LAND AND RESOURCE MANAGEMENT PLAN
PIKE AND SAN ISABEL NATIONAL FORESTS
AND
COMANCHE AND CIMARRON NATIONAL GRASSLANDS

AMENDMENT NUMBER 28

(August 2, 2001)

Page Code	Superceded	New

Reason For This Amendment:

A decision has been made to modify the suitable timber base and certain standards and guidelines within portions of the area Upper South Platte Watershed Protection and Restoration Project. The reason for the change is to make possible the project's desirable outcomes.

Amendment Number 28:

This amendment modified the Forest Plan by removing approximately 4,000 acres in the Upper South Platte Watershed from the Forest's suitable timber base to allow cutover areas to indefinitely persist as openings; and to modify the elk and mule deer thermal cover standards and guidelines under forest direction and management prescription 4B for areas generally below 7,500 feet in the Waterton/Deckers and Horse Creek subwatersheds to provide more sustainable forest conditions and diverse wildlife habitat while maintaining at least 5 percent of the area in thermal cover for elk and mule deer. See attached for more detail.

I have determined that, according to 36 CFR Part 219.10(f), this is not a significant amendment to the Forest Plan .

/s/ Abigail R. Kimbell — August 2, 2001
Abigail R. Kimbell — Date
Forest Supervisor

LAND AND RESOURCE MANAGEMENT PLAN
PIKE AND SAN ISABEL NATIONAL FORESTS
COMANCHE AND CIMARRON NATIONAL GRASSLANDS

AMENDMENT 28

July 2001

This document amends the Forest Plan (USFS 1984). It includes the current Forest Plan standards, the amendments to the standards, rationale for the amendment, and determination of significance.

FOREST VEGETATION

Current Forest Plan Standard and Guidelines

The Forest Plan, page III-47-50, identifies the general direction and the standards and guidelines associated with reforestation. The general direction is to establish a satisfactory stand on cutover areas within five years of final harvest. Permanent openings that serve specific management objectives are excluded. Ponderosa pine sites are required to have at least 190 seedlings per acre within five years of a final harvest.

Amendment For The Upper South Platte Watershed

This Forest Plan Amendment allows up to 25% of the vegetation treatment areas identified in the *Environmental Assessment for the Upper South Platte Watershed Protection and Restoration Project* (USFS 2000) to persist indefinitely on sites that were historically openings. Sixty percent of these openings will retain approximately 5-10% canopy closure while the remaining openings would have no canopy maintained. The openings will be located on southerly and westerly aspects that historically maintained persistent openings. The typical opening size will be 5 acres with the largest persistent opening being 40 acres. The field-identified locations will be mapped using a Global Positioning System and classified as "Administratively Not Suitable for Timber Production." Approximately 4,000 acres will be removed from the Forest's suitable timber base. The forest area capable, available, and suitable for timber production would be decreased from 581,550 acres (Forest Plan, Appendix B) to approximately 577,550 acres. These areas will not be reforested and will no longer contribute to the Allowable Sale Quantity (ASQ) for the Forest.

Reason For This Amendment

Created openings in the Upper South Platte Watershed need to persist for decades with little or no regeneration. Regeneration functions as ladder fuels that allow surface fires to become crown fires. Crown fires are not characteristic in the ponderosa pine type and the ecosystem is poorly adapted for these types of fires. The persistent openings will help restore a missing component in the landscape and provide more sustainable and heterogeneous forest conditions similar to the historic landscape. This amendment is consistent with Dr. Merrill Kaufmann's research findings near Cheesman Lake.

The created openings need to be removed from the Forest's suitable timber base to be excluded from the National Forest Management Act's reforestation requirement. The 4,000-acre reduction from the timber base represents less than 0.7% of the Forest's existing suitable timber base (581,550 acres). The areas that would be removed are low productivity sites and would not have much effect on the Forest's ASQ.

ELK AND MULE DEER THERMAL COVER

Current Forest Plan Standard and Guidelines

Forest Direction: Maintain 20 percent of the diversity unit in thermal cover (winter or spring-summer). (Forest Plan page III-33)
Management Prescription 4B: Maintain 30 percent of the diversity unit in thermal cover (winter or spring-summer). (Forest Plan page III-138)

Amendment For The Upper South Platte Watershed

The following replaces the current Forest Plan standards and guidelines under forest direction and management prescription 4B for diversity units below 7,500 feet elevation within the Waterton/Deckers and Horse Creek subwatersheds:
Manage vegetation to provide more sustainable forest conditions and diverse wildlife habitat while maintaining 5 percent of the area in thermal cover for elk and mule deer. This applies to all diversity units with at least 50% of the area below 7,500 feet elevation within the Waterton/Deckers and Horse Creek subwatersheds.

Reason For This Amendment

This amendment is necessary to provide improved Management Direction and Standards and Guidelines for creating forest conditions that are more sustainable and achievable while providing for the cover needs of deer and elk within the project area. In 1989, the Forest Service drafted an amendment to the Forest Plan to address this same issue, however it was never finalized (USFS 1989). The 1989 draft amendment recognized that the rigid definitions of cover for elk and mule deer for all of the Pike and San Isabel National Forest was not achievable.

This amendment addresses only areas generally below 7,500 feet within the Waterton/Deckers and Horse Creek subwatersheds. The forest vegetation conditions in these subwatersheds were analyzed in the *Landscape Assessment Upper South Platte Watershed* (Foster Wheeler Environmental 1999) and the *Environmental Assessment for the Upper South Platte Watershed Protection and Restoration Project* (USFS 2000). These analyses indicate that research on Denver Water's Cheesman Lake property is applicable to the forest vegetation in the Waterton/Deckers and Horse Creek subwatersheds.
This amendment allows for managing toward more sustainable forest conditions in the Waterton/Deckers and Horse Creek subwatersheds and is consistent with most wildlife goals in the Forest Plan. The desired landscape conditions will result in more heterogeneous natural landscapes with diverse habitats that are sustainable over the long-term benefiting elk, mule deer, and other wildlife. The objective is to manage vegetation toward forest conditions that are sustainable and similar to presettlement conditions. Before logging, grazing, and fire suppression, ponderosa pine stands within these subwatersheds were less dense, more open, and less vulnerable to diseases, insects, and large intense wildfires (Veblen et al. 2000). The desired landscape conditions are not intended to completely restore historic forest conditions in the subwatersheds, but to create conditions over part of the landscape that are similar to those

present before settlement. Historically, the forest likely provided much less thermal cover for elk and mule deer than what is present today.

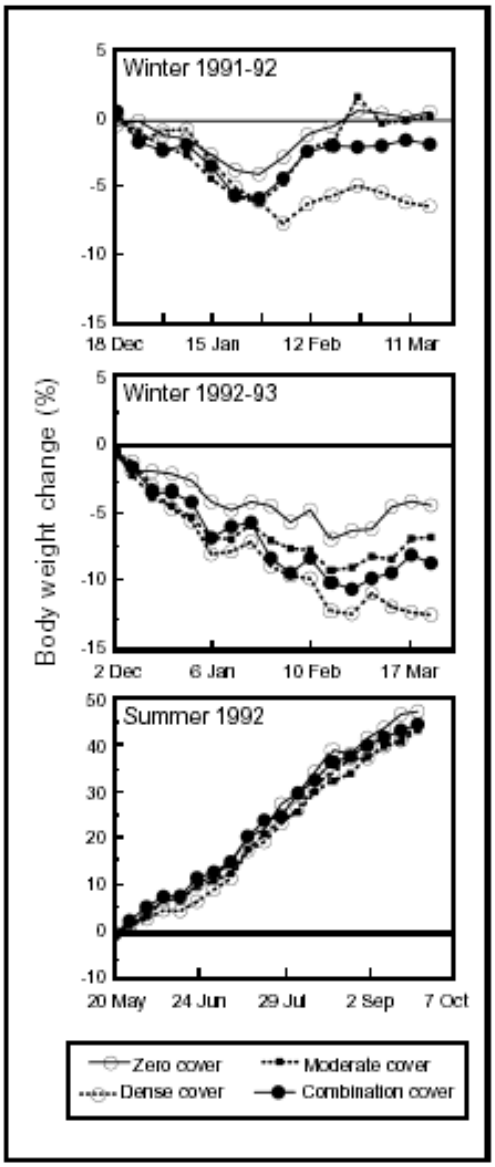
Thermal cover for elk and mule deer has been generally defined as 70 percent or greater crown closure (Hoover and Wills 1987). At current conditions, thermal cover in the winter range of these species in the Waterton/Deckers and Horse Creek subwatersheds are 5 and 8 percent for mule deer and elk, respectively. Thermal cover in both winter and summer range below about 7,500 feet within these subwatersheds is 9 percent. This is far less than the 20 and 30 percent thermal cover standards. The current forest and elk and mule deer habitat conditions are not sustainable. It would be extremely difficult to manage the ponderosa pine/Douglas fir forest within these subwatersheds to achieve the 20 or 30 percent thermal cover standards for a short period (20 years) and likely impossible over the long-term (100+ years) for reasons discussed below. The thermal cover definition was based primarily on empirical habitat studies in the Blue Mountains of Oregon and Washington (Thomas 1979) where the forest ecosystem is very different from the ponderosa pine forests in the Waterton/Deckers subwatersheds. The Blue Mountain forests are much more dense with larger trees and support a greater number tree species. This is because the soils are more productive and the climate is wetter. In contrast, the subwatersheds are much drier with unproductive decomposed granite soils with low moisture retention capacity. As a result, the subwatersheds are not capable of supporting dense stands of large trees, and thus cannot produce 70 percent crown closure over 20 percent or more of the area like in the Blue Mountains. It is also not feasible to manage the subwatershed forests to create canopy closures similar to those in the Blue Mountain forests. Even Thomas et al. (1979) indicated that ponderosa pine stands in the Blue Mountains are also not capable of meeting this standard. They wrote “where ponderosa pine stands are used for thermal cover, it is especially rare to find canopy closures approaching 70 percent.” Because thermal cover has little practical relevance for reasons discussed below there is no practical reason to increase tree density to meet the 20 or 30 percent thermal cover standards.

The *Environmental Assessment for the Upper South Platte Watershed Protection and Restoration Project* (USFS 2000) showed that managing vegetation toward the desired landscape conditions in the Waterton/Deckers and Horse Creek subwatersheds may slightly decrease or not change existing thermal cover in deer and elk winter ranges to 5 to 7 percent, respectively. It will decrease thermal cover to 8 percent in both summer and winter ranges within all diversity units below 7,500 feet in these subwatersheds. However, the project would reduce the potential for losing the remaining thermal cover to large-scale high intensity fires or insect-related mortality, thus indirectly benefiting deer and elk. The habitat capability calculated by the HABCAP model predicted that managing vegetation toward the desired landscape conditions would increase elk and mule deer overall winter habitat capability. More browse would be available to these species to sustain them through the winter.

General Elk and Deer Thermal Cover Thermal Cover Requirements. Many studies provided empirical evidence that free ranging ungulates occasionally use dense forest stands out of proportion to their availability. Several study areas indicate that elk use all available habitats at one time or another, but are much more selective during periods of stress (Lyon et al. 1985). In Montana, elk on winter range continuously seek the most moderate ambient weather conditions, and other factors influencing habitat selection are secondary (Beall 1973). In winter, elk move between foraging and bedding sites in response to changing ambient temperatures, increasing snow depths, and to enhance control of body temperature. Similarly, on summer range, Lyon (1979) concluded that maintenance of relatively constant body temperature “may be comparable to feeding as a daily preoccupation for elk.” Elk may use more open areas during spring green-up (Edge et al. 1987). During hot summer months, elk seek shaded, cool habitats (Leege 1984). Elk studies in the Blue Mountains of Washington and Oregon estimated optimal thermal cover for elk to be 10 to 20% of the occupied range (Thomas et al. 1979).

Mule deer are most likely to be found in open forested regions or on the plains and prairies (Snyder 1991b). Mule deer seek shelter at lower elevations when snows become deep. In open prairie regions mule deer tend to concentrate in river breaks and brushy stream bottoms (Mackie et al. 1987). The optimal amount of thermal cover has been estimated to be 10 to 20% of a deer's use area (Hoover and Willis 1984; Snyder 1991b; Thomas et al. 1979). Optimal winter ranges would contain thermal cover consisting of evergreen trees of at least pole-sapling stage, with 75% or greater canopy closure. The best summer and spring thermal cover is often made up of deciduous trees or shrubs. Optimal summer thermal cover is 75% or greater canopy closure for saplings or shrubs greater than 5 feet tall or 60% or greater canopy closure where trees are pole-size or larger (Hoover and Willis 1984).

Significance of Thermal Cover Based on Science. Cook et al. (1998) recently tested the sheltering effect of thermal cover to enhance condition of elk during summer and winter. They found no significant positive effect on condition of elk during any of four winter-long experiments and two summer-long experiments. In fact, during winter, they showed that the dense cover units actually provided the most costly energetic environments and the clearcuts the least (see figure). These results suggest dense thermal cover could have a negative effect. During summer, Cook et al. (1998) also found no indication that elk performance was influenced in any way by forest cover treatments, despite high summer temperatures (see figure). Other researchers have also found elk to be surprisingly tolerant of high summer temperatures (Cook et al. 1998).



Weight dynamics of elk, expressed as a percentage of beginning body weight, over the first summer and two winter experiments of the study.

This study also concluded that enhanced performance of elk with little or no thermal cover in winter was due to the greater levels of solar radiation flux and that potential energetic benefits of thermal cover (from reduced windspeed, elevated nocturnal temperature, and long-wave radiation flux during winter, and shading from solar radiation in summer) were negligible in respect to the thermoregulatory capabilities of elk. This is because large ungulates are well adapted to deal with climatic stresses, and apparently under various vegetative covers. (PNWRS 2000). The results suggest the weather-moderating effects of forest cover are too small, occur too infrequently, or are too variable to have significant effects.

The lack of significant positive benefits of thermal cover during this study is consistent with every other study of thermal cover influences on large wild ungulates conducted under rigorous

scientific conditions (PNWRS 2000). Swift et al. (1980) and Hobbs (1989) concluded that thermal cover had negligible influences on ungulates during winter, based on simulation models. Hobbs (1989) indicated that forage conditions, during or before winter, exerted greater effects on overwinter survival of mule deer than did thermal cover. Riggs et al. (1993) suggested that events must increase cumulative expenditures of energy reserves such that survival and/or reproductive rates are reduced. If such events do not occur, then thermal cover has little practical relevance.

Importance of Forage Versus Thermal Cover. Thermal cover and forage resources both address energy balance but from different perspectives: dietary energy levels and forage abundance control intake rates of energy whereas thermal cover has been perceived to reduce the rate of net energy loss (Cook et al. 1998). The effects of nutrition on animal performance have been well established. Quality, quantity, and distribution of forage directly affect carrying capacity of ungulates. The nutritional needs during summer and fall are especially important because of the high nutritional demands prior to winter. In contrast, similar effects have not been documented for thermal cover. In fact, the preponderance of evidence currently does not support the hypothesis that thermal cover is a significant habitat attribute necessary for the well-being of ungulates (Cook et al. 1998).

The inverse relation between forage production and forest overstory canopy is well documented. Providing large areas of thermal cover therefore could reduce nutritional carrying capacity and herbivore performance. The practical importance of nutrition is far more important than thermal cover in the productivity of ungulate herds. The energy saved through protection via thermal cover is negligible compared to the energy taken in through nutrition. The energetic benefits of thermal cover are considered inconsequential, thus leaving forage effects as the primary mechanism through which habitat influences individual performance (PNWRS 2000).

Significance of Thermal Cover to Land Management. Various thermal cover studies (Robinson 1960; Gilbert and Bateman 1983; Freddy 1984, 1985, 1986; Cook et al. 1998) offer strong evidence that influences of thermal cover on animal performance and population dynamics is rarely of consequence. Because thermal cover has little relevance to herd productivity or demographics, thermal cover considerations should be relegated low priority relative to other habitat values (Cook et al. 1998). In fact, if thermal cover has little practical relevance, then land management aimed at providing thermal cover is unnecessary and even counterproductive from the standpoint of long-term management (Riggs et al. 1993). In contrast, the effects of nutrition on animal performance have been well established. Long-recognized inverse relations between forage production and forest canopy closure indicate that decisions that emphasize thermal cover over food production can reduce forage production and, in turn, ungulate carrying capacity. Therefore, land management decisions relative to ungulates should place much greater emphasis on forage quantity and quality compared to thermal cover (Cook et al. 1998).

Importance of Thermal Cover in the Project Area. Winters in the lower portions of the subwatersheds are relatively mild. Snow depths are not considered limiting to elk or deer. Average maximum snow depths for each month between September and May ranges between 1.2 inches and 6.3 inches near Cheesman Lake and between 0.2 inches and 11.6 inches near Strontia Springs Reservoir. The snows typically melt quickly, particularly on south-facing slopes. In severe winter areas, snow depths greater than 18 inches typically restrict deer winter ranges. Snow depths greater than 12 inches begin to reduce the winter range (USFWS 1982). Elk typically avoid sites with snow accumulations in excess of 18 inches. Because snow accumulations are low in the project area, the value that cover provides for intercepting snow is of negligible value to elk and mule deer.

Winter temperatures in the subwatersheds average 30 degrees F. This is slightly cooler than average winter temperatures (36 degrees F) for the study area evaluated in the thermal cover study (Cook et al 1998) discussed above. Eric Cole, (Habitat Biologist, National Elk Refuge, U.S. Fish and Wildlife Service, pers. com., June 25, 2001), indicated that winter temperatures need to be sustained below –20 degrees F before thermal cover becomes important for protecting elk. Then, elk tend to only seek refuge during the most severe winter storms. He stated that "winter thermal cover is a non-issue" for the lower areas in the subwatersheds because of the mild winter temperatures. Summer temperatures in the project area average 62 degrees F, slightly cooler than average summer temperatures (66 degrees F) for the thermal cover study (Cook et al 1998) discussed above. Because summer temperatures are relatively cool, dense thermal cover in the project area has negligible value for protecting ungulates from summer heat.

The Colorado Division of Wildlife has also indicated that dense thermal cover does not appear to be as important as was previously thought (Janet George, NE Region Terrestrial Biologist, Colorado Division of Wildlife, pers. com., Nov. 21, 2000). The lower portions of the subwatersheds, where elk and mule deer are likely to congregate during severe winters, are mostly shrubland. The elk and deer populations are stable in this area. The Colorado Division of Wildlife intensively manages these elk and mule deer populations to maintain optimal numbers through their hunting and monitoring program. Slight changes in existing dense thermal cover would not adversely affect these populations.

Rationale for Desired Landscape Conditions. Scientists (Kaufmann et al. in preparation; Huckaby et al. 2000; Kaufmann et al. 2000; and Brown et al. 1999) have been studying historical landscape conditions on Denver Water's Cheesman Lake property with the Pike National Forest since 1995. They showed that the historic Cheesman Lake forest was less dense, more open, and less vulnerable to large-scale fires than the surrounding forested landscape. The historical fire behavior in this area followed a mixed severity fire regime characterized by a combination of surface fire and patchy crown fire. They concluded that past logging, grazing, tree planting, and fire suppression has substantially increased the current forest density and amount of Douglas-fir that acts as a ladder fuel for fires. As a result, the current forest conditions favor a crown fire regime, with a high risk of catastrophic stand-replacing fire. These higher-severity fires are more apt to have detrimental effects on wildlife habitat (Brown 2000). Because conditions are well outside the historic range of variability within the Forest, researchers believe that managers must remove wood to break up the dense, continuous forest (Kaufmann et al. 2000). Dry forest types, such as the lower montane forest, offer the clearest opportunities for thinning in conjunction with prescribed fire to contribute to restoration of wildlife habitat while making the forests more resistant to uncharacteristically severe fire (Brown 2000). Because openings are an important and transient part of the landscape, removing dense, young trees and retaining old trees will do much to restore the ecosystem and at the same time reduce wildfire risk. Such ecological restoration is compatible with reducing the hazards of catastrophic fire and insect outbreak (Veblen et al. 2000). Creating a more open forest will result in a more grassy understory that will burn at lower fire intensities, increase shrub and grass density, and reduce soil erosion (Kaufmann et al. 2000). Creating a more open forest would also benefit elk and deer by improving forage and reducing the risk of large-scale fires that are the primary threat to their habitat.

Kaufmann et al. (in preparation) indicated that more than 90% of the historical landscape had a crown closure of 30% or less. In contrast, only 50% of the current forest landscape has crown closure of 30% or less. In other word, the historical forest stands were much more open. They describe four basic stand conditions in the area: 1) openings vegetated primarily with grasses and shrubs, 2) patches that are pure or nearly pure ponderosa pine, 3) patches having both ponderosa pine and Douglas fir, and 4) patches of very old trees, persistent old growth. Historically 15% of landscape had persistent old-growth patches, pure ponderosa pine patches probably accounted

for 35-50% of the landscape, primarily on east, south, and west slopes. Ponderosa pine/Douglas fir patches on north slopes and portions of upper ridges may have accounted for 20-30% of the landscape, and at least 25% of the landscape was open, with no more than 10% tree crown closure (Kaufmann et al. in preparation; Dr. Merrill Kaufmann, Research Ecologist, Rocky Mountain Research Station, pers. com., June 26, 2001). Undoubtedly these proportions varied over time, especially when fires created openings, reduced tree densities, or killed young Douglas fir trees invading patches (Kaufmann et al. in preparation).

These patch proportions shifted dramatically because of the effects of logging, grazing, fire suppression, and tree planting, all of which are likely to increase forest density. Logging decreased the amount of old growth. Grazing reduced understory competition and helped the establishment of new seedlings. The lack of fire allowed more seedlings to survive. The result was a sharp increase in forest density, expansion of the area having a significant Douglas-fir component, and the loss of openings that temporarily increased during intense logging during the late 1800's (Kaufmann et al. in preparation).

Because the lower montane forests are well outside the historic range of variability, recent vegetation disturbances such as fire and insects have had a greater influence on the vegetation trends than forest management activities (Thinnes 2001; Veblen et al. 2000). In the Pike and San Isabel National Forests, timber-related vegetation management activities have annually averaged less than 0.3% of the lower montane forest compared to about 1% of the mature forest canopy lost annually because of wildfire and insects. Fire has eliminated more than 1,000 acres of mature lower montane forest annually since 1989. Insects, primarily Douglas-fir Tussock moth and western budworm, killed thousands of acres of mature forest. Fires and insects have eliminated the mature forest canopy on at least 60,000 acres since 1989. The fire behavior on several recent fires and the persistence of defoliation and beetle epidemics would not have occurred in the historic forest conditions. The current forest conditions are not sustainable. High-intensity wildfires and insect epidemics are expected to continue until tree densities are significantly reduced on much of the lower montane forest (Thinnes 2001). Because current forest conditions are not sustainable, current elk and mule deer cover habitat conditions are not expected to be sustainable.

The U.S. Forest Service in cooperation with the Colorado State Forest Service and Denver Water recently assessed the Upper South Platte Watershed to identify forested areas with the highest risk of fire and soil erosion (Foster Wheeler Environmental 1999). As a result, the Forest Service has targeted the highest risk areas for treatments to improve forest diversity and resilience in this fire-prone ecosystem used by elk and mule deer (USFS 2000). These treatments will include thinning ponderosa pine forests and creating openings similar to historic conditions. The openings will be interspersed throughout the treatment area to create more patchy conditions that result in more forage. These created openings will typically be less than five acres, and thus entirely usable by deer and elk. These treatments will have positive effects on overall forest health and sustainability resulting in a more heterogeneous natural landscape with diverse habitats that would have long-term beneficial effects on elk and mule deer (USFS 2000).

The selection of 5% as the new thermal cover standard is based on a standard that is achievable for this biophysical area. As discussed above, the science does not support the need for any thermal cover in this area. Five percent is believed to be sustainable based on Dr. Kaufmann's best estimates of the historic landscape where only 1% of the area would have been dense pole, 1% dense mature, and a small portion of the 15% old growth would have had the 70% canopy closure necessary for thermal cover.

FOREST PLAN AMENDMENT EFFECTS

The only vegetation treatment action relevant to this Forest Plan amendment that the USDA Forest Service expects to implement in the near future was described and analyzed in the *Environmental Assessment for the Upper South Platte Watershed Protection and Restoration Project* (USFS 2000). This EA, the *Public Review of the Environmental Assessment, Upper South Platte Watershed Protection and Restoration Project* document (Attachment B to the FONSI/Decision Notice for the Vegetation Treatment Subproject in Non-Roadless Areas), and the above analysis addressed direct, indirect, and cumulative effects of this project relevant to this plan amendment. The FONSI/Decision Notices for the EA addressed the significance of these effects. In the unlikely event that a different action relevant to this amendment is proposed in the near future, its environmental effects would also be evaluated according to NEPA.

DETERMINATION OF SIGNIFICANCE

The changes are not significant in accordance with the requirements of 36 CFR 219.10(e) and (f), 36 CFR 219.12(k), and FSM 1922.51 and 1922.52. In accordance with FSH 1909.12 and 5.32, the following factors were used to determine whether the amendment to the forest plan is significant or not significant.

Timing

The effective period for the amendment will be from the date of approval of the Upper South Platte Watershed Protection and Restoration Project and completion of the scheduled revision of the Forest Plan. A Notice of Intent to complete a revision of the Forest Plan was filed in the Federal Register in October of 1999. The Forest Plan revision is expected to be completed in about three years. This time period for the amendment is not significant.

Location and Size

The amendment applies only to areas generally below 7,500 feet within the Waterton, Deckers, and Horse Creek subwatersheds. This area covers about 61,000 acres of Forest Service managed lands or about two percent of the lands affected by the Forest Plan. This area is relatively small area. This location is not capable of achieving elk and deer thermal cover standards for reasons given in the above sections. Changing the thermal cover standards to something that is achievable for this location is not significant. Maintaining dense canopy cover on 20 percent of the landscape is not considered a significant attribute for the well-being of elk and deer for this location for reasons given in the above sections.

Goals, Objectives, and Outputs

The amendment will not cause a significant change in the goals, objectives and outputs of the Forest Plan for the following reasons. The amendment will allow for vegetation treatment activities that help achieve Forest Plan goals such as increasing diversity for wildlife habitat, improving the health and vigor of vegetation, and conserving water and soil resources (see Forest plan pages III-4 and III-5).

The amendment will allow for vegetation treatments that will help achieve Forest Plan objectives and outputs. The habitat capability calculated by the HABCAP model predicted that managing vegetation toward more sustainable conditions would increase elk and mule deer overall winter habitat capability. This is consistent with the Project Average Annual Outputs for elk and deer winter range that predict a steady increase (see Forest Plan page III-7). These treatments will also have positive effects on overall forest health and sustainability resulting in a more heterogeneous

natural landscape with diverse habitats having long-term beneficial effects on wildlife. This is consistent with Wildlife Habitat Improvement Outputs that predict a steady increase (see Forest Plan page III-7).

The amendment will allow for vegetation treatments that could reduce the Forest's existing suitable timber base by as much as 4,000 acres which is less than 1% of the Forest's existing suitable timber base (581,550 acres). This minor decrease would cause an insignificant decrease in the outputs for Allowable Sale Quantity (see Forest Plan page III-8).

Management Prescriptions

The amendment will provide flexibility to restore forest stands to conditions that are less dense, more open, and less vulnerable to large intense wildfires. It will allow the Forest Service to carry out restoration activities, such as thinning and creating openings that would mimic historical landscape conditions resulting in positive effects on overall forest health and sustainability. This is compatible with the prescriptions for management areas within the affected subwatersheds including Management Area 2A (emphasizes semiprimitive motorized recreational opportunities), 2B (rural and roaded-natural recreation), 3A (semiprimitive nonmotorized recreation in roaded or nonroaded areas), 4B (habitat for management indicator species), 5B (big game winter range), 7A (wood-fiber production and utilization), and 7D (wood-fiber production and utilization for products other than sawtimber) (see Forest Plan pages III-107 to III-188). The amendment would not affect other management areas. The amendment will not cause a significant change to the Forest Plan because it is compatible with management prescriptions.

I have determined that this amendment is not significant based on the analysis of the above factors. The USDA Forest Service will implement this amendment only after a decision on the vegetation treatment subproject evaluated in the *Environmental Assessment for the Upper South Platte Watershed Protection and Restoration Project* has been made and the appeal process has been completed.

/s/ Abigail R. Kimbell August 2, 2001

Abigail R. Kimbell Date

Forest Supervisor

References

Adams, A. W. 1982. Migration. *In* Thomas, Jack Ward; Toweill, Dale E., eds. *Elk of North America: Ecology and Management*. Harrisburg, PA: Stackpole Books: 301-322.

Beall, R.C. 1973. Winter habitat Use in the Sapphire Mountains of Western Montana. Pages 109-115 *In* Proc. Western States Elk Workshop, Bozeman, MT.

Brown, P.M., M.R. Kaufmann, W.D. Shepperd. 1999. Long-term patterns of past fire events in a montane ponderosa pine forest of central Colorado. *Landscape Ecology* 14:513-532.

Brown, R. 2000. Thinning, Fire and Forest Restoration: A Science-Based Approach for National Forests in the Interior Northwest. *Defenders of Wildlife.*

Cook, J. G., L.L. Irwin, L.D. Bryant, R.A. Riggs, and J.W. Thomas. 1998. Relations of forest cover and condition of elk: a test of the thermal cover hypothesis in summer and winter. *Wildlife Monographs* 141:1-61.

Edge, W. D, C. L. Marcum, S.L. Olson-Edge. 1987. Summer habitat selection by elk in western Montana: a multivariate approach. *Journal of Wildlife Management*. 51(4): 844-851.

Foster Wheeler Environmental Corporation. 1999. *Landscape Assessment, Upper South Platte Watershed*. Volumes 1, 2, and 3. Prepared for the U.S. Forest Service, Colorado State Forest Service, Denver Water Board, and U.S. Environmental Protection Agency.

Freddy, D.J. 1984. Quantifying capacity of winter ranges to support deer – evaluation of thermal cover used by deer. Pages 21-25 in Colorado Division of Wildlife. Wildlife Research Report. Denver CO.

Freddy, D.J. 1985. Quantifying capacity of winter ranges to support deer – evaluation of thermal cover used by deer. Pages 13-36 in Colorado Division of Wildlife. Wildlife Research Report. Denver CO.

Freddy, D.J. 1986. Quantifying capacity of winter ranges to support deer – evaluation of thermal cover used by deer. Pages 9-18 in Colorado Division of Wildlife. Wildlife Research Report. Denver CO.

Gilbert, F.F. and M.C. Bateman. 1983. Some effects of winter shelter conditions on white-tailed deer. *Odocoileus virginianus*. *Canadian Field Naturalist* 97:391-400.

Hobbs, N.T. 1989. Linking energy balance to survival in mule deer: development and test of a simulation model. *Wildlife Monographs* 101.

Hoover, R.L., and D.L. Wills. 1987. *Managing Forested Lands for Wildlife*. Colo. Div. of Wildlife in cooperation with USDA Forest Service, Rocky Mountain Region, Denver, Colorado, 459pp.

Huckaby, L.S., M.R. Kaufmann, J.M. Stoker, and P.J. Fornwalt. 2000. Landscape patterns of montane forest age structure relative to fire history at Cheesman Lake in the Colorado Frant Range. *Conference: Steps Toward Stewardship: Ponderosa Pine Forest Ecosystem Restoration and Conservation*, Flagstaff, AZ, April 24-28, 2000.

Kaufmann, M.R., P.J. Fornwalt, L.S. Huckaby, and J.Stoker. in preparation. Cheesman Lake – a historical ponderosa pine landscape guiding restoration in the South Platte Watershed of the Colorado Front Range. USDA Forest Service General Technical Report RMRS-GTR-XXX. Rocky Mountain Research Station, Fort Collins, CO.

Kaufmann, M.R., L. Huckaby, and P. Gleason. 1999. Ponderosa pine in the Colorado Front Range: long historical fire and tree recruitment intervals and a case for landscape heterogeneity. *Proceedings, Joint Fire Conference and Workshop*, Boise ID, June 1999.

Kaufmann, M.R., C.M. Regan, P.M. Brown. 2000. Heterogeneity in ponderosa pine/Douglas fir forests: age and size structure in unlogged and logged landscapes of central Colorado. *Can. J. For. Res.* 30:698-711.

Leege, T.A., compiler. 1984. Guidelines for evaluating and managing summer elk habitat in northern Idaho. *Wildlife Bulletin*. No. 11. Boise, ID: Idaho Fish and Game. 37 p. [A cooperative effort. Financial support provided by the Idaho Department of Fish and Game Federal Aid Project W-160-R, U.S. Forest Service, Bureau of Land Management, Plum Creek Timber Company and Idaho Forest Industry Council].

Lyon, L.J. 1979. Influences of logging and weather on elk distribution in western Montana. USDA Forest Service, Intermountain Research Station. Ogden, UT. Research Paper INT-236.

Lyon, L.J. and A. G. Christensen. 1992. A partial glossary of elk management terms. USDA Forest Service, Intermountain Research Station. General Technical Report INT-288. Ogden, UT.

Lyon, L.J., T.N. Lonner, J.P. Weigand, C.L. Marcum, W.D. Edge, J.D. Jones, D.W. McCleerey, and L.L. Hicks. 1985. Coordinating elk and timber management: Final Report on the Montana Cooperative Elk-Logging Study, 1970-1985. Montana Dept. of Fish, Wildlife and Parks, Bozeman, MT.

Mackie, Richard J.; Hamlin, Kenneth L.; Pac, David F. 1987. Mule-deer. *In* Chapman, Joseph A.; Feldhamer, George A., eds. *Wild Mammals of North America.* Baltimore, MD: Johns Hopkins University Press: 862-877.

Pacific Northwest Research Station (PNWRS). 2000. Why do elk need shelter? The case against the need for thermal cover. *Science Findings.* No. 22. USDA Forest Service, Portland Oregon.

Riggs, R.A., J.G. Cook, L.L. Irwin, and J.L. Spicer. 1993. Relating timber management to cover for big game on inteior northwest winter range: some thoughts on reducing conflict. *In* R.L. Callas. D.B. Kock, and E.R. Loft, eds., *Proceedings of the Western States and Provinces Elk Workshop*. California Department of Fish and Game, Sacramento, CA.

Robinson, W.L. 1960. Test of shelter requirements of penned white-tailed deer. *Journal of Wildlife Management* 24:364-371.

Snyder, S.A. 1991. *Odocoilius hemionus*. *In* U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (2001, February). Fire Effects Information System, [Online]. Available: http://www.fs.fed.us/database/feis/ [Accessed 3/7/01].

Swift, D.M., J.E. Ellis, and N.T. Hobbs. 1980. Nitrogen and energy requirements of North American cervids in winter: a simulation study. *In* E. Reimers, E. Gaare, and S. Skjennegerg, ed., *Proceedings of the Second International Reindeer/Caribou Symposium.* Roros, Norway.

Thomas. J.W., ed. 1979. *Wildlife Habitats in Managed Forests – The Blue Mountains of Oregon and Washington.* USDA For. Serv. Agric. Handbook No. 553.

Thomas, J.W. and D.E. Toweill, eds. 1982. *Elk of North America: Ecology and Management.* Stackpole Books, Harrisburg, PA.

Thinnes, J. 2001. Pike and San Isabel National Forests Lower Montane Forest Vegetation Trends. USDA Forest Service, Pike National Forest, South Platte Ranger District unpublished report.

United States Fish and Wildlife Service (USFWS). 1982. *Habitat Suitability Index Models: Mule Deer.* Draft.

United States Forest Service (USFS). 2000. *Environmental Assessment for the Upper South Platte Watershed Protection and Restoration Project*.

United States Forest Service (USFS). 1989. Amendment No. 15, Land and Resource Management Plan, Pike and San Isabel National Forests, and Comanche and Cimarron National Grasslands. Unpublished draft document on file in Forest Supervisor Office.

United States Forest Service (USFS). 1984. *Land and Resource Management Plan, Pike and San Isabel National Forests; Comanche and Cimarron National Grasslands.*

Veblen, T.T., P.M. Brown, and J. Donnegan. 2000. *Historical Range of Variability Assessment for Forest Vegetation of the Pike and San Isabel National Forests, Colorado.* USDA Forest Service, Agreement No. 1102-0001-99-033, with the University of Colorado, Boulder.