained as much as possible or practical. Retained dead trees will apply toward the project required number of snags per acre.
45. Applicable for Treatment Units 11 and 18: Created openings will be defined as areas generally two acres in size or less, with a canopy cover of 10 percent or less. Any trees remaining should be the oldest trees, generally in the dominant and co-dominant canopy class.
46. Where chipping operations are planned, depth of chips should not exceed 3 inches and should not exceed 40 percent ground cover of an area for any given acre.
47. Where mastication operations are planned, chunks of masticated material should not exceed 6 inches maximum depth.
48. Equipment should be excluded from the stream channel, except to cross at designated points.
49. No mechanical treatment on slopes greater than 40 percent.
50. A no treatment buffer of 100 feet, or to the edge of riparian vegetation, whichever is greater, would be established around perennial and intermittent streams, as well as wetlands, fens and wet meadows. Some of these features may only be discovered upon layout. No treatment would occur in wetlands, fens or meadows.
51. Operate heavy equipment off of road surfaces or landings only when soil moisture is below the plastic limit, or protected by at least one foot of packed snow or two inches of frozen soil. Soil moisture exceeds the plastic limit if the soil can be rolled into three millimeter threads without breaking or crumbling. Operator should postpone heavy equipment traffic occurring over packed snow or frozen soil areas if thawing is occurring in these areas to decrease any rutting potential.
52. Do not locate landings, staging areas or storage areas for any heavy equipment on wet or fine textured soils found in riparian areas, meadows, aspen stands, and wetlands (hydric soils). A soils map, provided by the soil scientist, will designate these locations.
53. Skid trails and landings will be agreed to by the Forest Service and the contractor during implementation.
54. If detrimentally compacted, puddled or displaced land exceeds 15 percent of any land unit, mitigation would include but not be limited to rehabilitating the main arterial skid roads and landings. This treatment would be followed by seeding using native species or by covering with slash.
55. Vegetation treatment would be excluded from inventoried lodgepole pine old-growth per Forest Plan standards for MA 3.5. Old-growth polygons within lodgepole pine and spruce-fir forest types could be treated if considered non-functional old growth at time of implementation. This determination of functionality is to be made for the polygon as a whole within the treatment unit. (See Old Growth Functionality Criteria, Forest Plan FEIS, Appendix B, pg. 11). For a site to be considered as still providing functional old growth habitat, key old-growth characteristics include large live trees (some of which are old and declining); either snags or fallen trees; and

greater than 20 percent overhead canopy closure. The specific lodgepole old-growth forest criteria include primarily (must be present): Presence of 15 or more large live trees (10 inches or greater dbh) per acre and overhead canopy closure greater than 20 percent (from live trees at time of evaluation). Secondly (may or may not be present): Presence of 2 or more large snags (10 inches or greater dbh) per acre. Presence of 3 or more large fallen trees (10 inches or greater dbh) per acre. Presence of large, old, declining live trees.

## Roads/Travel

56. During winter operations, maintain roads as needed to keep the road surface drained during thaws and break-ups. Perform snow removal in such a manner that the road and other adjacent resources are not protected. Do not use riparian areas, wetlands or streams for snow storage or disposal. Remove snow berms where they result in accumulation or concentration of snowmelt runoff on the road or erodible fill slopes. Install snow berms where such placement will preclude concentration of snowmelt runoff and will serve to rapidly dissipate melt water.
57. Temporary roads would be obliterated within 1 year of completion of use. Obliteration activities could include waterbars, seeding, covering with slash (should not exceed 18 inches), and providing sufficient barriers to prevent trespass. As recommended by a Forest Service Soil Scientist, decompact temporary road surfaces by ripping or subsoiling the entire length of disturbed areas. Where applicable, remove all temporary stream crossings and restore stream banks to natural contours following project completion. Reestablish natural drainage patterns with permanent rolling dips.
58. Obliterate non-Forest Service roads, ATV trails and access routes within treatment units that are more than 300 feet from a Forest Service road, unless waived by recreation specialist.
59. As determined by Recreation and Landscape Architect input, road closures shall be with gates, berms, plantings or with barrier rocks. If barrier rocks are utilized, they will be composed of various sizes, grouped in 'natural' arrangements and one-third to one-half buried with soil.
60. All road improvement, construction or deconstruction, or designated ATV or vehicle routes/ways to be used by crews would be surveyed for cultural resource prior to implementation; any NRHP-eligible cultural resources would be avoided by project design.
61. Road decommissioning should reclaim the disturbed areas and include stabilizing the drainages, obliteration of the road prism, full removal of any stream crossings, restoration of stream channels, revegetation with local native plants (as determined by a Forest Service botanist), and effective closures. This work should be done immediately after use but not to exceed one year after use ends. Temporary roads shall be subject to obliteration along its entire length and System roads shall be subject to at a minimum obliteration within visible site distance from its intersection with the connecting road (beginning terminus).
62. When operating on or along the road prism, impacts to road surfaces and drainage ditches will be limited. When damage is unavoidable as a result of project implementation, reconstruction and/or replacement of road surfacing and/or drainage ditches and/or drainage features will be completed as necessary. The Forest Service will determine post-operation/haul road maintenance, repair, reconditioning, or resurfacing needs on an individual basis.

63. Install closure gates as needed for travel management needs on Administrative or Maintenance Level 1 roads.

### **Slash**

64. Units 9, 71, 72, and 91: No lop and scatter allowed. All other slash disposal options are available.
65. Units 20, 23, and 24: All slash must be either removed offsite, masticated to a maximum depth of 6 inches, or chipped.

### **Burn Pile Construction**

66. Minimum pile size, hand or machine created, shall be no less than 6 feet high by 6 feet wide.
67. Locate machine piles a minimum of 150 feet from any infrastructure or private property boundary. Locate hand piles a minimum of 50 feet from any infrastructure or private property boundary.
68. Consult Fuels Specialist during contract preparation for current maximum pile size and pile separation requirements as regulated by the Colorado Air Pollution Control Division.
69. Piles shall be constructed in a manner to minimize large air spaces and dirt within the piles. Piles shall not have material extending more than 4 feet in any direction beyond the pile perimeter and a minimum of 4 feet of separation from pile perimeter to surrounding down woody material to reduce unwanted fire spread.
70. Construct a minimum of a 6 foot wide control line, down to bare mineral soil, around each machine pile to create separation between piled material and surrounding slash mat. If piles are grouped, a single control line may be placed around the entire group rather than around individual piles. The scraped material must be moved outward to avoid a berm adjacent to the piles' edge.
71. Hand piles in view corridor within two chains (132 feet) of the viewers on Larimer County roads 59 & 80C (the road corridor) should be 100 square feet maximum and limited to a density of no more than 20 per acre in road corridor area.
72. Within 100 feet of riparian vegetation along Trail Creek and Willow Creek stream channels, retain all existing downed woody material with a minimum of 5 inches or greater diameter. New slash from the thinning may be burned, piled, lopped, and/or scattered.
73. Also for those portions of units 12 and 24, as identified in the above design criterion, burn piles would not be located within 100 feet from the edge of the riparian zone, and burn piles within the 100-meter Preble's habitat zone on both sides of the stream channel would be burned only from November 1 through April 30, during the Preble's hibernation period. Material may be lopped and/or scattered, if it is deemed unnecessary to drag slash beyond 100 feet from the riparian zone.

### **Prescribed Burning Operations (Slash Piles)**

74. Obtain a smoke permit from the State of Colorado Air Pollution Control Division prior to implementing any prescribed burning.
75. Implement prescribed burning when smoke dispersion is favorable as required by the smoke permit.

76. Notify stakeholders, media, and smoke sensitive individuals prior to prescribed burning, by signs and/or phone calls/emails as required by the smoke permit.
77. Rehabilitate constructed fire lines by raking topsoil back over the line, covering with slash or other mulch materials, or seeding, if recommended by the botanist, to help prevent weed/non-native invasion.

**Revegetation**

78. For site revegetation, minimize potential for weed introduction. Use wood straw for mulch where feasible, instead of agricultural straw. All disturbed areas deemed to require seeding will be accomplished with seed approved by the Forest Botanist or USFS botany representative. Mulch or erosion control methods (blankets) shall be required on steep slopes where seeding will likely erode prior to the vegetative blanket getting established.

### 3.0 ENVIRONMENTAL CONSEQUENCES

Expected consequences of the proposed action are summarized below by resource area. More comprehensive analyses including the existing condition and detailing expected effects of the proposed action were prepared as individual resource specialist reports and are available in the project file.

#### SILVICULTURE

The Cherokee Park Project Area, located at elevations ranging from 6,400 to 9,095 feet, is predominantly characterized by ponderosa pine forests (see table below for breakdown of all cover types). In the project area, stand structure has been influenced in the past by human uses, fire exclusion and possibly climate change. During the late 19<sup>th</sup> and early 20<sup>th</sup> centuries, logging removed the largest and oldest trees. Over the last 100 years as wildfire suppression became more successful, more tree seedlings survived than would have under a natural fire regime.

**Table 3.** Cover types in Cherokee Park project area (all land ownership)

Cover	Total Acres	percent of Total
<b>TREE COVER</b>	18,616	55 percent
<i>Lodgepole Pine</i>	2,108	6 percent
<i>Ponderosa Pine</i>	13,774	41 percent
<i>Spruce/fir</i>	8	<1 percent
<i>Aspen</i>	491	1 percent
<i>Douglas Fir</i>	2,192	7 percent
<i>Limber pine</i>	7	<1 percent
<i>Cottonwood</i>	36	<1 percent
<b>SHRUB COVER</b>	7,521	22 percent
<b>GRASS / FORB COVER</b>	7,128	21 percent
<b>NO VEGETATION</b>	282	1 percent
<b>TOTAL</b>	<b>33,547 acres</b>	

Ponderosa pine fire history at elevations similar to Cherokee Park is characterized by a mixed severity fire regime that has resulted in a high degree of variation within stand structure. In these forests, mature stands are park-like with perhaps 50 to 120 large diameter trees per acre present and only a few smaller diameter and younger trees growing in a grass dominated under-story. Other stands are multi-storied with hundreds of trees of multiple diameters, ages, and heights present in the same stand. Where Douglas fir and ponderosa pine co-occur in the same stand and on aspects favorable for moister conditions, there is a tendency for the fir to slowly, successionaly replace the pine. Lodgepole pine stands in the project area have been shaped by severe stand-replacing fires which on average occur at intervals of 150 years or longer. Aspen is present throughout the project area, but represents only one percent of the forested area in pure stands or clones. Old growth stands in Cherokee Park contain older, larger diameter trees and other structural features such as snags, down logs and gaps in the canopy layers that include patches of regeneration.

Simultaneous with the regional mountain pine beetle (MPB) outbreak, beetle activity in Cherokee Park increased substantially in 2009, peaked in 2011 and decreased back to endemic levels in 2013. Various

size of dead trees are present throughout the project area, evidence of this recent disturbance event. Tree mortality within the treatment units, principally as a result of MPB infestation, is estimated at 37 percent. The table below depicts MPB activity since 2003.

**Table 4.** Mountain pine beetle (MPB) activity within the Cherokee Park Project Area (2003-2013) in acres. The infestation peaked in 2011, in bold print below.

Survey Year	Project Area MPB activity (acres)	Affected project area (percent)
2003	15	0.04 percent
2004	4	0.01 percent
2005	18	0.05 percent
2006	16	0.05 percent
2007	99	0.30 percent
2008	447	1.33 percent
2009	6,377	19.01 percent
2010	20,061	59.80 percent
<b>2011 (peak year)</b>	<b>25,531</b>	<b>70.14 percent</b>
2012	6,539	19.49 percent
2013	658	1.96 percent

If the proposed action is not undertaken and natural processes are allowed to occur (insect attacks, wind events, wildfire and so on), an abundance of dead trees scattered throughout the project area would be expected. These dead trees would function as snags in the short term and eventually topple. In some areas, jack-straw conditions would be created and this large accumulation course material on the ground would have the potential to affect fire behavior as well as increase fire intensity. Aspen sprouting would be stimulated in canopy openings that are created where a significant proportion of the mature lodgepole pine has been killed by MPB. It is expected these stands would regenerate with lodgepole pine eventually. In stands where Douglas fir comeingle with ponderosa pine, Doug fir will thrive as a result of mature ponderosa being killed by MPB.

On the other hand, if the proposed action is undertaken, varying age and size classes of ponderosa pine would be result. Stand composition after thinning would favor ponderosa pine and aspen in the majority of the treatment areas. Douglas fir would be favored on northerly aspects. In the created openings, there would be an increase in grasses and foraging potential for wildlife. By creating openings, wildfire behavior would be lessened by breaking up continuous canopy fuels, increasing fine flashy fuels, increasing solar exposure and altering surface wind effects. Thinning would reduce the number of trees per acre, which would in turn provide more water and soil nutrients for the remaining trees and other vegetation. This effect would likely make the remaining trees more resistant to insect and disease attacks.

In mature lodgepole pine stands, where the proposed treatment is salvage of dead trees, openings would be created and mature, live larger diameter lodgepole trees would be retained. Live trees would

not be targeted for cutting, however it is anticipated that a significant proportion of these trees could be lost due to harvesting operations and post treatment windfall.

In the central Rocky Mountains, stands of lodgepole pine are generally considered susceptible to wind throw after cutting. Partial cutting, or thinning, increases the risk because the entire stand is opened up and therefore vulnerable. Less damage is associated with clearcutting, because only the boundaries between cut and uncut areas are vulnerable. A substantial proportion of the leave trees are expected to blow over in time. Whether standing or on the ground, these trees may provide wildlife habitat and eventually become coarse woody debris. Where aspen stands coincide with lodgepole treatment units, aspen sprouting is expected to increase following treatment.

Approximately 133 acres thinning of sapling and pole size lodgepole pine trees is proposed. The primary purpose of thinning in these units is to accelerate the development of old growth stand conditions by reducing tree-to-tree competition and increasing tree vigor.

The proposed treatment on 52 acres is to remove the dead trees and masticate shrubs. This treatment will reduce the amount of woody material and ladder fuels.

Aspen enhancement is proposed on 299 acres throughout the project area. This treatment would eliminate conifer competition and allow for aspen clones to thrive and possibly expand.

Proposed meadow enhancement treatments proposed over 1705 acres would remove encroaching conifers, allowing these sites to persist as openings. Without treating, natural succession would occur and eventually the amount and extent of grassy meadows in the Cherokee Park area would decline and would be replaced by conifers.

Habitat Structure Stage (HSS) is a means of describing the condition of a forest stand in terms of stand age, canopy closure, and average tree size. The existing and expected post treatment cover types and the associated HSS within the proposed treatment units are summarized in Table 5 below. Thinning primarily affects the understory but a measurable change occurs to canopy closure and HSS. In ponderosa pine and Douglas fir cover types, the effects of thinning would potentially change from a high to moderate closure and from a moderate to low closure. Due to an increase in available soil moisture and sunlight, a minor increase in aspen cover would be anticipated in most of the treatment areas.

**Table 5.** Predicted changes in habitat structure state (HSS) from proposed treatments, in acres

Tree Cover Type	Pre/Post Treat.	Seedling Stands	Young stands w/ sapling & pole trees			Mature stands			Total (ac)
			<39 percent canopy closure	40-69 percent canopy closure	>70 percent canopy closure	<39 percent canopy closure	40-69 percent canopy closure	>70 percent canopy closure	
			2T (ac)	3A (ac)	3B (ac)	3C (ac)	4A (ac)	4B (ac)	
Lodgepole Pine	<i>pre-treat</i>	4	29	162	58	27	177		457
	<i>post treat</i>	4	197	28	24	189	15		457
Ponderosa Pine	<i>pre-treat</i>		108	337	34	487	801	7	1774
	<i>post treat</i>		308	140	31	934	354	7	1774
Douglas fir	<i>pre-treat</i>		18	77	3		15		113
	<i>post treat</i>		49	49			15		113
<b>Pre-Treatment Total</b>		4	155	576	95	514	993	7	2344
percent of total tree cover		<1 percent	7 percent	25 percent	4 percent	22 percent	42 percent	0 percent	100 percent
<b>Post-Treatment Total</b>		4	554	217	55	1123	384	7	2344
percent of total tree cover		<1 percent	24 percent	9 percent	2 percent	48 percent	16 percent	<1 percent	100 percent

See paragraph above for definition of HSS. HSS 2T represents seedling stage; HSS-3 represents younger stands with sapling and pole sized trees; HSS-4 stands are mature with trees greater than 9 inches DBH; HSS-A represents stands with a crown closure of less than 39 percent; HSS-B is 40 to 69 percent; and HSS-C greater than 70 percent.

Cumulatively, fuel reduction projects conducted in and near the project area by private landowners would be expected to continue. In combination with proposed treatments on National Forest land, these efforts would generally reduce surface fuels and increase openings in canopies in localized areas. It is not anticipated that additional significant MPB caused tree mortality will continue to occur. It appears that MPB populations have declined to endemic levels. The insect killed trees will eventually begin to fall and contribute to coarse woody debris. The proposed treatment and active future fire suppression activities would reduce the chances of stand replacing crown fires from occurring. As a result, tree age and insect or pathogen induced mortality may be more of an influence on stand structure dynamics than wildfire into the future. Consequently, to maintain the desired condition of the stands, future management interventions such as controlled surface fires or thinning may be needed.

## FUELS

Recent fire history in Cherokee Park is characterized by small, lightning-caused fires. There have been 50 fires recorded within the project boundary on Forest Service land for a total of 74.25 acres burned since 1951. Most of these fires have been less than an acre in size. Only two fires were 10 acres or larger and were human caused. About 26 percent of the fires have been human caused whereas 74 percent were lightning caused. Ponderosa pine fire history on a longer term scale at this elevation is discussed in the proposed action and the previous silviculture section. The lack of large fires in recent years can likely be attributed to fire suppression and land use in this area.

Fuel hazard is a fuel complex (vegetation type, arrangement, continuity, etc.) that presents a threat of ignition and resistance to control. High fuel hazard would describe a stand with a high percent canopy closure combined with significant ladder fuels that would be likely to perpetuate a ground wildfire into the crowns. As the table below summarizes, significant portions of the Cherokee Park project area are considered either very high fuel hazard or moderate fuel hazard. It is predicted that proposed vegetation treatments would reduce the high and very high fuel hazard substantially across the project area, as a whole, and within individual treatment units. As a result, low and moderate fuel hazard would increase. In other words, acres treated would change from high and very high fuel hazards and be redistributed to low and moderate fuel hazards.

**Table 6.** Change in fuel hazard (acres) before and after treatment (tx) within project area and proposed units

Fuel Hazard	Overall Project Area			Treatment Units		
	Before TX	After TX	percent Change	Before TX	After TX	percent Change
Low	1,774	1,942	+9 percent	217	385	+77 percent
Moderate	7,322	8,187	+11 percent	1,235	2,100	+70 percent
High	677	331	-51 percent	397	51	-87 percent
Very High	4,377	3,690	-16 percent	1,277	590	-54 percent

For this analysis, fire behavior under 90<sup>th</sup> percentile weather was modeled for existing conditions and post-treatment conditions. Ninetieth percentile weather conditions are good parameters to use for modelling fire behavior and are defined as 10 percent of the days in the historical weather database having lower fuel moisture and higher wind speeds compared to the rest of the days. Rare but large and destructive fires often occur under 90<sup>th</sup> percentile weather conditions. While fire behavior prediction programs have limitations that could underestimate or overestimate the predicted fire behavior, it is instructive to compare trends. Under 90<sup>th</sup> percentile conditions, most of the existing stands would exhibit intense fire behavior, too extreme for ground suppression crews to use direct suppression tactics. The proposed treatments would lessen the fire intensity in those areas treated (see table above) which would allow firefighters an opportunity to use suppression tactics on a wildfire within or near the project area. The openings created as a result of treatment would help to reduce the threat of wildfire outside the project area from continued crown fire. As with any treatment, repeated entries into the project area would be needed to continue to maintain benefits afforded by the proposed treatments with this analysis.

Fuels modelling data helps predict fire behavior (described as surface, torching and crown fire) under given fuels and weather conditions. At windspeeds less than the torching index a surface fire is expected. If the windspeed is greater than the torching index but less than the crowning index a passive crown fire (torching) is expected. When windspeeds are greater than the crowning index an active crown fire can be expected.

As the table below demonstrates, fire intensity in the project area under existing conditions could threaten private property and infrastructure as well as forest resources. Ground crews are only able to directly suppress wildfires safely when fireline intensities are less than 100 BTUs (British thermal unit)/

per foot/per second (BTU/ft/sec) and flame lengths less than four feet. The expected flame lengths and fireline intensities under 20-ft winds (10mph) range from 1.3-15.6 feet and 10-2,235 BTU/ft/sec, respectively. Expected flame lengths with 25 mph wind gusts range from 1.7-54.7 feet and fireline intensities from 19-6,279 BTU/ft/sec. Even though the predicted fire behavior is intense over most of the area, the results fall within the historical fire severity for these vegetation types. Because the project area is intermixed with private property with homes and other infrastructure, this fire behavior is less desirable.

**Table 7.** Predicted fire behavior results for the existing conditions under 90<sup>th</sup> percentile weather.

Fuel Model	Fire Type*		Rate of Spread (chain/hour)		Fireline Intensity (BTU/ft/sec)		Flame Length (feet)		Torching Index (mile/hour)	Crowning Index (mile/hour)
	20-ft WS	Gust WS	20-ft WS	Gust WS	20-ft WS	Gust WS	20-ft WS	Gust WS	20-ft WS	20-ft WS
GR1	S	S	13.7	20.2	25	37	2.0	2.4	n/a	n/a
GR2	S	S	27.3	95.9	143	502	4.4	7.9	n/a	n/a
GS1	S	S	15.8	55.6	93	327	3.6	6.5	n/a	n/a
GS2	S	S	23.3	81.4	229	801	5.5	9.7	n/a	n/a
SH1	S	S	4	7.1	11	19	1.3	1.7	n/a	n/a
SH7	S	S	45.9	126.3	2235	6146	15.6	24.9	n/a	n/a
TL3	S	S	2.1	6.2	10	29	1.3	2.1	125.8	28.7
TL8	P	P	9.6	63.7	166	1403	4.8	18.1	5	42.6
TU5	P	P	17.5	88.9	1087	6279	13.8	54.7	0	34.8

\*S = surface fire; P = passive fire (torching), GR1 (heavily grazed areas), GR2 (open meadow areas), GS1 (open brushy areas, mostly on south slopes), GS2 (open brushy areas with a higher concentration of brush than the GS1 fuel model, mostly on south slopes), SH1 (open brushy areas with little to no grass component, mostly on south slopes), SH7 (brushy areas with little to no grass component and higher concentration of brush than the SH1 fuel model, mostly on south slopes), TL3 (lodgepole pine stands with a heavier litter load due to needle cast from beetle killed trees), TL8 (models ponderosa pine stands), and TU5 (mostly mixed conifer stands and areas with a ladder fuel component such as younger suppressed trees).

Because the proposed fuels treatments would change the character of the forest and grass/shrub stands, different fuel models were employed to model post-treatment conditions. As the table below depicts, the predicted fire behavior across the proposed treatment units would be expected to drop down to surface fire except for in ponderosa pine stands where wind gusts exceed 25 mph. The flame lengths drop significantly with treatment and range from 1.3-5.5 feet under 20-ft wind speeds. The flame lengths also decrease under windy conditions and range from 2.1-9.9 feet. The most significant change is shown by the decrease in fireline intensity. Fireline intensity for 20-ft windspeeds is expected to be 10-229 BTU/ft/sec and 29-801 BTU/ft/sec under 25 mph windspeeds. Removing the standing dead trees along with thinning the remaining stands to create space between crowns will help to decrease the threat of crown fires across the treatment units for several years. With whole tree skidding and piling of the slash within the units, fire behavior would decrease to a more manageable rate of spread. Whole tree skidding consists of removing the entire tree from the stand and processing it at a landing, in turn leaving less slash in the unit. Even with whole tree skidding operations, some slash would be left in the

units due to breakage while felling and skidding the material. Torching could be expected in treated stands under 90<sup>th</sup> percentile weather conditions once the regeneration begins to grow through any residual slash post-implementation. In whole tree skidding units, surface fire could be expected under 20 foot winds and where the distance between crowns and surface fuels is at least 14 feet. Similarly, surface fire could be expected if windspeeds are 25mph and where distance between crowns and surface fuels is at least 22 feet.

**Table 8.** Predicted fire behavior for all post-treatment units under 90<sup>th</sup> percentile weather

Fuel Model	Fire Type*		Rate of Spread (chain/hour)		Fireline Intensity (BTU/ft/sec)		Flame Length (feet)		Torching Index (mile/hour)	Crowning Index (mile/hour)
	20-ft WS	Gust WS	20-ft WS	Gust WS	20-ft WS	Gust WS		20-ft WS	Gust WS	20-ft WS
TL3 <sup>1</sup>	S	S	2.1	6.2	10	29	1.3	2.1	90.8	42.6
TL3 <sup>2</sup>	S	S	2.1	6.2	10	29	1.3	2.1	175.9	35.3
TL8	S	P	7.2	36.5	117	665	4	9.9	19.1	52
GS1	S	S	23.3	81.4	229	801	5.5	9.7	n/a	n/a
SB1 <sup>3</sup>	S	S	13.1	40.8	214	668	5.3	9	n/a	n/a

\*S = surface fire; P = passive fire (torching), <sup>1</sup>Fuel model used for mixed conifer stands with CBD of 0.012 kg/m<sup>3</sup>. <sup>2</sup>Fuel model used for lodgepole pine stands with CBD of 0.016 kg/m<sup>3</sup>. <sup>3</sup>Fuel models occur only in Units 7, 73, 92, and 93

Cumulatively, the proposed vegetation treatments along with other fuels reduction projects in the area, (such as the timber sales directly west of the project area, the Sheep Creek Broadcast Burn completed recently, as well as other fuels reduction completed on private property within and surrounding the project area) would help disrupt fire behavior in the event of a wildfire in the area. The treatment units scattered across the landscape act as a barrier to large fire growth as evidenced by fuels reduction projects tested by wildfires across the western United States. Fire intensities would be expected to decrease due to the cumulative effect of these treatments together on federal and private, allowing firefighters to suppress wildfires more readily.

## ROADS

There are approximately 85.5 miles of inventoried roads within the Cherokee Park project area boundary. Many of these roads provide access to the Forest or cross Forest Service land. The mixed land ownership hinders use of NFSRs (National Forest System roads) by the general public in most cases. There is evidence of motorized administrative and/or private use by adjacent private land owners and their guests. It is possible that much of the NFSR system within the project area serves private landowners for primary or secondary egress. Most of the roads in the area were not found to have effective closures that would prevent unauthorized motorized use. Numerous roads within the project area run adjacent to or cross perennial streams. Drainage of the road system is fair with some improvements needed. The table below summarizes project area roads.

**Table 9.** Summary of Existing Roads in Project Area

System	Jurisdiction	Maintenance Level	Miles	Miles	Miles
National Forest System (NFSR)	Forest Service	2	18.04	19.43	23.52
		3	1.39		
	Private	2	4.09	4.09	
Private	Forest Service	2	1.92	1.92	11.42
	Private	2	9.50	9.50	
County	County	4	16.3	16.3	16.3
State	Forest Service	2	0.01	0.01	2.03
	State	2	2.02	2.02	
Undetermined	Forest Service	NA	0.61	0.61	32.17
	Private	NA	2.89	2.89	
	None	NA	28.67	28.67	
<b>TOTAL</b>					<b>85.44</b>

Note: Table does not include other private roads and driveways that do not access Forest Service land nor any roads outside of the Cherokee Park planning project boundary

Under the proposed action, new roads may be added to the system. However, many roads already exist on the ground, but haven’t been formally added to the Forest Service inventory of roads. Unauthorized roads may be used as temporary roads to access treatment units and then decommissioned following use for this project. It is recommended that all natural drainages be restored and road prisms re-contoured to match the existing ground during road decommissioning. Failure to recontour road prisms may lead to future illegal use of these segments. In addition to discouraging unplanned uses, such as illegal OHV recreation use, if the unauthorized roads in the project are properly closed to eliminate traffic, including restoration of natural ground contours and drainages, it is expected that sedimentation from the roads will likely decrease and that watershed condition would be improved over the long-term. However, immediate project activities may increase erosion and sedimentation in the watershed until vegetation is established on the roads and drainages have reached a natural equilibrium. Application of soil and water best management practices would limit these temporary increases of erosion and sediment. The thinning of fuels associated with this project could make illegal cross-country motorized travel easier in certain places and/or make it easier to drive illegally around gates and other road blocks.

Some roads will require maintenance and reconstruction prior to vegetation treatments, including the crossing under two overhead power lines along NFSR 334.0 (cost unknown). If cut trees are processed into chips for hauling, this would likely be done where existing roads are adequate for this type of truck traffic. If it is determined during project implementation that road reconditioning is needed, such costs typically range from \$2,000 to \$3,000 per mile and the approximate cost for road obliteration is approximately \$1,500 per mile. Total road reconstruction costs for the proposed project are estimated at \$55,000 to \$75,000.

Cumulatively, it is anticipated that as the population increases in the Front Range the use of National Forest roads will increase. With the backlog of road maintenance needs increasing, the presence of non-system/unclassified roads will lead to a continuing increase by unplanned uses, such as illegal OHV recreationalist, until these roads can be effectively obliterated or added to the transportation system where appropriate.

### **LANDS/SPECIAL USES/MINERALS**

The Cherokee Park project area is heavily intermixed with private, state and Forest Service lands and approximately 60 percent of the area is private or state owned. Year-round residency by landowners is increasing. Rights-of-way authorizations across private land are not currently in place within the majority of the project area. If access by the Forest Service across private land does not currently exist or cannot be formalized through the proper authorization, treatment in a number of areas may not be possible. The Forest Service is directed by regulation to acquire easements that are permanent and provide for all types of traffic, including use by the general public, unless the Forest Land Management Plan indicates such use is not needed. Full public easements should be sought on roads that have been determined necessary for long-term forest management. In order for the Forest Service to acquire anything less (a limited-use easement or temporary road use permit) than a full, public easement (ROW) when a road across private lands has been determined to be needed on the Forest Transportation System, the Forest Supervisor must document justification and acquire Forest Service Regional Office approval (the process is detailed in the Lands specialist report in the project file). The Forest Service may consider use of temporary road use permits when the future access needs do not justify the expense of a permanent road or trail and access by the public is not needed. These roads would be considered non-system roads and would not be part of the Forest transportation system.

The following are definitions of the different types of right-of-ways the Forest Service can acquire across non-Federal (private) land depending on the road status and Forest Management needs:

- **Full public easement:** Negotiated and acquired across private property when a road has been determined to be needed as part of the Forest Transportation System (“system” roads). This would be an easement where the public would be allowed on NFS lands. Approved by the Deputy Regional Forester.
- **Limited-use easement:** Healthy Forests Restoration Act (HFRA) and Accelerated Watershed/Vegetation Restoration Plan (AWRP) projects allow acquisition to acquire limited-use easements at the Forest Supervisor level. These are acquired on system roads and allow access only for Forest Service and their contractors (no public). Long-term policy is still a consideration and justification for acquiring anything less than full public easement on a system road is required. Approved by the Deputy Regional Forester.
- **Temporary road use permit (non-system roads):** Refers to authorization to utilize non-system road during project implementation. This is the instrument used if roads have been determined to not be needed for long-term Forest management and are not on the Forest Transportation System. Approved by the Forest Supervisor

- Temporary road use permit (system roads):** For HFRA/AWRP projects, temporary permits may be acquired on these roads while working with the private landowner on the acquisition of an easement. A decision to acquire a temporary permit on a system road (after a landowner refuses an easement) can be made by the Forest Supervisor. This requires the consideration of policy and the justification protocol checklist to be followed. It requires Deputy Regional Forester approval.

Implementation of the proposed action would require the determination of existing or the acquisition of right-of-ways through private land, either easements or temporary road use permits, to access some of the proposed treatment units. Acquisition of temporary access is not likely to affect lands or increase mineral use or general use by the public in the project area. Acquisition of full public rights-of-way has the potential to increase proposals for special use authorizations and mineral exploration. However, until access is finalized the potential effects are unknown. Any such projects would be analyzed separately as specific proposals are received. The proposed treatment is not likely to impact existing special uses or mineral activities in the area. Encroachments onto NFS lands may be discovered as boundary lines are posted for the project.

A number of special uses are authorized in the Cherokee Park project area. These uses include grazing, outfitting and guiding, and utilities such as Poudre Valley REA. Access for these uses should be maintained unless resource concerns dictate otherwise.

**Table 10:** Access needs for proposed vegetation treatments, by sub-area within Cherokee Park.

Unit #	Area	FS Roads	Current Situation	Access Needs
1 – 5, 6-7, 72-73	Poudre River Ranch	FSR 334	Do not need additional access, reciprocal easements for this area in place.	None.
8 - 10, 91 - 93	Pratt Creek	FSR 182	Do not need additional access, full public easement for this area in place.	None.
11-12	Poudre River Ranch	No system roads	No access across small piece of private between CR80C to FS Section 12. Grazing permit in this area.	Need access across private and determine status of this road. If system road, seek full public easement. If not system, determine if should become system road for grazing allotment use.
13-15, 17	Diamond Creek	FSR316.0	Assume access from CR59 south via FSR316.0 Need to formalize access across private. (FSR316.A is faint, would need large amount of work)	System road, Forest should seek full public easement. And reciprocate easement to landowner who needs across NFS land (reciprocal easements). Same landowner for Sec. 26 & 35.
18-19		CR59	County road accesses these units	None.
20, 23, 24	Mill Creek	FSR184 and FSR308A	No access or authorizations currently. HOA may have authority to grant easement,	For system roads, Forest should seek full public easement and reciprocate

Unit #	Area	FS Roads	Current Situation	Access Needs
			otherwise, easements with individual landowners will be required.	easement with Mill Creek HOA for all roads within subdivision including spur roads, driveways, etc.
21-22	Schaffer	FSR310	No access or authorizations. Grazing and O/G permits in this area.	For system roads, Forest should seek full, public easement and reciprocate easement to landowner to cross NFS land.

**WATERSHED, SOILS AND AQUATIC ECOSYSTEMS**

The project area includes portions of six different HUC6 watersheds: Fish Creek-Dale Creek, Halligan Reservoir, Lower Dale Creek, North Fork Cache La Poudre River, Sheep Creek (North Fork Cache La Poudre River) and Trail Creek (North Fork Cache La Poudre River). Forest Service ownership ranges from 0 up to 24 percent within these watersheds. Cherokee Park is characterized by wooded ridges broken by ephemeral or intermittent drainages. The ephemeral drainages are dry, covered with grass and shrubs, needle-cast, mature trees and occasional aspen stands. Intermittent drainages have mature aspen or willow communities along the banks and may have flowing water, pooled surface water or subsurface moisture.

The most persistent existing negative hydrologic impact to Forest Service lands in the project area is from the erosion of system or unauthorized roads, which transports sediments to adjacent stream channels. Due to the checkerboard land ownership, roads through private lands where the Forest Service has no management control do contribute to water quality impacts on Forest Service stream segments. However this degradation is not as great as in other areas of the Forest due to the lack of public access to much of the project area. Field surveys of unauthorized routes suggest that negative impacts increase in areas with greater sediment stream contribution, high traffic, or large disturbed (bare soil) areas. More than 40 percent of the roads surveyed exhibit a direct impact to watershed resources. These roads are located less than 100 feet from intermittent or seasonally flooded riparian zones, wetlands, intermittent or perennial stream crossings and/or within high erosion areas (sediment contribution sections). Livestock grazing has also contributed to stream channel or riparian area degradation, both on Forest Service allotments and private land.

Most of the areas surveyed for soil disturbance within the Cherokee Park Project area are currently classified as undisturbed, with some slightly disturbed areas. Areas with slight disturbance are generally areas with disturbance generated from past timber harvest activities. Past disturbance is visible in old skid trails (recovering), old roads, old slash piles, existence of stumps without obvious disturbances and places with minimal subsoil mixing. Within the project area, only 247 acres are rated as high erosion potential and 20 acres are considered to be potentially unstable slopes. These are shallow, low strength soils on steep slopes, with a high mass movement potential.

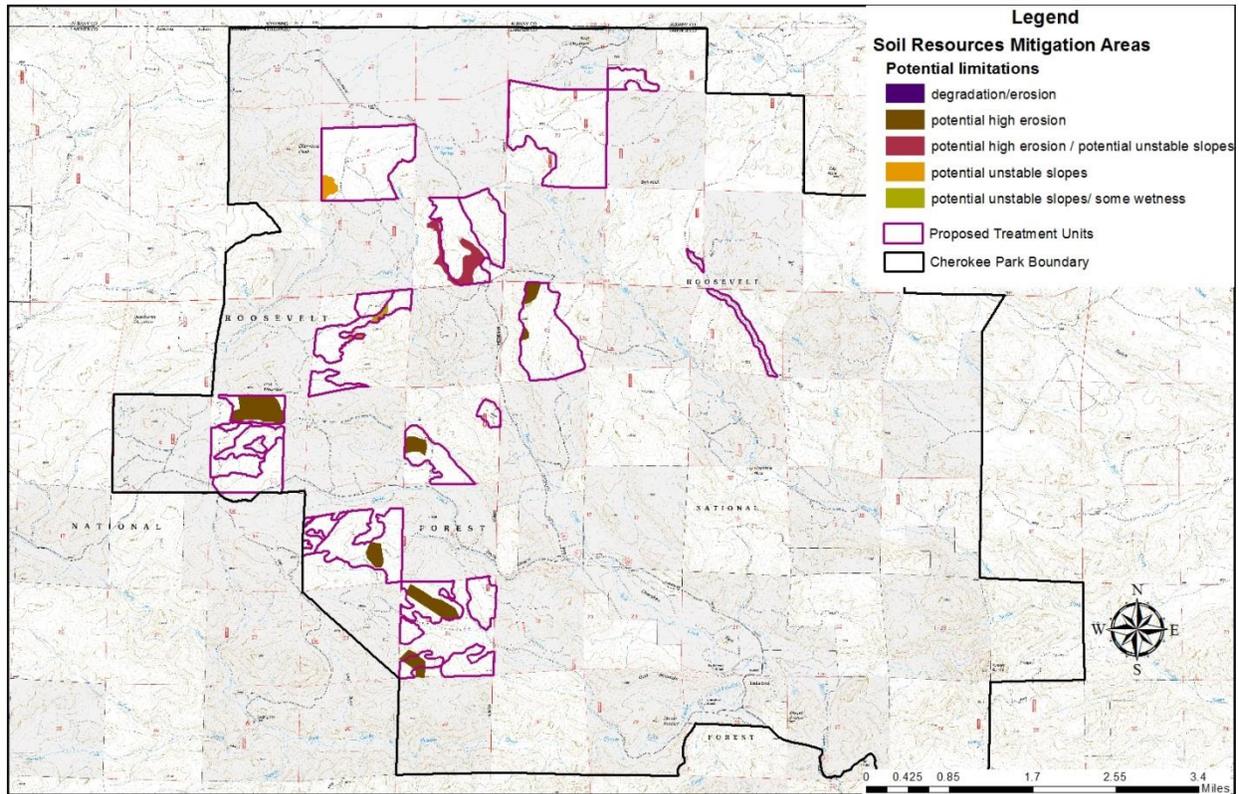
**Table 11.** Summary of environmental consequences to soil, water and aquatic resources expected as a result of the no action and proposed action alternatives

RESOURCE	EFFECTS	
	Alternative 1: No Action	Alternative 2: Proposed Action
Watershed & Soils	No new impacts, however watershed and soils improvements would not occur as a result of road decommissioning.	Slight, short-term impacts to soil and water resources. Minimal impact to overall water yield. Decommissioning of roads would decrease erosion into water bodies.
Aquatic Ecosystems	No improvements to stream and riparian area habitat.	Improvements to stream and riparian area habitat.

**Effects to Watershed and Soil Resources**

Direct and indirect effects to watersheds and soils as a result of the proposed action is expected to be limited, particularly with inclusion of design criteria. The primary impact of sediment, when it reaches a water body would be the alteration of aquatic habitats by reducing habitat quantity and quality. Adherence to the forest plan standards and guidelines for water, soil and fisheries protection should protect the aquatic habitats of the project area (USFS 1997). The increased sediment yield described in the soil and water section is only expected to last 2 years and would be limited in scope geographically across the project area.

*Vegetation Treatments:* The proposed vegetation treatments are expected to have a minimal impact on overall water yield of the watershed, as they would affect 8 percent or less of any of the project area watersheds. There are 10 acres of potential wetlands adjacent to proposed treatment units 1, 8, 9, 10, 11, 12, 14, 20, 21, 22. In these areas, during periods when surface water is absent, the water table lies well below or near the land surface. Although vegetation treatments are proposed for only a small percent of the three affected watersheds, this type of management has the potential to impact adjacent streams and aquatic habitats. Riparian areas within and adjacent to units would be excluded from heavy equipment operation, including service, fuel equipment and/or chemical storage and or waste dumps activities. Erosion and runoff may occur during snowmelt or high storm events. Severe erosion potential exists on steep mountain slopes, within units 2, 4, 6, 10, 11, 18, 20 (See Map 6 below). With implementation of the recommended design criteria, operation of mechanized equipment during vegetation treatments would not be expected to have a measurable effect on streams, wetlands, or riparian areas in the treatment units.

**Map 6.** High erosion and unstable slope areas within treatment units

Principal access to the proposed units would be from existing roads and trails, with approximately 8.5 miles of temporary road needed. Conversion of existing trails or two-track roads to temporary roads could result in some increase in sediment. However, erosion control practices, relocation, and reclamation activities (obliteration, mulching, seeding) that are included in the project design criteria are expected to reduce sediment yield to values lower than current conditions.

Pile burning can remove ground cover and create bare soil patches if all organic material is reduced to ash. The use of larger and taller burn piles is expected to generate more heat, burn longer and generate more severe burn effects than smaller piles. Burning machine piles with heavy fuels is most likely to create a high soil burn severity impact due to heat and residence time of the fire. Chipping and mastication provide a protective ground cover. In the early stages of decomposition soil nutrient availability is reduced, but increases when the material is mostly decomposed. There could also be an increase in soil compaction due to the use of heavy equipment for chipping and mastication.

*Road system modifications:* Based on the watershed inventory that was conducted, there are approximately 4 miles of roads considered as high impact to watershed resources in the project area. Sedimentation from these roads was modelled and changes that can be expected are: If a road near a sensitive riparian area (ex: 24w182) is converted to a system road, the amount of sediment delivered from the road to watershed resources will likely increase as compared to current conditions.

If a road by a perennial channel with a flooded riparian area and a stream crossing (ex: 5W334) is converted to a system road, the amount of sediment erosion from the road to watershed resources will likely increase compared to current conditions. Decommissioning of roads in the project area will reduce sediment at these sites to close to negligible values.

Cumulative watershed effects include past and present vegetation management (timber harvest, fuels treatment and prescribed fire) and erosion from roads resulting from increased travel as a result of proposed treatments. The effects from the past vegetation management dating from the 1960’s through 2000 are largely undetectable from a watershed perspective. Ground cover percentages are similar to native levels, and the largest remaining impact is from roads. Non-system roads still persist from these past activities. However, implementation of planned road decommissioning and watershed improvements within these watersheds along with the timber management are expected to improve the overall watershed conditions in the long term. Significant increased travel is not expected due to lack of public access in the project area. Cumulative effects to soil and water resources are expected to be greater under Alternative 2 than Alternative 1 in the short term. However, with inclusion of project design criteria, long term effects are expected to be less for Alternative 2.

**Effects to Aquatic Resources**

There are no known federally listed threatened or endangered species found in the project area or otherwise predicted to be impacted by the project work. Two FS Aquatic Sensitive Species/Species of Concern and two aquatic management indicator species were analyzed for this project. See table below for summary of effects to aquatic resources.

**Table 12.** Summary of predicted effects to aquatic species resulting from proposed action

Species	Presence/Absence	Expected Effects
<b>Sensitive/Species of Concern</b>		
Hudsonian emerald ( <i>Somatochlora hudsonica</i> )	Species is not known to occur in project area, but habitat is present. May exist on federal lands or in adjacent private lands where more likely suitable habitat could exist.	Risks of sediment affecting the species should it be found to exist in project area.  Project implementation and cumulatively MAII <sup>1</sup>
Arapahoe snowfly ( <i>Capnia arapahoe</i> )	Species is not known to occur in project area but habitat is present.	There are risks of sediment affecting individuals of the species should it be found to exist in project area. Sedimentation sensitivity of species is uncertain.  Project implementation and cumulatively MAII <sup>1</sup>
<b>Management Indicator Species</b>		
Brook trout ( <i>Salvelinus fontinalis</i> )	Species commonly found throughout drainages and forest areas.	Project activities would likely have a net positive effect with short-term effects in the project area

Species	Presence/Absence	Expected Effects
		but, would not result in the loss of viability  Cumulatively, expect short-term effects but no loss of viability.
Brown trout <i>(Salmo trutta)</i>	Species commonly found throughout drainages and forest areas.	Project activities would likely have a net positive effect with short-term effects in the project area but, would not result in the loss of viability.  Cumulatively, expect short-term effects but no loss of viability.

MAII<sup>1</sup> may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend towards federal listing

**AIR**

With regard to air quality, the EPA is primarily concerned with presence of particulate matter because of potential impacts on public health. Particulate matter, or PM, is the term used for particles found in the air, including dust, dirt, soot, smoke, and liquid droplets. PM10, particles less than 10 microns in diameter, pose a health concern because they can be inhaled into and accumulate in the respiratory system. The Colorado Air Pollution Control Division (APCD) records pollution data (PM10) by county rather than by airshed. According to 2011 data, Larimer County’s primary sources of particulate pollutants are agricultural tilling, road dust, solvents, construction, and oil and gas.

Proposed project activities are likely to increase only particulates over the duration of the project. There would be more dust created from an increase in traffic from logging trucks and other vehicles associated with implementation as well as the machines working in the units. Burning any slash piles created during implementation would increase particulate matter contributions to the airshed. As a result of burning slash piles created by the proposed Cherokee Park project, it is expected that 13 tons of PM10 per year (assuming 1,000 acres of piles are burned in a given year) would be added to the Medicine Bow Airshed in any given year over the life of the project.

Cumulatively, the particulate matter produced during the proposed activities for this project coupled with other Forest Service broadcast and pile burning projects within the Medicine Bow Airshed would contribute approximately 884 tons of PM10 over the life of all projects combined. Because broadcast burns are phased over multiple years, we anticipate it will take a minimum of eight years to complete all proposed broadcast burns within the Medicine Bow Airshed. The Forest Service may add an average of 110 tons of PM10 per year over eight years, or about 1 percent of the County’s annual total. Additionally, each year an estimated 13 tons of PM10 would be produced from pile burning throughout these projects. Pile burning each year could add approximately 0.11 percent to Larimer County’s annual PM10 total. Motor vehicle travel along paved and unpaved roads would continue, also contributing to the particulate matter totals.

## WILDLIFE

With the exception of Preble’s meadow jumping mouse, other Threatened, Endangered, or Proposed (TEP) wildlife species were excluded from this analysis because none are known or suspected to occur in the proposed treatment units or project area. Similarly, no designated “critical” (in reference to the Endangered Species Act (ESA)) or suitable habitat exists for TEP species, except for Preble’s mouse. Suitable habitat is present, but critical habitat is not located in the project area for Preble’s mouse. Project design criteria are included to eliminate or minimize potential impacts to Preble’s habitat in the two vegetation treatment units that contain suitable habitat. No downstream effects are expected to occur to ESA- listed species that occur in the Platte River system, as water depletions are not part of the proposed action.

Region 2 sensitive wildlife species and ARNF terrestrial management indicator species (MIS) with potential habitat or those known to occur were considered in this analysis. The No Action Alternative was determined to have no impact and no cumulative impact to the analyzed sensitive wildlife species. The proposed action may adversely impact individuals, but is not likely to result in a loss of viability on the Planning area (ARNF), or in a trend toward federal listing (MAII) for: pygmy shrew, fringed myotis, hoary bat, northern goshawk, flammulated owl, Lewis’ woodpecker, and olive-sided flycatcher. The proposed action is expected to have a beneficial impact for Townsend’s big-eared bat. No Impacts are expected for the other sensitive species analyzed. In summary, potential impacts leading to MII determinations for the sensitive species include: impacts to a relatively small amount of low-quality habitat, removal of snags and some larger trees that could provide suitable nesting or roosting habitat, and potential felling of trees with active nest or roost cavities. These potential impacts are moderated by project design criteria or treatment guidelines that would retain 3 or more large snags per acre, retain the large majority of live dominant overstory trees in ponderosa pine and mixed conifer units, and remove generally only dead trees in lodgepole pine units. The proposed fuels treatments are intended to enhance ponderosa pine and mixed conifer stand conditions by removing primarily smaller diameter trees, while leaving a residual stand of larger trees. The thinning treatment would allow residual trees to reach late-successional or old growth conditions more rapidly than without treatment. Additionally, the fuels thinning and salvage treatments would reduce the potential for large stand-replacing wildfires that could remove suitable habitat for decades. A summary of determinations for R2 Sensitive wildlife species and Forest MIS are presented in the table below.

Predicted cumulative effects for the wildlife species analyzed are not expected to be significant. No potential for adverse cumulative impacts is expected to occur for marten, gray wolf, northern harrier, and Townsend’s big-eared bat from implementation of the proposed action. Residential development on private lands and permitted livestock grazing have the greatest potential to cause measurable impacts to Preble’s habitat. However, only small portions of fuels units 12 and 24 along Trail Creek and Willow Creek overlap suitable Preble’s mouse habitat, and unit 24 is not within a grazing allotment. Existing homes, and any future home development, generally does not occur and would not be expected to occur within riparian habitat, and impacts to Preble’s habitat would likely be very limited in scope. Because of the existing good riparian habitat conditions, and the lack of appreciable habitat impacts and

the expected long-term beneficial impacts of the proposed action, implementation of the proposed action is not expected to lead to or contribute to appreciable cumulative effects for Preble’s meadow jumping mouse. Designated Preble’s critical habitat is not present in the analysis, and there would be no chance for appreciable cumulative effects to Preble’s critical habitat from the proposed action. Impacts to Fringed myotis, Hoary bat, Northern Goshawk, Flammulated owl, Lewis’ woodpecker, Olive-sided flycatcher from the proposed action are expected to be minor or of low probability, with long-term benefits for habitat maintenance and development. Given this and the Forest Plan direction for the analysis area, the proposed action is not expected to lead to or contribute to appreciable cumulative effects for these six species, when added to impacts from past, present, and reasonably foreseeable future activities. Because only a limited amount of low-quality potential shrew habitat would be impacted by the proposed treatments, the proposed project would not result in or contribute to appreciable cumulative impacts for pygmy shrew.

**Table 13:** Summary of determinations, estimation of effects and influences for Threatened, Proposed, Region 2 Sensitive, and Forest Management Indicator Species

Species	Status	Proposed Action
Preble’s meadow jumping mouse	Threatened	<sup>1</sup> NLAA for species; No Effect for Critical Habitat
American marten	FS Sensitive	<sup>2</sup> NI
Gray wolf	FS Sensitive	NI
Pygmy shrew	FS Sensitive	<sup>3</sup> MAII
Fringed myotis	FS Sensitive	MAII
Townsend’s big-eared bat	FS Sensitive	Beneficial Impact
Hoary bat	FS Sensitive	MAII
Northern goshawk	FS Sensitive	MAII
Northern harrier	FS Sensitive	NI
Flammulated owl	FS Sensitive	MAII
Lewis’ woodpecker	FS Sensitive	MAII
Olive-sided flycatcher	FS Sensitive	MAII
Elk	MIS Young to Mature Forest & Openings	<sup>5</sup> Positive
Mule deer	MIS Young to Mature Forest & Openings	Positive
Golden-crowned kinglet	MIS for Interior Forest	Neutral
Hairy woodpecker	MIS for Young to Mature Forest	Neutral
Mountain bluebird	MIS for Openings	Positive
Pygmy nuthatch	MIS for Old Growth	Positive
Warbling vireo	MIS for Aspen	Positive

<sup>1</sup>NLAA – May Affect, but Not Likely to Adversely Affect; <sup>2</sup>NI – No Impact; <sup>3</sup>MAII - May adversely impact individuals, but not likely to result in a loss of viability in the planning area, nor cause a trend towards federal listing; <sup>4</sup>Neutral Influence, no change to planning unit populations; <sup>5</sup>Positive Influence, no change to planning unit populations

## WEEDS

Most of the project area is located in the montane ecological zone, and therefore the relative risk of noxious weed invasion or expansion is considered high. Access to NFS lands within the Cherokee Park area is complicated due to the mixed pattern of ownership between private and public lands, therefore, most known and treated noxious weed infestations are located within active grazing allotments where management regularly occurs. Moderate infestations of leafy spurge are known to occur on the Mill Creek Allotment, and small infestations of Dalmatian toadflax are known to be in the Schaffer Allotment. These infestations have been treated periodically over the years as resources have been available.

Proposed project activities involving ground disturbance (fuels reduction, watershed improvements, transportation management) are expected to increase risk of introduction and spread of noxious weeds. This risk is greater where: a) weeds already occur in or near potential treatment units; b) project activities involve use of mechanical equipment versus hand crews; c) project activities involve prescribed fire (burning piles of slash); d) project activities involve creation of (including temporary) skid roads, fire lines, landings, and other areas of soil disturbance; and e) treatments will open up the forest canopy the most, as most weed species grow well in open areas. Noxious and invasive weed species compete with native plants, can degrade and modify native communities, and can reduce resources for native species (e.g., moisture, soil nutrients, and light).

Approximately 4,600 acres of the Cherokee Park project units are proposed to be hand and/or mechanically treated, with slash to be piled and burned. On average, there are 17 (10 foot by 10 foot) slash piles created and burned per acre in a fuels reduction project. Therefore, if all 4,600 acres are piled and burned, approximately 180 acres of burned pile footprint will be created which may have a high potential for noxious weed invasion. In areas where similar fuels treatments have occurred, Canada thistle is especially aggressive in burned pile areas. These infestations usually occur within one to two years subsequent to burning. In areas mechanically treated, heavy equipment operation can increase soil compaction and ground disturbance, particularly within skid-trail, landing, and temporary road areas, which can in turn increase the risk of noxious weed invasion. In addition, all landings are likely to have large machine piles that will be burned.

The proposed decommissioning of roads could create additional disturbance, depending on the method implemented. In the long-term, however, having fewer roads as a vector to spread weed seed is desirable for minimizing additional noxious weed infestations.

Under the proposed action, both direct and indirect effects would be expected to result in an increase in noxious weed infestations over time, contributing to the long term cumulative impacts of increased infestations from other past, present, and future activities. To minimize the spread or introduction of noxious weeds, appropriate preventative project design criteria have been developed to be implemented with the proposed action.

## RANGE

The Cherokee Park project boundary overlaps all or portions of five active grazing allotments. Rangeland in these allotments is assessed to be in fair to good condition with a stable trend. Vegetation treatments are proposed in three of these allotments: Schaffer, Sheep Creek, and North Poudre. The following table summarizes grazing allotment use in the project area.

**Table 14.** Summary of current grazing allotment use in the Cherokee Park project area

Allotment	Permit type	Number	Kind/Class	Season	percent Acres in Project Area
Mill Creek	Term	11	cow calf pairs	7/1-9/30	100
Moen	Term	21	cow calf pairs	6/15-9/15	100
Schaffer	Term (On/Off)*	27 on/36 total	cow calf pairs	6/6-10/5	100
Sheep Creek	Term	126	cow calf pairs	6/21-9/25	9
North Poudre	Term (On/Off)*	46 on/91 total	cow calf pairs	5/25-10/30	100

\*A term grazing permit with an on/off provision addresses an allotment with mixed land ownership of NFS lands and private land.

The proposed vegetation treatments may result in either beneficial or adverse effects for rangeland resources, as it applies to livestock grazing management. Openings created in the tree canopy by vegetation thinning or aspen/meadow enhancement may have beneficial impacts to livestock grazing by increasing production of herbaceous forage. However, depending upon what species are present before treatment influencing post-treatment establishment, the benefits are not as notable if much of the production is composed of annual grasses and weeds. There would be potential for range improvement damage (e.g. fences and water developments) from tree thinning operations, hauling, or pile burning.

As part of the terms and conditions of a grazing permit, a permit holder is required to maintain all range improvements and move livestock in accordance with the allotment management plan. Some of the existing roads in the allotments are used to accomplish a portion of this work, but are not specifically identified in the permit. In many cases, permit holders have used these roads for permit administration for decades. The proposed action includes decommissioning unauthorized roads, except those currently utilized by grazing or other permittees. Administrative access to those roads is needed by grazing permittees to meet the terms and conditions of their grazing permit, such as to maintain range improvements and to move livestock. These routes should be identified in individual permits.

Past, present, and reasonably foreseeable future impacts to livestock grazing include past and ongoing motorized and non-motorized recreation, mountain pine beetle epidemic and past and present vegetation management. In addition, overall access and management is complicated by the checkerboard pattern of public and private ownership. Cumulatively, adverse impacts to range resources in the project area are not expected as a result of the proposed action. Understory vegetation overall is expected to increase as a result of the proposed vegetation treatments combined with mountain pine beetle-caused tree mortality.

## BOTANY

Proposed, Threatened, or Endangered plant species were excluded from this analysis as none are known or suspected to occur in the proposed treatment units. Similarly, no designated “critical” (in reference to the Endangered Species Act) or suitable habitat exists for any of the above. No downstream effects are expected to occur to this group of species. Region 2 sensitive plants and locally rare plants with potential habitat or those known to occur were considered in this analysis. The No Action Alternative is determined to have no direct indirect or cumulative impacts to the analyzed sensitive plant species. The proposed action, may adversely impact individuals, but would not be likely to result in a loss of viability on the Planning area, or in a trend toward federal listing for rock cinquefoil and yellow lady’s slipper. No Impacts are expected for the other sensitive species analyzed.

Cumulatively, adverse impacts to rock cinquefoil and yellow lady’s slipper individuals (if present) are possible; when considered with previous, current and future loss of habitat. Therefore, it is determined that implementation of the proposed action may adversely impact individuals, but would not be likely to result in a loss of viability on the planning area, nor cause a trend to federal listing for rock cinquefoil, and yellow lady’s slipper. A summary of determinations for R2 Sensitive and locally rare plants are presented in the table below.

**Table 15:** Summary of determinations for Forest Service Region 2 sensitive and locally rare plants

Common Name	Species	Determination of Effects of Proposed Action
<b>Region 2 Sensitive Species</b>		
Park milkvetch	<i>Astragalus leptaleus</i>	NI
Slender moonwort	<i>Botrychium lineare</i>	NI
Lesser-panicled sedge	<i>Carex diandra</i>	NI
Yellow lady’s-slipper	<i>Cypripedium parviflorum</i>	<sup>2</sup> MAII
Colorado tansyaster	<i>Machaeranthera coloradoensis</i>	NI
White adder’s-mouth	<i>Malaxis brachypoda</i>	NI
Budding monkeyflower	<i>Mimulus gemmiparus</i>	NI
Rock cinquefoil	<i>Potentilla rupincola</i>	MAII
Dwarf raspberry	<i>Rubus arcticus</i> ssp. <i>acaulis</i>	NI
Autumn willow	<i>Salix serissima</i>	NI
<b>Locally Rare Plants</b>		
Larimer aletes	<i>Aletes humilis</i>	Anticipated to continue to exist as long as the habitats are not severely altered
Wood lily	<i>Lilium philadelphicum</i>	Could be damaged by equipment or the dragging of logs through populations.

Determinations for R2 Sensitive Species: <sup>1</sup>NI = No Impact; <sup>2</sup>MAII = May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.

## RECREATION

The Cherokee Park project area provides a varied recreational setting used primarily by local outfitter and guides and hunting by the general public. There are no recreation facilities, but there is a single ATV/OHV route on Forest Road 182. There are seven outfitter and guide permit holders that operate within the project area boundary. Dispersed camping occurs only on those portions of Larimer County Road 59 and Forest Service Road 182 that are on National Forest lands. The table below provides a summary of expected impacts to recreation that could result from implementation of the proposed action. Because recreation in the project area is relatively minimal, cumulative impacts as a result of this proposal are not expected.

**Table 16.** Expected impacts to recreational activities as a result of the proposed action

Recreational activity	Current Intensity	Proposed Action
Outfitter/Guide	Outfitters are primarily in the south and west portions of the project area, use is minimal.	Road closures have the highest potential to impact this activity, with the greatest impacts occurring during summer and early fall.
ATV (road)	Currently ATV use is moderate to high	Road closures have the highest potential to impact activity, with the greatest impacts occurring during summer and early fall.
Hunting	Hunting within the project area is considered moderate; especially along County Roads 59 and 80C. Typically occurs on the weekends from September through November during the deer and elk seasons.	Road closures have the potential to impact activity, greatest impacts occurring during the fall big-game hunting seasons.
Other Recreation Uses (dispersed car camping, bicycling, horseback riding)	Minor, there are a few dispersed camping sites and there are no system trails within the project area.	Road closures have the highest potential to impact activity, with the greatest impacts occurring during summer and early fall.
Public Access	Very limited	Access not expected to change.
Recreation Infrastructure (roads, trails)	Minimal	Prescribed fire and machinery used to treat slash could damage or destroy wooden structures such as fences, gates and signs.
Creation of Unauthorized Routes/Vehicle Trespass	Moderate	Thinning could open up new areas to off-road vehicle trespass and resource damage.

## SCENERY

The topography of the project area is moderately rolling to steep and vegetation varies from open areas with grasses and shrubs to conifer trees and deciduous species. The checkerboard ownership pattern is evident, with residential and second home development occurring on alternating private land parcels. Travel through the project area is relatively low. This landscape has low to moderate visibility which refers to how obvious proposed changes to the landscape such as road construction, tree removal or other human development may be in that landscape. Desired landscape character here is a 'natural-appearing' landscape. Viewpoints of interest include the Larimer County Roads 59 and 80C as well as the residential areas themselves.

The effects that would result from the proposed action could range from a minor positive to a minor adverse impact on the scenery resource over the long term. While improving the vigor of the green forested landscape would be a positive effect, short term minor adverse effects to the scenic quality of

the area would result from thinning activities such as creation of landings and burn piles. The proposed action is expected to increase the stability of the landscape. If a wildfire occurred following the proposed vegetation treatments, effects to visual resources are predicted to be less than if no treatments are undertaken.

Several of the proposed treatment units are of primary concern to visual resources due to their relative location: Units 8 and 19 which are along Larimer County Roads 59 and 80C; Unit 12 which is in the foreground/midground from Larimer County Road 59; and units that have linear boundaries such as those along private land.

**Table 17.** Summary of effects to visual resources from units of primary interest

Viewpoint w/ Units of Primary Interest*	Forest Plan Adopted Scenic Integrity Objective (SIO)	Existing Condition/ No Action		Proposed Action		
		Existing Scenic Integrity	Existing Landscape Stability	Resultant Scenic Integrity	Resultant Landscape Stability	Remarks
1 (Unit 8)	Moderate	Moderate	Moderate/Low	Moderate	High	Short term effects & long term stability
2 (Unit 12)	Moderate	Moderate	Moderate/Low	Moderate	High	Short term effects & long term stability
3 (Unit 19)	Moderate	Moderate	Moderate/Low	Moderate	High	Short term effects & long term stability

\*See visual resources report for more information about viewpoints of interest

**HERITAGE**

A class I heritage resources literature review was completed for the proposed project which utilized Office of Archaeology and Historic Preservation site and survey records, the Arapaho and Roosevelt National Forests and Pawnee National Grassland cultural resource atlas, relevant cultural resource management reports, and Government Land Office plat maps. Sixteen previous cultural resource inventories were completed in the vicinity (inside of or within ½ mile of the project area). Eight cultural resources were found in this area, and three of those are located within the project area. None of the resources documented are eligible for the National Register of Historic Places. In addition, the Northern Arapaho, Northern Cheyenne, Northern Ute, Southern Arapaho, Southern Cheyenne, and Southern Ute Tribes were consulted to determine whether any culturally significant places or locations of concern to these Tribes were located within the analysis area. No concerns about culturally significant sites within the analysis area were identified by Tribal representatives.

Under the proposed action, primary impacts to cultural resources from mechanical thinning, or other vegetation treatments, may include the displacement, alteration, and destruction of surface artifacts and cultural features, as well as disturbance to site soil deposition and site stability. In addition, architectural components such as standing wooden or stone walls may be knocked down by machinery. Also, localized burning could disturb the integrity characteristics of archeological artifacts in the area.

Road improvement and/or deconstruction may disturb subsurface cultural deposits. In addition, removal of forest products through firewood or fencepost permits could adversely affect cultural resources by introducing traffic in or around the sites and therefore opportunities for vandalism or removal of artifacts. Chainsaw thinning is not considered to have the potential to adversely affect cultural resources except those sites, such as culturally peeled trees or aborglyphs that are themselves cultural resources (USFS AR Agreement No. 07-MU-11021000-025).

The reduction of fuels in the analysis area, as well as the other proposed activities, would have indirect effects on significant historic properties in the project vicinity by reducing the probability that a severe wildfire would modify or destroy these sites. Watershed improvement projects, as proposed, would have the potential to impact cultural resources in ways similar to mechanical thinning. Although proposed activities would have the potential to cause adverse effects to cultural resources, a sample cultural resource inventory of the analysis area found no new significant (NRHP eligible) cultural resources within the proposed treatment units.

Cumulatively, although individual cultural resources may be impacted by proposed activities, these resources are not considered to be significant, as none are eligible for the NRHP. Cultural resources are non-renewable. The loss of archaeological resources has occurred in the past and will continue to occur in the future through both natural and human causes. Although efforts have been made to locate cultural resources within the project area, it is possible that there are undiscovered cultural resources that may be affected by project activities. The accumulated loss of individual cultural resources has the potential to limit our ability to understand broad patterns of human history as well as local historical events.

## 4.0 CONSULTATION & COORDINATION

*The Forest Service contacted, consulted, and scoped with the following individuals, Federal, State, and local agencies, and tribes during the development of this environmental assessment:*

### **Interdisciplinary Team Members**

Kevin Atchley, District Ranger

Nehalem Clark, Project Lead

Lenora Arevalos, Recreation

Cambria Armstrong, Fuels/Air

Tom Bates, Botany

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Deb Entwistle, Hydrology

Larry Fullenkamp, Archaeology

Dave Hattis, Silviculture

Sue Greenley, Lands/Specials Uses/Minerals

Dan Kipervaser, Silviculture

Mike Montgomery, Contract Admin.

Janice Naylor, GIS

Lizandra Nieves-Rivera, Soils

Kim Obele, Range and Noxious Weeds

Dale Oberlag, Wildlife Biology

James White, Fuels Implementation

Michele White, Transportation & Travel

Sonya Whitesell, Watershed & Soils

### **Federal, State and Local Agencies**

Bureau of Reclamation

City of Fort Collins (and City Utilities)

City of Greeley (and City Water)

Colorado Division of Wildlife

Colorado State Forest Service

Colorado State Historic Preservation Office

Colorado State University

Crystal Lakes Fire

Livermore Fire Department

Northern Colorado Water Conservancy

Rocky Mountain National Park

U.S. Fish and Wildlife Service

### **Tribes**

Cheyenne and Arapaho Tribes of Oklahoma

Northern Arapaho

Northern Cheyenne

Southern Ute

Ute Trip

### **Others**

Colorado and Federal Congressional Delegation

Environmental and Ecological Organizations

Forest Products Companies

Local Residential Developments & Assocs.

Local Residents and Businesses

Private Citizens

Recreation Groups

Utility Providers

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