

WILDLIFE REVIEW FOR SAN JUAN NATIONAL FOREST TERRESTRIAL WILDLIFE MANAGEMENT INDICATOR SPECIES

RANGER DISTRICT:

Columbine Ranger District,
Hinsdale, La Plata and San Juan Counties, Colorado

PROJECT NAME:

Weminuche Grazing Analysis Landscape

INTRODUCTION and SUMMARY OF FINDINGS

The purpose of this review is to evaluate the potential effects from domestic livestock grazing in the Weminuche Grazing Analysis Landscape on fish and wildlife species designated as Management Indicator Species (MIS) on the San Juan National Forest (SJNF) by the Forest's 2013 Land and Resource Management Plan (Forest Plan). The species addressed in this review are not species at risk of becoming Threatened or Endangered, nor are they species limited in distribution or restricted to the Weminuche Landscape.

Grazing of domestic livestock has occurred in the Weminuche Landscape for over a century and has been authorized by the SJNF since the early 1900's. The current (2013) Forest Plan, along with Allotment Management Plans (AMP's), Annual Operating Instructions (AOI's) and Term Grazing Permits, regulate the current numbers and type of livestock, dates of use, salting, vegetation manipulation and other activities undertaken for the purpose of grazing domestic livestock on National Forest System lands.

Sheep are the primary domestic livestock permitted to graze in this landscape, and their principle forage areas are in the alpine zone, although substantial amounts of time are spent in lower elevation zones enroute to alpine summer pastures, or in lower elevation allotments such as Spring Gulch and Burnt Timber. Even higher elevation allotments, such as Virginia Gulch and Endlich Mesa, have substantial portions of the allotment below the alpine zone in habitats such as spruce-fir and mixed conifer forests. One allotment, Canyon Creek, has been converted administratively from sheep to cattle and grazed by cattle since the summer of 2013. This conversion was done at the request of the permittee. For this reason, the Canyon Creek Allotment will be analyzed in one of two potential configurations, as a cattle allotment or as a sheep allotment, but not both simultaneously.

Alpine rangelands in this Landscape have been used for grazing domestic sheep since the late 1800's. Prior to government control, sheep were herded in tightly grouped bands and continuously bedded in the same location for several nights in a row, which resulted in some areas of intense forage utilization and soil impacts from trampling and trailing. Some sites in the Weminuche Landscape still display these historic effects of long periods of intensive domestic sheep grazing decades after the allotments were last grazed.

Loosely herded sheep, like the ones under current management practices in this Landscape, aggregate in large groups when resting or drinking then gradually split up into smaller

groups as they graze away from water or bed grounds. Loose herding techniques allow sheep to spread-out and graze with a minimum of driving, which results in less intensive grazing and less impacts from trampling. Use of bed grounds is restricted to only a few nights in one place in order to reduce impacts to soils and vegetation.

Sheep are considered “intermediate feeders” meaning they utilize grasses, forbs, and shrubs, and have the ability to adjust their feeding habits to whatever is available. Sheep generally prefer forbs, but they also readily utilize grasses, and depending on the season, may consume roughly equal amounts of forbs and grasses, including some sedges. Leaves are the most readily grazed portions of most plants. Selectivity of forage species may vary with the stage of plant maturity, location,

Upon completion of field visits to the Landscape, interdisciplinary team meetings, and the analysis provided in this review, I have determined that the alternatives analyzed in the EIS will not contribute to any extraordinary circumstances that would affect the viability of the terrestrial wildlife Management Indicator Species (MIS) listed in the 2013 SJNF Forest Plan.

PROJECT INFORMATION:

Location:

The Weminuche Landscape is located Hinsdale, La Plata and San Juan Counties, Colorado. The area is located northeast of Durango in Townships 36-40 North, Ranges 4-9 West, N.M.P.M., and is within the Columbine Ranger District of the San Juan National Forest. Most of the Weminuche Landscape analysis area is within the congressionally designated Weminuche Wilderness, the largest single wilderness area in the state of Colorado.

The Weminuche Landscape includes about 166,627 acres, of which about 162,599 acres (98%) is National Forest System (NFS) land. The remaining 4,028 acres are split out between Durango Reservoir Grant lands (City Reservoir) at 2,962 acres, and private lands at 1,066 acres. On National Forest System lands, 85% of the analysis area is in the Weminuche Wilderness. The remaining 15% is non-wilderness.

Within the Weminuche Landscape, domestic sheep grazing is currently permitted on about 57,983 acres (36%) of National Forest System (NFS) lands in 5 active allotments (Burnt Timber, East Silver Mesa, Spring Gulch, Tank Creek, and Virginia Gulch), and 8 vacant allotments (Canyon Creek, Cave Basin, Fall Creek, Flint Creek, Johnson Creek, Leviathan, Pine River, and Rock Creek). Approximately 58,408 acres (36%) of NFS lands are suitable for domestic sheep grazing, and 50,239 acres (31%) of NFS lands are suitable for cattle grazing.

The only allotment in the Weminuche Landscape with currently permitted cattle grazing is the Canyon Creek Allotment. Canyon Creek Allotment however, will be analyzed as either a cattle allotment or a domestic sheep allotment, but not both classes of livestock simultaneously. A portion (1,544 acres) of the West Needles Allotment, which was closed to grazing in the Silverton Grazing Analysis, is proposed to be added to existing allotments and re-authorized for domestic sheep grazing under this EIS.

Alternatives Evaluated by the EIS:

The Weminuche Landscape Environmental Impact Statement (EIS) evaluates four alternatives. The preferred alternative (Alternative 4) is to re-authorize domestic sheep grazing on all or portions of NFS lands in the Weminuche Landscape through an adaptive management process (Quimby 2005) that would meet or move resource conditions toward

desired conditions, and be consistent with Forest Plan resource direction, Standards and Guidelines. The EIS does not authorize nor analyze grazing on non-federal lands which are intermixed with NFS lands across the Weminuche Landscape. Below, is a brief summary of the four alternatives analyzed in the EIS. For more detailed information about each alternative, please see the Environmental Impact Statement.

1 – No Action Alternative whereby domestic livestock grazing would not be reauthorized in the Weminuche Landscape.

2 – Current Management Alternative involving traditional livestock management using a predefined number of livestock (domestic sheep only) and specific grazing dates and allotment configurations.

3 – Adaptive Management w/ Forage Reserves Alternative. This alternative is to continue to permit domestic livestock grazing on NFS lands by incorporating a variety of Adaptive Management strategies (Quimby 2005) that will allow the lands within the landscape to meet or move towards meeting Forest Plan direction standards, and guidelines and desired conditions identified in the EIS. Adaptive Management strategies are “tools” or management actions designed to maintain suitable resource conditions, or move unacceptable resource conditions towards desired conditions (Quimby 2005). Adaptive Management is designed to be flexible in regards to livestock numbers and season dates.

This alternative would incorporate adaptive management options for the active grazing allotments (Burnt Timber, Canyon Creek, Endlich Mesa, Spring Gulch, Tank Creek and Virginia Gulch), including boundary adjustments, trailing, and design criteria. This Alternative would permanently convert the Canyon Creek Allotment from sheep to cattle and permanently close the allotment to domestic sheep grazing. This Alternative would authorize the creation of a new domestic sheep forage reserve allotment out of portions of the Johnson Creek, Leviathan and Rock Creek Allotments. The remaining four vacant sheep allotments (Cave Basin, Fall Creek, Flint Creek, and Pine River) would be closed to domestic sheep grazing. Finally, a cattle forage reserve allotment would be created out of the lower third of the Cave Basin Allotment. See the EIS for a detailed list of specific actions that would be authorized under this Alternative.

4 – Adaptive Management/Closing Vacant Allotments Alternative, the Preferred Alternative. The preferred alternative is to continue to permit domestic livestock grazing on NFS lands by incorporating a variety of Adaptive Management strategies (Quimby 2005). Adaptive Management strategies are “tools” or management actions designed to maintain suitable resource conditions, or move unacceptable resource conditions towards desired conditions. Adaptive Management is designed to be flexible in regards to livestock numbers and season dates.

This alternative would incorporate all the adaptive management options of Alternative 3 for the active grazing allotments (Burnt Timber, Canyon Creek, Endlich Mesa, Spring Gulch, Tank Creek and Virginia Gulch), including boundary adjustments, trailing, and design criteria. The difference between this Alternative and Alternative 3 is that all seven currently vacant allotments (Cave Basin, Fall Creek, Flint Creek, Johnson Creek, Leviathan, Pine River, and Rock Creek) would be entirely closed to domestic sheep grazing. No forage reserves, sheep or cattle, would be authorized. See the EIS for a detailed list of specific actions that would be authorized under this Alternative.

Existing Vegetation:

See section 3.3 Vegetation of the EIS, and the Biological Evaluation (BE) for a detailed description of current vegetation and wildlife habitat conditions in the Weminuche Landscape.

The Weminuche Landscape contains about 162,573 acres of wildlife habitat on National Forest System lands. An additional 378 acres of National Forest outside the Landscape would be crossed by sheep and cattle trailing across lower elevation lands enroute to permitted allotments within the Landscape. Domestic sheep and cattle graze far less than the total amount of habitat in the Landscape. Only about 36% (58,019 acres) of the Landscape is considered to be suitable domestic sheep grazing range under current management (Alternative 2). Under the Preferred Alternative (Alternative 4) only about 17% (27,602 acres) of the Landscape is considered to be suitable domestic sheep grazing range. Under the Preferred Alternative (Alternative 4) only about 8% (13,733 acres) of the Landscape is considered to be suitable for cattle grazing. Current management does not permit cattle grazing within the Weminuche Landscape. Alternatives 3 and 4 propose to allow the Canyon Creek Allotment to be converted permanently to a cattle allotment and closed to domestic sheep grazing. Under current management, Canyon Creek Allotment is a vacant sheep allotment being temporarily stocked with cattle. The livestock permittee has requested to permanently convert the Canyon Creek Allotment from sheep to cattle grazing. For this reason, the Canyon Creek Allotment is analyzed as both an active cattle allotment and a vacant sheep allotment that could be restocked administratively.

The wildlife habitat type with the most acres considered suitable for domestic sheep and cattle grazing in the Weminuche Landscape is spruce-fir forest. Overall, nearly half (43%) of the acres considered suitable for livestock grazing in the Weminuche Landscape are comprised of spruce-fir forests (70,600 acres). Under current management (Alternative 2), about 37% (26,408 acres) of all spruce-fir forests in the Landscape are considered suitable for grazing by domestic sheep. Under Alternative 3, only about 18% (acres) of spruce-fir forests would be suitable for sheep grazing and 6% (4,072 acres) would be suitable for cattle grazing. Under Alternative 4, the preferred alternative, only about 16% (11,217 acres) of spruce-fir forests would be suitable for sheep grazing and 8% (5,942 acres) would be suitable for cattle grazing. Therefore compared to current management, the preferred alternative (Alternative 4) would reduce the amount of spruce-fir forests in the Weminuche Landscape considered suitable for livestock grazing by 21%.

The spruce-fir forest type is generally found between 9,000 feet and 12,000 feet elevation. These forests are dominated by a varying mixture of Engelmann spruce and subalpine fir trees. In mature stands, these forests generally display high tree densities and closed canopy covers, which limits forage production on the forest floor. In the Weminuche Landscape however, most spruce-fir stands (85%) have moderate to low canopy cover and therefore tend to have higher forage production on the forest floor. In this Landscape, 66% of spruce-fir forests have moderate tree densities with canopy closures of 40-70%, and an additional 19% of spruce-fir stands have low canopy closures (less than 40%). Many of the spruce-fir stands with moderate to low canopy cover were created by timber harvests from the late 1960's through early 1990's. These previously harvested stands provide most of the acres considered suitable for livestock grazing in the Landscape.

Domestic sheep often pass through krummholz scattered in the alpine zone. Krummholz, which is dominated by dwarfed conifers (mostly spruce) and herbaceous species, is a transition type that occurs between spruce-fir forests of the subalpine zone and the treeless alpine zone. Sheep foraging in this type is relatively minor. Cattle grazing can occur in this

type when it is in close proximity to parks. Current species composition and distribution in this type are likely similar to conditions found during the reference period.

Sheep also pass through mature spruce fir stands on their way to and from alpine pastures. However, sheep prefer to spend as little time as possible in dense stands of spruce fir forest because of the generally poor forage conditions under closed-canopy stands. In general, cattle also spend little time in mature spruce-fir stands because of the lack of forage under closed canopy stands. Usually, cattle impacts in closed canopy conifer forests are small in scale and limited in scope as livestock rest near the edges of parks or travel along well-worn trails between adjacent parks or to nearby water sources.

Domestic sheep spend much of their time in the alpine zone (30% of suitable grazing acres in the Landscape), with minor amounts of time spent in mountain grasslands (about 5% of suitable acres in Landscape), and passing through aspen forests (about 1% of suitable acres in Landscape) and aspen forests mixed with conifer (about 6% of suitable acres in Landscape) on their way to and from alpine pastures. About 44% of riparian habitats in the Landscape are considered suitable for sheep grazing under current management (Alternative 2), compared to 14% under Alternative 3, and 8% under the preferred alternative (Alternative 4).

Overall, about one third (30%) of the acres in the Weminuche Landscape (49,343 acres) are comprised of alpine habitats. Under current management (Alternative 2), about 33% of all alpine habitats in the Landscape are considered suitable for grazing by domestic sheep. Under Alternative 3, about 18% of all alpine habitats in the Landscape are considered suitable for grazing by domestic sheep. Under the preferred alternative (Alternative 4), only about 15% of alpine habitats (7,471 acres) would be suitable for sheep grazing in the Landscape. Therefore compared to current management (Alternative 2), the preferred alternative (Alternative 4) would reduce the amount of alpine habitats in the Weminuche Landscape considered suitable for livestock grazing by 18%.

Sheep obtain most of their forage in the alpine zone and spend most of their time in the alpine zone, although they pass through other habitat types to reach the alpine zone. Cattle however, spend little time and obtain little forage in alpine habitats. Alpine habitats are also potentially the most sensitive habitats to livestock grazing because of their very short annual growing seasons, harsh environmental conditions, frequently shallow soils, and often long time span for vegetation recovery. For these same reasons, wildlife species whose primary habitats occur in the alpine zone have the potential to be significantly affected by livestock grazing impacts in alpine habitats.

General Impacts of Livestock Grazing:

In general, effects of livestock grazing on wildlife species and habitats may result from the direct competition between livestock and wildlife for food or cover. Other effects may result from the short- or long-term reduction in habitat quality or capability, or reduced habitat effectiveness, potentially affecting breeding and foraging habitats, and habitats used by primary prey species such as insects and small mammals. A potential negative effect of grazing activities is browsing impacts to upland willows of moderate to low stature, reducing hiding cover and food availability for wildlife or the primary prey species on which they depend.

Operational activities by livestock permittees such as fence construction and replacement, construction or maintenance of water developments, and managing livestock distribution can also affect wildlife habitats. In most cases, construction or replacement of fences and construction or maintenance of water developments may require the removal of very small

amounts of grassland, shrub, or forested vegetation at small and localized scales. For these reasons, no measureable negative effects to wildlife habitats are expected from these typically small scale livestock management activities. Although vegetation removal can result in small losses of wildlife habitat, these projects can also provide some benefit to wildlife by mitigating grazing impacts such as reducing the timing and extent livestock graze in and near primary rangelands.

Moving livestock from pasture to pasture or across allotments may cause minor disturbance to individual animals, temporarily displacing individuals, such as with the use of domestic sheep herding and protection dogs. In some localized areas, repetitive use of certain routes by livestock can reduce wildlife habitat capability, but such disturbances typically occur at very small scales and last for a very limited duration of time. Invasive species such as noxious weeds may be introduced during all livestock management activities and weeds may expand into previously disturbed and undisturbed areas, potentially negatively affecting forage quantity and quality for wildlife and/or their primary prey.

Based on the considerations described above, wildlife species associated with grassland, shrubland and riparian/wetland habitats, and forested species that prefer more open stand conditions, are expected to have greater potential to be affected by livestock grazing activities. The reduction or alteration of grassland, shrubland, or riparian/wetland habitats has potential to negatively affect wildlife associated with these habitats, and/or their primary prey. Generally, less habitat impacts are expected under rest rotation grazing systems, followed by deferred rotation systems, and more traditional rotation system. Generally, wildlife species associated with dense mixed conifer and spruce-fir forests are less likely to be affected by livestock grazing activities due to the general dislike of these habitats by cattle and sheep, and generally minimal overlap of grazing activities with habitats used by these species.

There are a variety of operational strategies used in managing livestock in the Weminuche Landscape. Some livestock, both cattle and sheep, are trailed to designated allotments, while others are transported by truck. In some instances, range improvement projects are conducted to manage and improve livestock distribution, such as the construction of fencing (brush, wire, and pole), and water developments (spring development, stock ponds, and reservoirs) and associated maintenance, and salting, range riding, and domestic sheep herding and protection dogs.

Converting the class of livestock from domestic sheep to cattle has the potential to increase effects to some wildlife habitats. This is because cattle tend to spend more time than sheep within spruce-fir and aspen forests, especially along the margins of parks and near water sources where they often rest during the heat of the day. Cattle also have a greater tendency to create well defined regular use trails through closed-canopy forest stands as they travel to adjacent parks and water sources. Cattle also have the potential for somewhat greater impacts than sheep in riparian areas, especially in areas where they congregate and lounge near preferred water sources. Woody riparian vegetation such as willows, may be negatively affected by the physical action of cattle moving through and around willow stands, and also by browsing on the plants themselves. In comparison, domestic sheep tend to spend less time than cattle within and immediately adjacent to riparian areas and water sources.

Converting the class of livestock from domestic sheep to cattle has the potential to decrease effects to some wildlife habitats. This is because cattle spend little time in the alpine zone whereas sheep spend much of their summer grazing season in or enroute to the alpine zone where they obtain most of their forage.

Fencing is frequently used in cattle allotments to establish and maintain effective pasture rotation systems but is rarely used in sheep allotments. For this reason, effective management of cattle allotments typically requires the creation and/or maintenance of fences, which often must pass through lynx habitat, sometimes resulting in the permanent loss of wildlife habitats. The amount of wildlife habitats lost to fence construction and maintenance activities is generally very small and restricted to very narrow corridors (generally about 10 feet in width), but nonetheless minor losses of wildlife habitats to cattle fencing may be unavoidable in some allotments after they are converted from domestic sheep to use by cattle.

For all the reasons just described, converting the Canyon Creek Allotment from sheep to cattle has potential to result in greater impacts to wildlife species associated with spruce-fir and aspen forests than by continued domestic sheep grazing. Similarly, converting the lower portion of the Cave Basin Allotment from a sheep allotment to a cattle forage reserve would also be expected to have increased effects to these same species under Alternative 3. More importantly, because the Cave Basin Allotment hasn't been grazed by either class of livestock since 1988, permitting cattle grazing for up to 3 years out of any 10 consecutive years is likely to have some additional negative consequences for wildlife habitat conditions within this allotment, compared to current conditions (Alternative 2). Under Alternative 2, effects to wildlife habitats would potentially be greater than under Alternative 3 because under Alternative 3 the allotment could be grazed at most for three years out of any consecutive 10 years whereas under Alternative 2 annual grazing could be authorized.

Fence construction and maintenance activities necessary to achieve desired conditions, particularly for cattle in the Canyon Creek Allotment, may be undertaken in some places. Fencing is rarely used for sheep pastures in the Weminuche Landscape, except to separate sheep from cattle pastures, or to delineate administrative horse pastures. Under the preferred alternative about 4.12 miles of new fence would need to be constructed in or immediately adjacent to the Canyon Creek Allotment. These new fences would be necessary to create an effective 3-pasture rotation system within the allotment after converting the allotment from a sheep allotment to a cattle allotment. In addition, several short segments of new fence would be needed to provide an effective division between cattle in the Canyon Creek Allotment and cattle in the adjacent Bear Creek Allotment.

Of the 4.12 miles of new fence construction proposed in the preferred alternative, 3.88 miles would be in the Canyon Creek Allotment, and 0.24 miles would be outside the Landscape in the adjacent Bear Creek Allotment. Of the 3.88 miles of new fence construction in the Weminuche Landscape, 3.57 miles would be in spruce-fir forest, and 0.55 miles would be in other habitats. The 3.57 miles of new fence construction would result in the long-term loss of 4.33 acres of wildlife habitat. An additional 0.29 acres of wildlife habitat would be lost to construction of the 0.24 miles of new fence just outside the Landscape in the Bear Creek Allotment. The overall affect to wildlife habitat would be a long-term loss of 4.62 acres of wildlife habitat, due to the removal of vegetation along the fence right-of-way.

Vegetation Condition Monitoring:

Examination of the body of available monitoring data shows, for the project area overall, vegetative conditions are generally meeting the project's desired conditions (see sections 3.2 Soil and Water, and 3.3 Vegetation of the EIS). There are areas of concern however, specifically at bed grounds and trailing "choke points." These areas of concern are generally limited in scale and localized in their extent. Many of these areas of concern are due to management practices from decades past when sheep stocking rates and intensity of use were much higher than under current management practices. For example, evidence of sheep trails that were created decades ago can still be seen in some areas. The management

practices that created these conditions changed many years ago but evidence of their use still remains in some places.

SAN JUAN NATIONAL FOREST MANAGEMENT INDICATOR SPECIES

The 2013 San Juan National Forest Land and Resource Management Plan (Forest Plan) establishes management direction for Management Indicator Species (MIS). Forest Plan direction for MIS addresses maintaining healthy populations of wildlife and fish species. Due to the large number of species that occupy National Forest System lands, a subset of species is identified for analysis purposes that are intended to represent the full range of species. This subset is collectively referred to as Management Indicator Species (MIS). The Forest Plan establishes goals, objectives, standards, guidelines, and monitoring requirements that are specific to MIS. Each action proposed by the agency is analyzed in a manner that discloses its effects to MIS and evaluates its consistency with the management direction contained in the Forest Plan. The analysis then determines what effect project-level impacts might have on Forest-level population and habitat trends for each MIS.

This analysis is based on the best available science such as the most recent Forest-wide habitat and individual MIS assessments, expert professional opinions, and site-specific field review of the analysis area. The most recent Forest-wide habitat and species assessments explain the reasons for MIS selection in the Forest Plan, and contain information on the species life history, conservation status, distribution and abundance on the Forest and on each Ranger District, and population and habitat trends.

This MIS analysis complies with the 2008 Planning Rule, 36 CFR Part 219. Management indicator species monitoring is not discussed in the final rule. The 1982 rule is not in effect (sec. 219.14(b)(4)). No obligations remain from that regulation (including MIS), except those that are specifically in a [Forest] plan. Section 219.14 (b) (4) states, "For units with plans developed, amended, or revised using the provisions of the planning rule in effect prior to November 9, 2000 (See 36 CFR parts 200 to 299, Revised as of July 1, 2000), that rule is without effect. No obligations remain from that regulation, except those that are specifically in the plan."

This analysis addresses terrestrial MIS only. Aquatic MIS are addressed in a separate analysis conducted by a fisheries biologist. This analysis of effects to terrestrial MIS meets the current MIS analysis requirements in the San Juan National Forest Land and Resource Management Plan (USDA Forest Service 2013a). The current Forest Plan does not rely solely on gathering/using quantitative population data, but specifically allows for the use of a variety of species information and data sources that can be used to conduct the MIS analysis. Table 2.3.1 on page 36 of the Forest Plan lists the four terrestrial MIS designated by the Forest Plan, the habitat of concern for each MIS, and the management issue addressed by each MIS. Table 3.3.4 (page 131) in the Final Environmental Impact Statement (USDA Forest Service 2013b) for the Forest Plan lists the planning issues for which each terrestrial MIS was selected. Desired conditions for each terrestrial MIS are listed on page 37 of the Forest Plan, and objectives for each terrestrial MIS are listed on page 38 of the Forest Plan.

The Forest Plan lists a variety of acceptable data sources for monitoring population trends of terrestrial MIS and trends in terrestrial wildlife habitat conditions. Acceptable data sources for monitoring terrestrial MIS population trends are listed on page 255 of the Forest Plan (USDA Forest Service 2013a) and include sources such as: population estimates by State Wildlife agencies (Colorado Parks and Wildlife - CPW), professional judgment of USFS Wildlife Biologists, habitat inventory assessments, resource information system data, and activity/program reviews. Acceptable data sources for monitoring trends in terrestrial wildlife

habitat conditions are listed on page 251 of the Forest Plan and include sources such as, CPW, TNC, Forest Inventory and Analysis program (FIA), National Resource Information System (NRIS), Rocky Mountain Bird Observatory, and professional judgments by USFS ecologists and wildlife/fisheries biologists, habitat inventory assessments, resource information system data, and activity/program reviews.

All MIS identified in the Forest Plan and reasons for their selection are considered during initial project screening (Appendix A). A detailed analysis was then conducted for those MIS that may be affected by the action alternatives (Table 1). The analysis describes how the alternatives would likely affect Forest-wide habitat and population trends (direct and indirect effects section, below).

A detailed analysis is intended to disclose the potential effects of the action on MIS and their habitats in a manner that identifies the relationship between the action being considered and the long-term viability of the MIS on the administrative unit, the entire San Juan National Forest. For this analysis, the “effects of the action” include the direct and indirect effects to the species caused by the proposed project, and are effects that are reasonably certain to occur. “Reasonably certain to occur” requires existence of clear and convincing information that establishes an effect to the MIS will be caused by the preferred alternative. This requires that a cause and effect relationship be established that is not merely speculative or based on remote possibilities. Principles of population ecology using the concept of species limiting factors as they relate to reproduction, growth, mortality rates, and distribution of MIS are applied whenever possible.

Most MIS analyzed in detail have either been observed or reported on NFS lands in the Weminuche Landscape. Additionally, most MIS have habitat that is well distributed across the SJNF. It should also be noted that within and adjacent to NFS lands in the Weminuche Landscape there are large amounts of habitat in similar condition, and this habitat is well distributed across the Landscape and connected to the larger National Forest administrative unit. The Weminuche Landscape does not provide unique or isolated habitats within which discrete populations are restricted. Most MIS are not species at risk nor are they species that are trending towards protected status. They are well distributed across the SJNF. For some MIS, such as elk, there appears to be no relationship between habitat trends and population trends, with population trends regulated primarily by State hunting season structures.

Again, MIS regulations do not apply to non-National Forest System lands and thus this analysis will be limited solely to those species and the acres of habitat that occur on NFS lands.

AFFECTED ENVIRONMENT: MANAGEMENT INDICATOR SPECIES

There are 4 terrestrial species identified as MIS in the SJNF Forest Plan (USDA Forest Service 2013a). Some species may not be present in the Landscape due to the absence of suitable habitat, or, suitable habitat is present in the analysis area but the project alternatives would not affect the species or its key habitat components (Table 1 and Appendix A, below). Only one terrestrial MIS has habitat present in the Weminuche Landscape and may be affected by domestic livestock grazing; elk. Affects to MIS that are also designated as Forest Service Sensitive Species were also discussed in the project’s Biological Evaluation (available in the project record).

Existing habitat for each MIS on NFS lands was determined by the use of Geographical Information System (GIS) modeling using vegetative information described in Forest-wide MIS Assessments. Habitat modeling was conducted using habitat structural stage matrices

described by Towry (1984). In addition, species information on distribution across the Forest, professional judgment of Forest Service wildlife biologists, coordination with Colorado Parks and Wildlife (CPW) biologists, coordination with the U.S. Fish and Wildlife Service, and field reconnaissance of the Weminuche Landscape was also used.

Abert's squirrel is rarely present in the Weminuche Landscape because of the lack of mature ponderosa pine forests in the landscape (San Juan National Forest 2005a). The forest conditions with which Abert's squirrel is most closely associated are limited and irregularly distributed within the generally higher elevations of the Weminuche Landscape, making occurrence irregular and densities highly variable, depending on site conditions. Abert's squirrel is also hunted during the small game hunting seasons regulated by Colorado Parks and Wildlife. They are habitat specialists and are present in the Landscape year round.

The Landscape provides optimal hiding cover for elk in mature spruce-fir forests (San Juan National Forest 2005b). Foraging habitat for elk is abundant in summer in some alpine and krummholz areas. Elk generally arrive in the Landscape during late spring for calving after snow melt, and are present in most habitat types during summer and early fall. Elk generally leave the Landscape when snow depth increases in late fall, but a few bull elk remain in the Landscape all winter on windswept ridges above timberline.

The mature spruce-fir forests of the Landscape provide good foraging habitat for American marten due to the relatively large and undisturbed nature of many forested areas, due to the generally high amounts of large downed wood on the forest floor that provides ready access through the snow pack to the subnivean space, and due to the steep slopes of much of the Landscape (San Juan National Forest 2005c). American marten habitat consists of spruce-fir, cool-moist mixed conifer, high elevation aspen mixed with spruce-fir or cool-moist mixed conifer, and willow riparian adjacent to these habitats (Buskirk and Ruggiero 1994). The Landscape provides high quality marten habitat and sightings and tracks are regularly found in the Weminuche Landscape. The Landscape also provides high value travel corridors that link other adjacent large patches of suitable habitat outside wilderness.

The mature spruce-fir, mixed conifer and aspen forests of the Landscape provide good habitat for hairy woodpecker due to the relatively mature state of many of these forests in the Landscape (San Juan National Forest 2005d). Hairy woodpecker is a widely distributed and relatively abundant primary cavity excavator species within the Weminuche Landscape, being found in all forested habitat types in the Landscape (Winternitz 1998).

Perhaps the greatest current and near-future (5- to 10-years) influence on habitat conditions for American marten, elk and hairy woodpecker in the Weminuche Landscape is an expanding spruce beetle (*Dendroctonus rufipennis*) outbreak within the upper Pine River and upper Vallecito Creek drainages. It is expanding from northern and eastern portions of the Weminuche Landscape towards southern and western portions of the Landscape. The spruce beetle is the most significant natural mortality agent of mature spruce trees. Spruce beetle outbreaks can cause extensive tree mortality and modify stand structure by reducing the average tree diameter, height, and stand density. Infected trees often take a couple years to die, so infestations appear to be more widespread in following years. Beetles grow to adulthood inside trees and then take off to infect new trees. However, most of the spruce-fir forests in the Weminuche Landscape are mixed with subalpine fir, which are not affected by spruce beetles. For this reason, stands with higher fir composition are less affected by beetles than stands with higher spruce composition.

Most spruce-fir forests in the landscape are mature closed-canopy stands that are at risk to beetles. Within the past five years, the upper third of the Pine River and Vallecito Creek drainages have had extensive areas of mortality of mature Engelmann spruce trees, in some

areas exceeding 80% to 90% of mature overstory trees. Within stands affected by spruce beetles, there is a high probability that most spruce trees over five inches diameter will die. Within the next five years the beetle outbreak is expected to expand down the Pine River and Vallecito Creek drainages, and is expected to increase in the upper Florida River and Missionary Ridge portions of the Weminuche Landscape.

The beetle epidemic has the potential to substantially alter spruce-fir habitat conditions for American marten, elk and hairy woodpecker, improving it for elk and hairy woodpecker in the most heavily affected areas, and reducing its value for American marten in the most heavily affected areas. Summer foraging habitat for elk could be greatly improved by the beetle epidemic because mortality of overstory trees is expected to substantially open the canopy of previously closed-canopy spruce stands, allowing substantial increases in forage production in the understory. The high mortality rates of the older overstory spruce trees would substantially improve the amount and connectivity of hairy woodpecker foraging and nesting habitat within the Landscape, and woodpecker populations are expected to increase substantially in response to the ongoing beetle outbreak, similar to post-fire conditions (Winternitz 1998). Because woodpecker populations are expected to increase substantially in response to the ongoing beetle outbreak, habitat conditions for many obligate secondary cavity nesting species are also expected to substantially improve in the near future.

Spruce-fir forests make up about 43% of the Weminuche Landscape and 36% of the area currently suitable for sheep grazing in the Landscape. Spruce-fir forests are also in close proximity to some preferred sheep grazing areas and therefore some small and localized areas of grazing impacts were observed. However, American marten is unlikely to be substantially affected by sheep grazing or cattle grazing activities because they primarily forage in the overstory tree canopy on red squirrels and on the forest floor for red-backed voles under closed-canopy mature spruce stands, which are unlikely to be substantially affected by sheep or cattle grazing activities.

It is recognized that sheep and cattle congregating during the day under mature closed-canopy spruce-fir forests located immediately adjacent to preferred grazing areas can cause areas of impacts under spruce-fir stands. However, these areas are generally limited in scale, small in area, and in close proximity to parks and alpine zones. They are generally too small in scale to cause population level impacts to marten habitat capability or to cause substantial shifts in marten habitat effectiveness sufficient to result in changes in marten distribution or abundance.

Hairy woodpecker habitat is also unlikely to be affected by sheep or cattle grazing activities because the larger overstory dead and diseased trees that provide most of their foraging and nesting substrate are not affected by grazing activities. Undoubtedly, the small scale and generally low intensity of potential negative effects to American marten, elk and hairy woodpecker habitats associated with domestic sheep and cattle grazing activities in spruce-fir forests in the Weminuche Landscape is very low in comparison to the expectation of near-future widespread, potentially substantial, and expected long-term impacts from the ongoing spruce beetle outbreak that is rapidly expanding within the Weminuche Landscape.

ENVIRONMENTAL CONSEQUENCES: DIRECT AND INDIRECT EFFECTS

Table 1 provides rationale for why some MIS species were brought forward for detailed project analysis and why some species were not. Only one species has habitat present in the Weminuche Landscape and may be affected by domestic sheep grazing (Table 1). The species brought forward for detailed analysis for this domestic sheep and cattle grazing project is elk (San Juan National Forest 2005b). Affects of domestic sheep and cattle grazing to Region 2

designated sensitive species (American marten) is also discussed in the Biological Evaluation that is available in the project record.

Table 1. Forest Plan terrestrial Management Indicator Species (MIS) for the San Juan National Forest, from the 2013 Forest Plan (USDA Forest Service 2013).

MIS Species	Preferred Habitat	Brought Forward for Detailed Analysis?
Birds (1)		
Hairy woodpecker (<i>Picoides villosus</i>)	All forested habitats, associated with snags for foraging and nesting. Year-round resident.	No, woodpecker habitat is present in the Landscape but nesting and foraging habitat would not be affected by sheep or cattle grazing. No further analysis is necessary. Hairy woodpecker was not analyzed further as SJNF MIS.
Mammals (3)		
Abert's squirrel (<i>Sciurus aberti</i>)	Ponderosa pine. Year-round resident.	No, squirrel habitat is present in the Landscape but would not be affected by sheep or cattle grazing. No further analysis is necessary. Abert's squirrel was not analyzed further as SJNF MIS.
American marten (<i>Martes americana</i>)	Spruce-fir and cool-moist mixed conifer. Year-round resident.	No, marten habitat is present in the Landscape but would not be affected by sheep or cattle grazing. No further analysis is necessary. American marten was not analyzed further as SJNF MIS.
Elk (<i>Cervus elaphus</i>)	All terrestrial habitats; pine, pinyon-juniper and mountain shrublands in winter. Resident.	Yes , elk habitat is present in the Landscape and food sources are potentially affected by sheep and cattle grazing.

Table 2 (below) shows the amount of existing habitat for each species brought forward for detailed analysis. Existing habitat was modeled using the Forest's vegetation database and habitat models described in Forest-wide MIS Assessments. Specifically, the models use habitat structural stage information described by Towry (1984), habitat and species distribution information across the Forest, professional judgment of wildlife biologists on the Forest, coordination with CPW, and was based on field reconnaissance of the analysis area.

Table 2 (below) also shows the amount of terrestrial MIS habitat affected by domestic sheep grazing under Alternative 2, Alternative 3 and Alternative 4. Acres of habitat affected by cattle grazing are a subset of, and less than, the acres affected by domestic sheep grazing. Because cattle and sheep would not be present together during the same grazing season (i.e. grazing would be by sheep or cattle alone, not both in the same season), effects of cattle grazing would be a subset of and less than those displayed for sheep. For this reason, the acres of impact from cattle grazing will not be displayed in addition to the sheep grazing acres displayed below.

In order to determine the amount of affected habitat, we determined what areas were suitable and unsuitable for grazing. Suitable range areas are directly affected or have potential to be affected by livestock grazing. Unsuitable areas are most likely unaffected by grazing. Suitable range areas are tundra, grasslands, open meadows, or open forested areas where sheep and cattle spend a majority of their time. Unsuitable areas include 1) lakes, reservoirs, ponds, and major rivers, 2) bare road beds, 3) perennial streams, 4) slopes greater than 40%, and 5) rock outcrop, rubble land, granitic, highly erosive, or areas with very wet soils. Although grazing does not occur in areas such as major rivers and perennial streams, livestock could affect riparian habitat adjacent to these areas. The estimates in Table 2 have accounted for grazing occurring adjacent to permanent water sources and their riparian areas.

Table 2. Acres of terrestrial MIS habitat affected by domestic sheep grazing in the Weminuche Landscape under each alternative, for species brought forward for detailed analysis.

MIS	Acres of Habitat Affected by Grazing Under Current Management (Alternative 2)		Acres of Habitat Affected by Grazing Under Forage Reserves (Alternative 3)		Acres of Habitat Affected by Grazing Under Preferred Alternative (Alternative 4)	
	Total Acres	Suitable Acres	Total Acres	Suitable Acres	Total Acres	Suitable Acres
Elk Forage	39,787 (100%)	17,271 (43%)	39,787 (100%)	11,965 (30%)	39,787 (100%)	11,189 (28%)
Elk Cover	73,448 (100%)	26,455 (36%)	73,448 (100%)	11,650 (16%)	73,448 (100%)	9,723 (13%)
Elk Winter Range	5,458 (100%)	4,652 (85%)	5,458 (100%)	4,619 (85%)	5,458 (100%)	4,619 (85%)
Elk Winter Concentration	2,664 (100%)	1,992 (75%)	2,664 (100%)	1,992 (75%)	2,664 (100%)	1,992 (75%)

A brief description of suitable habitat for each MIS brought forward for detailed project analysis, and their likely period of use is provided in Appendix A (below). Forest-wide habitat and population trends estimates for each of the MIS brought forward for detailed analysis are provided in Table 3, below. More detailed information about species' natural history requirements, distribution, and habitat and population trends is on file at the Columbine Ranger District Office located in Bayfield, Colorado and will not be discussed in greater detail.

Table 3. Habitat and population trends for Forest Plan MIS brought forward for detailed analysis (San Juan National Forest 2005b).

MIS	Forest-wide Habitat Trend	Forest-wide Population Trend	Forest-wide Habitat	Habitat in Landscape Suitable for Grazing under Current Management (Alternative 2)	Habitat in Landscape Suitable for Grazing under Forage Reserve (Alternative 3)	Habitat in Landscape Suitable for Grazing under Preferred Alternative (Alternative 4)
Elk	Stable to downward	Stable	Forage – 568,898 Cover – 1,002,716 Winter – 471,234	Forage – 17,271 (3.0%) Cover – 26,455 (2.6%) Winter – 4,652 (1.0%)	Forage – 11,965 (2.1%) Cover – 11,650 (1.2%) Winter – 4,619 (1.0%)	Forage – 11,189 (2.0%) Cover – 9,723 (1.0%) Winter – 4,619 (1.0%)

Livestock grazing can influence habitat by modifying plant biomass, species composition, and structural components such as vegetation height and cover (Hoffman 2006, Kie et al. 1996). Direct effects may result from competition between livestock and wildlife for food or cover. Indirect effects may include gradual reductions in the amount and quality of forage available for wildlife. Conversely, grazing may benefit wildlife by improving vigor of some plants, thereby increasing the amount and quality of forage produced. Operational effects may result from fence construction and water developments, although few structural range improvements would be created specifically to manage sheep grazing in the Weminuche Landscape.

The few structural improvements in the Weminuche are principally related to converting existing sheep allotments to cattle allotments, and would be in the form of new and/or improved fences necessary to implement an effective 3-pasture rotation grazing system, and maintenance/installation of some water sources. Under the preferred alternative of the EIS (Alternative 4), about 22.9 miles of new fence construction is thought to be necessary among the five proposed cattle allotments (Burnt Timber, Canyon Creek, Endlich Mesa, Spring Gulch, and Tank Creek). These new fences would be necessary to create an effective rotation system within the allotment or as allotments are combined with adjacent allotments, or to provide effective divisions between neighboring cattle allotments. This 22.9 miles of potential new fence could result in the loss of about 27.8 acres of wildlife habitats in the analysis area. However, because fence lines are typically narrow corridors less than 10 feet in width that are not barriers to wildlife movements, it is unlikely that the 27.8 acres of habitat disturbed

by new fence construction would be lost to wildlife use. For this reason, the 22.9 miles of new fence construction is unlikely to alter the amount of habitat available to MIS or affect the manner in which MIS such as elk are distributed within and among the allotments. This amount of habitat disturbance is very small compared to the large amount of elk habitat within these five allotments and therefore this activity is unlikely to affect MIS population numbers or trends or the amount of habitat or habitat trends at the Forest-wide scale.

Repetitive use of certain routes by livestock can create non-system trails that may encourage public use, causing additional wildlife disturbance. The trailing across hillsides seen in some allotments is likely a function of historic sheep grazing practices, but new trails are unlikely to be created under current grazing practices. Invasive species such as noxious weeds may be introduced during any livestock associated management activity or may expand into previously undisturbed areas, affecting wildlife forage quantity and quality.

For all three action Alternatives, direct and indirect effects are expected to be mostly short-term. Long-term effects are associated with permanent structures such as fences, livestock created trails, and establishment and/or expansion of noxious weeds. Forest Plan Standards and Guidelines, design criteria, and adaptive management actions are included to address many of these effects to reduce impacts to habitat, wildlife, and other resources.

DISCUSSION:

Alternative 1 (No Action)

Alternative 1, the no action alternative, would be wholly beneficial for all management indicator species because domestic sheep and cattle grazing would not be re-authorized on National Forest System Lands in the Weminuche Landscape. There would be no impact on Forest-wide habitat trends or population trends from selecting Alternative 1. There would be no potential impacts from sheep or cattle grazing activities to key habitat components for MIS. Selection of Alternative 1 has the potential to provide direct benefits to MIS, but the degree of benefit would probably be small in any given year and limited in scale on the landscape to those small areas that are currently being affected by domestic sheep grazing and not meeting desired conditions under current management. Benefits to MIS from selecting Alternative 1 would probably be long term (> 10 years) but very small and localized in scale.

Benefits to MIS from selecting Alternative 1 would probably be most pronounced for elk in alpine basins. Benefits to elk foraging areas would come from gradual, long term improvements in the condition of moist alpine areas adjacent to riparian zones or wet meadows. These potential improvements however would be limited to a few localized areas where current utilization levels are high and impacts to soil and vegetation have historically occurred or are continuing to occur.

Alternative 2 (Current Management)

Selection of Alternative 2 is expected to result in continued improvement in habitat conditions for MIS, but at a much slower rate than would have occurred under Alternative 1. Habitat conditions for MIS are expected to continue to gradually improve under Alternative 2 because there has been a substantial decline in the number of domestic sheep grazed in the Weminuche Landscape from historical numbers, but the number of sheep grazed in the Landscape has been quite stable for the past 30 to 45 years. Permitted numbers of domestic sheep grazing in the Weminuche Landscape have dropped about 59% from a high of about 10,800 animals in the early 1970's to about 4,400 animals currently. In addition, numbers of

sheep grazing on the San Juan National Forest have dropped about 95% from a high of about 216,600 animals in the 1930's to about 10,800 currently. As numbers of sheep have declined in the Landscape, habitat conditions for MIS, especially those MIS that forage in alpine areas in mid to late summer, have had a long term and gradual improvement in foraging habitat conditions. Gradual improvements in habitat conditions for MIS are expected to continue for some time in the future even if numbers of sheep remain relatively stable over the next few (5+) years because alpine plants have a relatively short growing season and recovery processes are slower than in lower elevation habitat types.

Selecting Alternative 2 would have both positive and negative effects for MIS. Selecting Alternative 2 would have gradual beneficial effects for MIS because gradually improving habitat conditions for MIS would continue and current habitat capability for MIS would be maintained. Alternative 2 would also have gradual negative effects for MIS, compared to Alternative 1, because a few localized areas would continue to be affected by sheep grazing activities, such as near the alpine/spruce-fir interface. Selecting Alternative 2 would be generally beneficial for MIS because of continued gradual improvement in habitat conditions, but much less so than selecting Alternative 1, because improvement in habitat conditions would probably occur over a longer time frame and be of a lower magnitude than under Alternative 1. The scale of habitat improvement from selecting Alternative 2 would likely be small and limited to those areas that are being degraded by livestock grazing under current management. In general, habitat conditions are expected to continue to gradually improve in most areas under Alternative 2, but habitat conditions for MIS would continue to be impacted in a few localized areas.

Under current management, an average of about 34% of the habitat in the Landscape for the four MIS is considered suitable for sheep grazing. Displayed another way, on average about 66% of the habitat for the four MIS in the Weminuche Landscape is considered unsuitable for sheep grazing under current management. For the one MIS whose habitat could be affected by the project (elk) the amount of habitat suitable for sheep grazing under Alternative 2 represents from 1% to 3% of its habitat Forest-wide. For this reason, selection of Alternative 2 is unlikely to cause measurable changes to Forest-wide habitat trends or population trends for elk.

Population trends for elk are controlled primarily by annual hunter harvest and do not appear to be correlated with the amount of available habitat on the Forest (San Juan National Forest 2005b). Therefore, selection of Alternative 2 is unlikely to affect elk population trends forest-wide. The slight habitat improvements resulting from changes in sheep or cattle grazing areas or practices in the Weminuche Landscape are unlikely to cause measurable changes in the amount of elk habitat or elk populations at the scale of the entire San Juan National Forest. Changes in habitat capability for elk are likely to be very small in comparison to the relatively large amounts of habitat available at the Forest-wide scale. The changes to elk habitat expected from the rapidly expanding beetle outbreak are expected to far exceed those expected from any management changes that might result from selecting one alternative versus another. Elk are widespread across the Forest and population trends and habitat trends are stable to slightly downward, respectively. In addition, the impacts of sheep and cattle grazing to elk habitats is generally limited to a few localized areas and thus is unlikely to affect more than a few individuals and would not cause a measurable change to habitat or populations trends at the Forest-wide scale.

Alternative 3 (Forage Reserve Alternative)

For all MIS, Alternative 3 is expected to be more beneficial than Alternative 2 due to specific design criteria and adaptive management actions designed to meet or move ecological conditions towards the project's desired conditions, and due to the closing of vacant

allotments that could be restocked under Alternative 2. Selecting Alternative 3 would generally maintain current rangeland conditions in active allotments and areas authorized for forage reserves, but would result in fewer benefits to wildlife and habitats and result in slower rate of meeting or exceeding desired conditions in areas where impacts are currently occurring, compared to Alternative 1 or Alternative 4. Selecting Alternative 3 may affect small numbers of individuals in localized areas but is unlikely to affect populations. Effects from selecting Alternative 3 would be limited to minor changes in species abundance or local use patterns only. Selecting Alternative 3 is not expected to result in negative consequences to MIS populations from the standpoint of affecting viability at the Forest-wide scale.

Selecting Alternative 3 would be generally beneficial for MIS, although less so than under Alternative 1 or Alternative 4, but more so than selecting Alternative 2. The improvements in habitat conditions for MIS expected to occur under Alternative 3, compared to Alternative 2, are likely to be generally small and limited to a few localized areas where habitat conditions are being affected by sheep grazing activities under current management practices. For example, under Alternative 3 there would be a 49% reduction in the acres of alpine and spruce-fir habitats suitable for domestic sheep grazing (about 21,849 acres), compared to Alternative 2 (about 42,465 acres). Under Alternative 3 only 21% of the elk habitat in the Weminuche Landscape would occur in areas suitable for livestock grazing, compared to 39% of elk habitat under Alternative 2.

Selecting Alternative 3, similar to Alternative 2, would have both positive and negative effects for MIS. Selecting Alternative 3 would have beneficial effects for MIS, compared to Alternative 2, because application of adaptive management strategies and design criteria should result in more rapid improvements in habitat conditions in those localized areas where sheep grazing impacts are currently occurring. Also similar to Alternative 2, Alternative 3 would have negative effects for MIS, compared to Alternative 1, because a few localized areas would continue to be affected by sheep and cattle grazing activities, such as near the alpine/spruce-fir interface.

Selecting Alternative 3 would be generally beneficial for MIS, more so than selecting Alternative 2, but less than selecting Alternative 1 or Alternative 4, because improvement in habitat conditions would probably occur in a shorter time frame than under Alternative 2, but over a longer time frame than under Alternative 1 or Alternative 4. In general, habitat conditions are expected to continue to improve in most areas under Alternative 3, probably at a faster rate and to a greater degree than under Alternative 2, but at a slower rate and to a lesser degree than under Alternative 1 or Alternative 4. Under Alternative 3, habitat conditions for MIS would continue to be impacted in a few localized areas where grazing impacts are currently occurring.

The application of adaptive management strategies and design criteria under Alternative 3 should result in more rapid improvements in habitat conditions in some localized areas where sheep grazing impacts are currently occurring (Alternative 2). This is because adaptive management strategies would not be applied under Alternative 2. Although more rapid improvement in habitat conditions for MIS is expected under Alternative 3 than under Alternative 2, improvements in habitat conditions as a result of the adaptive management approach are likely to be too small to affect populations of MIS or the total amount of habitat available in the Weminuche Landscape.

Under Alternative 3, an average of about 22% of the habitat in the Landscape for the four MIS is considered suitable for sheep grazing, compared to about 34% under Alternative 2. Displayed another way, on average about 78% of the habitat for these four species in the Weminuche Landscape is considered unsuitable for sheep grazing under Alternative 3, compared to 66% under Alternative 2. Therefore selection of Alternative 3 would provide a

12% reduction in the amount of habitat affected by grazing in the Landscape, compared to Alternative 2. For the one MIS whose habitat could be affected by the project (elk), the amount of habitat suitable for sheep grazing under Alternative 3 represents from 1% to 2% of its habitat Forest-wide. For this reason, selection of Alternative 3 is unlikely to cause measurable changes to Forest-wide habitat trends or population trends for elk.

Population trends for elk are controlled primarily by annual hunter harvest and do not appear to be correlated with the amount of available habitat on the Forest (San Juan National Forest 2005b). Therefore, selection of Alternative 3 is unlikely to affect elk population trends forest-wide. The slight habitat improvements resulting from changes in sheep or cattle grazing areas or practices in the Weminuche Landscape are unlikely to cause measurable changes in the amount of elk habitat or population trends at the scale of the entire San Juan National Forest. Changes in habitat capability for elk due to selecting Alternative 3 are likely to be very small in comparison to the relatively large amounts of habitat available at the Forest-wide scale. As with Alternative 2, the changes to elk habitat expected from the rapidly expanding beetle outbreak are likely to far exceed those expected from any management changes that might result from selecting one the EIS alternative versus another. Elk are widespread across the Forest and population trends and habitat trends are stable to slightly downward, respectively. In addition, the impacts of sheep and cattle grazing to elk habitats is generally limited to a few localized areas and thus is unlikely to affect more than a few individuals and would not cause a measurable change to habitat or populations trends at the Forest-wide scale.

Alternative 4 (Preferred Alternative)

For all MIS, Alternative 4 is expected to be more beneficial than Alternative 3 or Alternative 2 due to specific design criteria and adaptive management actions designed to meet or move ecological conditions towards the project's desired conditions, and due to the closing of forage reserve allotments authorized under Alternative 3. Selecting Alternative 4 would generally maintain current rangeland conditions in active allotments, but would result in fewer benefits to MIS habitats and result in slower rate of meeting or exceeding desired conditions in areas where impacts are currently occurring, compared to Alternative 1. Selecting Alternative 4 may affect small numbers of individuals in localized areas but is unlikely to affect populations. Effects from selecting Alternative 4 would be limited to minor changes in species abundance or local use patterns only. Selecting Alternative 4 is not expected to result in negative consequences to MIS populations from the standpoint of affecting viability at the Forest-wide scale.

Selecting Alternative 4 would be generally beneficial for MIS, although less so than under Alternative 1, but more so than selecting Alternative 3 or Alternative 2. The improvements in habitat conditions for MIS expected to occur under Alternative 4, compared to Alternatives 3 and 2, are likely to be generally small and limited to a few localized areas where habitat conditions are being affected by sheep or cattle grazing activities under current management practices. For example, under Alternative 4 there would be a 56% reduction in the acres of alpine and spruce-fir habitats suitable for domestic sheep grazing (about 18,688 acres), compared to Alternative 2 (42,465 acres), and an 14% reduction compared to Alternative 3 (21,849 acres). Under Alternative 4 only 18% of elk habitat in the Weminuche Landscape would occur in areas suitable for livestock grazing, compared to 21% under Alternative 3 and 39% under Alternative 2.

Selecting Alternative 4, similar to Alternative 3, would have both positive and negative effects for MIS. Selecting Alternative 4 would have beneficial effects for MIS, compared to Alternative 3 and Alternative 2. Although the same adaptive management strategies and design criteria applied under Alternative 4 would also be applied under Alternative 3, the three forage

reserve allotments authorized under Alternative 3 would not be authorized under Alternative 4. Therefore Alternative 4 is expected to result in improvements in habitat conditions in some localized areas where sheep and cattle grazing impacts are currently occurring, similar to Alternative 3. There would also be a portion of the Landscape without grazing under Alternative 4 that would be authorized for grazing under Alternative 3 (three forage reserve allotments). Also similar to Alternative 3, Alternative 4 would have negative effects for MIS, compared to Alternative 1, because a few localized areas would continue to be affected by sheep and cattle grazing activities within the remaining active allotments, such as near the alpine/spruce-fir interface.

Selecting Alternative 4 would be generally beneficial for MIS, more so than selecting Alternative 3 and much more so than selecting Alternative 2, but less than selecting Alternative 1. This is because improvement in habitat conditions would probably occur in a shorter time frame than under Alternative 3, but over a longer time frame than under Alternative 1. In general, habitat conditions are expected to continue to improve in most areas under Alternative 4, but across a larger portion of the Landscape than under Alternative 3 and Alternative 2, but habitat conditions for MIS would continue to be impacted in a few localized areas.

Under Alternative 4 the application of adaptive management strategies and design criteria should result in more rapid improvements in habitat conditions in some localized areas where sheep grazing impacts are currently occurring (Alternative 2). This is because adaptive management strategies would not be applied under Alternative 2. Although more rapid improvement in habitat conditions for MIS is expected under Alternative 4 than under Alternative 2, improvements in habitat conditions as a result of the adaptive management approach are likely to be too small to affect populations of MIS or the total amount of habitat available in the Weminuche Landscape.

Under Alternative 4, an average of about 18% of the habitat in the Landscape for the four MIS is considered suitable for sheep grazing, compared to about 22% under Alternative 3, and 34% under Alternative 2. Displayed another way, on average about 82% of the habitat for these four species in the Weminuche Landscape is considered unsuitable for sheep grazing under Alternative 3, compared to 78% under Alternative 3 and 66% under Alternative 2. Therefore selection of Alternative 4 would provide a 16% reduction in the amount of habitat affected by grazing in the Landscape, compared to Alternative 2, and a 4% reduction compared to Alternative 3. For the one MIS whose habitat could be affected by the project (elk), the amount of habitat suitable for sheep grazing under Alternative 4 represents from 1% to 2% of its habitat Forest-wide. For this reason, selection of Alternative 4 is unlikely to cause measurable changes to Forest-wide habitat trends or population trends for this species.

Population trends for elk are controlled primarily by annual hunter harvest and do not appear to be correlated with the amount of available habitat on the Forest (San Juan National Forest 2005b). Therefore, selection of Alternative 4 is unlikely to affect elk population trends forest-wide. The slight habitat improvements resulting from changes in sheep or cattle grazing practices in the Weminuche Landscape are unlikely to cause measurable changes in the amount of elk habitat or population trends at the scale of the entire San Juan National Forest. Changes in habitat capability for elk due to selecting Alternative 4 are likely to be very small in comparison to the relatively large amounts of habitat available at the Forest-wide scale. As with Alternative 3 and Alternative 2, the changes to elk habitat expected from the rapidly expanding beetle outbreak are likely to far exceed those expected from any management changes that might result from selecting one EIS alternative versus another. Elk are widespread across the Forest and population trends and habitat trends are stable to slightly downward, respectively. In addition, the impacts of

sheep and cattle grazing to elk habitats is generally limited to a few localized areas and thus is unlikely to affect more than a few individuals and would not cause a measurable change to habitat or populations trends at the Forest-wide scale.

Species Present and Potentially Affected by the Preferred Alternative:

Elk are habitat generalists with the ability to utilize various nutritional sources and thus can be found using nearly every habitat available on the SJNF (San Juan National Forest 2005b). The Weminuche Landscape provides elk cover and forage during spring, summer and fall but elk are largely absent in winter from nearly all of the Landscape due to the relatively high elevations and relatively deep snow levels typical of the Landscape. Elk cover and forage habitats are widely distributed across the Weminuche Landscape and large numbers of elk can be found in many areas throughout the snow-free season. Elk winter range however, is very limited in the lowest elevation portions of four allotments (Burnt Timber, Canyon Creek, Endlich Mesa and Pine River). Within the overall elk winter range, there are two small areas that are also designated as elk winter concentration area. About half of the Spring Gulch Allotment is elk winter concentration area, and a small area in the central portion of the Canyon Creek Allotment. Although most elk leave most of the Landscape in winter, a few animals remain during winter in the alpine zone on windswept ridgelines. The numbers of elk summering and wintering in the Landscape has changed in recent years. The 2002 Missionary Ridge fire created large areas of regenerating aspen which is a favored browse of elk. The CPW believes this is the reason why aerial monitoring flights in recent years have detected much larger than usual numbers of elk over wintering in the burn area and stopping well short of and well above the elevation of their traditional winter ranges. Traditionally, elk foraging habitats consist of grass-forb vegetation in open meadows and under open forest canopies, new growth on Gambel oak and other shrubs, and vegetation in aspen pockets and along intermittent drainages.

Potential impacts to elk from sheep and cattle grazing are primarily associated with the effects grazing has on cover, forage, and calving areas. There is about 73,448 acres of cover for hiding, thermal cover, and calving in the Landscape. There is about 38,787 acres of elk forage habitat in the Landscape. About 36% of the available elk cover and 43% of the available elk foraging habitat in the landscape is suitable for sheep grazing under current management practices (Alternative 2; Table 2, above). Under Alternative 3, about 16% of the available cover and 30% of the available foraging habitat is suitable for sheep grazing. Under Alternative 4, about 13% of the available cover and 28% of the available foraging habitat is suitable for sheep grazing.

Cover consists of dense stands of coniferous or deciduous forests, and mountain shrubland and riparian vegetation (USDA Forest Service 2005). Current sheep and cattle grazing impacts on cover are minor due to the minimal impact from browsing on coniferous and deciduous vegetation, and the limited amount of time and foraging activity livestock spend in dense, closed canopy conifer forests due to lower amounts of preferred grass/forb forage available in the understory. For this reason, impact to elk cover from sheep and cattle grazing is expected to be limited under Alternative 2, and less so under Alternatives 3 and 4.

Browsing of willows in alpine upland areas by sheep was noted during field visits to active sheep grazing allotments, but impacted areas were generally limited in scope and restricted to localized areas. Due to the limited scope and restricted nature of impacted sites, it appears unlikely that selecting Alternative 2, 3 or 4 would result in impacts that would reduce elk cover or foraging habitat enough to reduce habitat capability or affect elk populations. Selection of Alternative 4 would likely result in greater improvement in elk habitat conditions, compared to Alternatives 2 because of the application of adaptive management strategies and

design criteria that are not being applied under current grazing management practices. In addition, under Alternative 3 three allotments would be closed to grazing and four other allotments would become forage reserve allotments, allowing grazing during a maximum of three out of any ten consecutive years, thereby reducing the grazing intensity on those allotments compared to if annual grazing were reauthorized under Alternative 2. Selecting Alternative 4 would be more beneficial for elk than Alternative 3 because the forage reserve allotments permitted under Alternative 3 would not be authorized under Alternative 4. Only the currently active allotments would be reauthorized under Alternative 4.

About 25% of the SJNF is classified as elk winter range (San Juan National Forest 2005b), although there is only about 5,458 acres of elk winter range in the Weminuche Landscape (Table 2, above). Winter range is considered to be the limiting habitat factor for elk on National Forest System lands, although elk populations are thought to be influenced primarily by hunter harvest than amount of available habitat. Because there is little difference among the Alternatives in the allotments where the winter range is located, there would be little differences in effects to elk winter range for selecting one EIS alternative versus another. The biggest difference among the alternatives would be the application of adaptive management strategies and design criteria under Alternatives 3 and 4 that should result in more rapid improvements in habitat conditions in some localized areas where sheep grazing impacts are currently occurring, compared to Alternative 2.

Forest-wide, there is no detectible correlation between elk habitat trends, summer or winter, and population trends (San Juan National Forest 2005b). The Forest-wide elk population trends are intentionally downward or stable, and are controlled primarily by hunter harvest established and regulated by the CPW. Therefore, the limited amount of elk winter range in the Landscape that is suitable for sheep or cattle grazing under Alternatives 2, 3 or 4 (<1% for each alternative), compared to the large amount available Forest-wide, strongly suggests that selecting Alternative 2, 3 or 4 would not affect elk habitat trends or population trends Forest-wide.

Forest-wide, the habitat trend for elk winter range is stable with a forage to cover ratio of 61:39, which is very close to the optimum ratio of 60:40 (San Juan National Forest 2005b). The elk forage to cover ratio in the Weminuche Landscape is currently 39:61, well below the optimum ratio of 60:40 (Table 3, above). The lack of forage area in the Weminuche Landscape is due to the predominance of closed-canopy conifer forests in the Landscape. The elk forage to cover ratio in areas suitable for sheep grazing would move somewhat closer to the optimum under Alternative 3 (51:49) and Alternative 4 (54:46), compared to Alternative 2 (39:61).

Forest Plan Conformance

Project level and planning-level direction for land management decisions is provided by the 2013 Final San Juan National Forest and Proposed Tres Rios Field Office Land and Resource Management Plan (USDA Forest Service 2013). The following definitions and resource direction is excerpted from the 2013 Forest Plan. Only that Forest Plan direction applicable to the project and/or preferred alternative is discussed below.

“A standard is an approach or condition that is determined to be necessary to meet desired future conditions and objectives, and/or to ensure the long-term viability of resources. A standard describes a course of action that must be followed or a level of attainment that must be reached. Deviations from standards would require analysis and documentation through a subsequent land management plan amendment.”

“A guideline is presumptively a requirement to meet desired future conditions and objectives, and/or to ensure the long-term viability of resources. Guidelines are put forward in this LRMP in recognition that there may be circumstances that could generate or require alternative, more appropriate means of meeting desired future conditions and objectives, and/or to ensure the long-term viability of resources.” “If the Responsible Official for a project decision finds that deviation from a guideline is necessary, he or she must record the reasons for deviation as part of the project decision and explain how the intent of the guideline,-as established by the desired future conditions and objectives, and/or need to ensure long-term viability of resources-is being met through alternative means. If the intent of the guideline is met through alternative means, a land management plan amendment typically would not be required.”

Desired Condition 2.3.20 **MIS:** Abert’s squirrel (*Sciurus aberti*) – Ponderosa pine habitats provide interconnected structure in mature conifer stands that produce abundant foraging (cone crops and above- and belowground fungi) and reproductive habitat.

This desired condition does not apply to this project because livestock grazing would not alter the structure of mature ponderosa pine habitat stands, cone crops, or belowground fungi.

Desired Condition 2.3.21 **MIS:** American marten (*Martes americana*) – Habitat connectivity for spruce-fir and cool-moist mixed conifer forests is maintained at broad spatial scales. These forest contain a diverse array of structural stages (including mature and old growth) and habitat attributes (snags and downed logs) to provide effective foraging, breeding and dispersal habitat for marten.

This desired condition does not apply to this project because livestock grazing would not alter habitat connectivity for spruce-fir and cool-moist mixed conifer forests at broad spatial scales, or structural stage diversity for marten.

Desired Condition 2.3.21 **MIS:** Elk – Management activities and human disturbance levels (especially in severe winter range, winter concentration areas, and calving grounds) provide effective habitat capable of meeting state population objectives.

The project is consistent with this desired condition because management actions, especially in winter range, would continue to provide effective habitat and have the potential to somewhat improve habitat effectiveness for elk under all alternatives. In addition, the project would continue to provide habitat sufficient to meet state population objectives for elk under all alternatives.

Desired Condition 2.3.21 **MIS:** Hairy Woodpecker (*Picoides villosus*) – Snags occur in numbers, size, and quality in and adjacent to aspen, ponderosa pine, and mixed conifer forests to provide effective habitat for foraging and reproduction.

This desired condition does not apply to this project because livestock grazing would not alter snag numbers, size, or quality, or green snag replacement trees and therefore would not alter habitat effectiveness for hairy woodpecker.

Guideline 2.3.58: New structural improvements, reconstruction, and operations should be designed to provide for wildlife movement to sustain populations.

The project is consistent with this guideline because new structural improvements proposed by the project are limited to water developments that have the potential to

improve wildlife habitat, and fencing which would be done in a wildlife friendly manner in accordance with CPW fencing recommendations.

Guideline 2.3.60: Management activities and access should be limited or avoided in critical winter range, severe winter range, and winter concentration areas for pronghorn, elk and mule deer during the following times to keep survival and reproduction from being negatively impacted (see Figures 2.3.1, 2.3.2, and 2.3.5):

- Pronghorn: December 1-April 30
- Elk: December 1-April 30
- Mule deer: December 1-April 30

This guideline does not apply to this project because livestock would not be on any allotment within this Landscape during the critical winter periods listed in the guideline.

Guideline 2.3.62: **Ungulates:** Projects or activities in big game critical winter range, winter concentration areas, severe winter range, production areas and important migration corridors should be designed and conducted in a manner that preserves and does not reduce habitat effectiveness within those mapped areas.

The project is consistent with this guideline because management actions, especially in winter range, would continue to provide habitat effectiveness for ungulates under all alternatives.

Guideline 2.3.63: **Ungulates:** In order to provide for healthy ungulate populations capable of meeting state population objectives, anthropomorphic activity and improvements across the planning area should be designed to maintain and continue to provide effective habitat components that support critical life functions. This includes components of size and quality on the landscape provide connectivity to seasonal habitats (wildlife travel corridors), production areas, critical winter range, severe winter range, and winter concentration areas, along with other habitat components necessary to support herd viability.

The project is consistent with this guideline because the project would continue to provide for healthy ungulate populations capable of meeting state population objectives through continuing to provide effective habitat components that support critical life functions, especially on winter ranges, under all project alternatives. Herd viability would be maintained under all project alternatives.

For the reasons described above, selection of any of the project alternatives would be consistent with management direction for MIS in the 2013 Forest Plan.

Alternative 4 is expected to be more beneficial to all MIS than Alternative 3, and Alternative 3 more so than Alternative 2, due to application of design criteria, desired conditions, and monitoring of design criteria implementation. Under Alternatives 2, 3 and 4, adequate forage will be maintained for elk and other species associated with early successional habitats, and impacts to riparian or upland habitats are expected to be only small in scale and localized in extent. For Alternatives 2, 3 and 4, direct and indirect effects are expected to be mostly short-term, result in only a few potential localized negative impacts to habitats for MIS, affect individuals rather than populations, and cause only very minor changes in relative abundance. Domestic sheep and cattle grazing under Alternatives 2, 3 and 4 may contribute a minor additional negative effect to current Forest-wide habitat and population trends for each MIS, but the amount of negative effect would be too small to be detectible at the Forest-wide scale.

The preferred alternative (Alternative 4) is unlikely to significantly alter habitat capability at a level that is detectable across the Weminuche Landscape. Because alpine range conditions are expected to gradually improve over time under all Alternatives, though more so under Alternative 1 than 4, and more so under Alternative 3 than 2, habitat capability for MIS is expected to gradually improve over time within the Weminuche Landscape. Selection of Alternative 2, 3 or 4 is not likely to alter habitat conditions for MIS in a way that is measurable or detectable at the Forest-wide scale.

The density of standing snags in forested stands currently meets the standards described in Table 2.2.3. Snag densities, or densities of green snag replacement trees, are not directly affected by domestic sheep or cattle grazing. There may be some localized snag losses due to harvest for personal use firewood near sheep herder camps, but this indirect effect is not likely to alter snag densities except in very small and localized areas near camp sites that are used consistently for many years. Because sheep herder camps are moved on a regular basis (at least every 5 days) and are generally located in the alpine zone near preferred sheep foraging areas, effects to snag densities from firewood harvesting is not likely to be measurable across the entire Landscape. For these reasons, the snag density standards described in Table 2.2.3 would be met under all project alternatives.

The State's population goals for commonly hunted MIS (elk) are currently being met or exceeded in the Data Analysis Unit in which the Weminuche Landscape is located. Vegetation conditions are generally being maintained and in most cases meet or exceed desired conditions in domestic sheep and cattle grazing allotments (see vegetation section of the EIS). Vegetation impacts from domestic sheep and cattle grazing are generally small in scale and localized in effect and for that reason are not likely to have population level effects for elk.

The current deer and elk forage to cover ratio is 39:61 in areas suitable for domestic sheep grazing. The desired target for the forage to cover ratio is 60:40. Domestic sheep grazing does not affect the amount or distribution of cover for elk. Although there is some forage overlap between sheep and elk that was evident in the Weminuche Landscape, overall utilization rates were within desired conditions. For this reason, existing forage to cover ratios for elk do not appear to be affected by domestic sheep or cattle grazing. For this reason, the forage allocation standard would be met. Domestic sheep are not brought onto allotments until after the end of June so human activities associated with livestock grazing would not disturb elk calving areas. The Weminuche Landscape provides elk calving areas, but there is little overlap with preferred domestic sheep grazing areas. For this reason, the preferred alternative would meet management direction for elk production areas.

Cumulative Effects for all Management Indicator Species

Other activities that continue to influence habitat capability for MIS in the Weminuche Landscape include development of private lands adjacent to public lands, increasing levels of jeep and OHV traffic on most roads in the Landscape, and substantial and increasing amounts of recreational use on many non-motorized trails in the Landscape. Influences that continue to affect vegetation in the Landscape and that therefore could affect habitat capability for MIS, include ongoing fire suppression, personal use firewood harvesting of standing dead trees for use as primary home heating purposes, and natural events such as wild fire, insect and disease outbreaks such as the ongoing bark beetle outbreak, wind throw events, and avalanches. All these activities have contributed to changes in the composition, structure, and function of habitat for MIS in the Landscape.

Prepared by:

/s/Chris Schultz

CHRIS SCHULTZ
Wildlife Program Leader
Columbine Ranger District

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Appendix A: Forest Plan Management Indicator Species (MIS) for terrestrial wildlife for the 2013 Final San Juan National Forest and Proposed Tres Rios Field Office Land and Resource Management Plan (USDA Forest Service 2013).

MIS Species	Preferred Habitat	Reason for Selection in Forest Plan	Habitat Present in Analysis Area (AA)?	Species Present in AA, and Period of Use?	Species Affected by Preferred Alternative?	Species Identified for Detailed Analysis?
Mammals (3)						
Abert's squirrel (<i>Sciurus aberti</i>)	Ponderosa pine	Unique habitat, species easily monitors change, limited range Nationwide	Yes	Yes, year-round	No - livestock grazing will not affect habitat	No
American marten (<i>Martes americana</i>)	Spruce-fir and cold-wet mixed conifer	Unique habitat, species easily monitors change	Yes	Yes, year-round	No - livestock grazing will not affect habitat	No
Elk (<i>Cervus elaphus</i>)	All terrestrial habitats; pine, pinyon-juniper and mountain shrub/Gambel oak in winter	Economically important, public issue	Yes	Yes, spring through fall, depending on snow depth	Yes	Yes
Birds (1)						
Hairy woodpecker (<i>Picoides villosus</i>)	All forested types, aspen, and pinyon-juniper	Unique habitat, habitat that can be monitored	Yes	Yes, year round	No - livestock grazing will not affect habitat	No