MANAGEMENT INDICATOR SPECIES— COMMONLY HUNTED BIG GAME

Introduction

The three most common ungulates (elk, mule deer, and white-tailed deer) are used identified in the Forest Plan as Management Indicator Species for the commonly hunted big game species of the Flathead National Forest. At the forest level, meeting these species' habitat needs indicates that the needs of species such as black bear, moose, and mountain lion will also be met. Their basic habitat needs of cover, forage, and security are similar and may be altered by human actions in similar ways (Joslin and Youmans 1999, Witmer et al. 1998). During the formulation of the Forest Plan, it was assumed standards designed for elk would also be adequate for mule deer because they generally use similar habitats.

Timber harvest and salvage, major insect epidemics, and fire typically reduce or alter security and thermal cover used by these ungulates. These disturbances often create edge habitat and temporary high quality foraging areas, which often benefit these big game species. The extent that large animals will make use of a natural or man-made opening depends on individual experience, seasonal forage quality, proximity of security cover, presence of roads, and intensity of human use. Loss of security cover increases vulnerability to predation and hunting, and can affect ungulates' (particularly elk) use of an area (Christensen et al. 1991, Unsworth et al. 1993, Unsworth et al. 1998, Wisdom et al. 1986). Elk consistently avoid roads open to motorized use (Hieb 1976, Leptich and Zager 1991, Lyon 1979 and 1983, Perry and Overly 1997, Rost and Bailey 1979, Thomas et al. 1988). Topography and residual or relatively quickly recovering under- and mid-stories contribute to security cover after salvage activities. Depending on the criteria used with salvage operations, live trees, snags, and downed wood can also contribute to security cover.

Hunters can displace elk from preferred habitats to larger, less diverse patches of cover (Lyon and Canfield 1991). During hunting season, elk appear to require contiguous, nonlinear hiding cover patches over 250 acres in size and more than one-half mile from open roads (Hillis et al., 1991) in order for the elk population to provide continued hunter opportunity and a diverse bull age structure (Youmans 1991). White-tailed deer habitat guidelines written by Montana Department of Fish, Wildlife, and Parks (MDFWP) biologists recommend maintaining or establishing a zone of "arboreal vegetation" at least 100 feet or 1.5 sight distances from the edge of riparian features (Riley and Cross 1983; Exhibit Rb-5). They also suggested maintaining upland corridors and encouraging multi-species timber stands. Research indicates that white-tailed deer prefer to have hiding cover within approximately 165 feet (Riley and Cross 1983), and elk approximately 500 feet (Thomas and Toweill 1982). Timber management to optimize deer habitats in western Montana "should emphasize perpetuation or enhancement of habitat diversity" (Mackie et al. 1998). Spring, summer, and fall months are important periods when ungulates give birth to and nurse calves and fawns, grow antlers, improve physical condition, accumulate fat for enduring the winter months, and endure the

stress of the big game hunting season. Mature Douglas-fir stands provide critical fawn-rearing habitats (Pac et al. 1991) and should be associated with high-quality foraging areas and security.

Analysis Area

All lands within the boundaries of the fire areas (Exhibit Rg-2) were considered for the evaluation of direct and indirect effects on elk, mule deer, and white-tailed deer. This approximately 49 square mile area (about 32,000 acres) is large enough to include habitat for populations of all three of these big game species and is representative of effects of fires, natural tree mortality, timber harvest, and firewood cutting across the landscape. Security cover, summer and winter thermal cover, water sources, security areas, and foraging areas are distributed across these drainages, with winter range being the most limited habitat value. All of the actions proposed in the alternatives that could directly or indirectly affect this resource are contained within this area. The remaining area on the west side of Hungry Horse Reservoir was added to the above for the consideration of cumulative effects, totaling approximately 270 square miles (about 172,900 acres; Exhibit Rg-2). A larger-scale assessment was also conducted to address population viability concerns (Exhibit Rg-5). The consideration of direct, indirect and cumulative effects for these species included analysis of effects on summer range, fall or transition range, potential and designated winter range for elk and mule deer (Management Areas 13 and 13A) and white-tailed deer (Management Areas 9 and 9A), as well as thermal cover and levels of motorized access.

Information Sources

Data used in this analysis included multiple geographical information system layers, Forest Plan Management Areas, pre- and post-fire aerial photography, stand exams, field surveys, fire severities, road locations, research literature, and winter range information from interagency mapping efforts and the MDFWP Information Services Unit.

Affected Environment

The large areas covered by the fires include varying amounts of the full range of habitats used by ungulates. These include summer range, calving and fawning habitat, fall transition range, and small amounts of winter range. The effectiveness of fall transition and winter range largely depends on climatic effects such as extreme winter temperatures and snow depth, and use varies accordingly. The benefits of increased summer forage in the form of grass and forbs is likely secondary to providing security/hiding habitat during calving and fawning season and fall hunting season, and providing browse during fall and early winter.

The fire history and forest types of the analysis area indicate that security and thermal cover were usually present and abundant across the area. In stand replacing fire regime areas, large patches of hiding cover were usually available for long time intervals, with relatively brief

periods of reduced cover after fires. In mixed severity fire regime areas, cover value was fairly constant in complex and dynamic mosaics. Local use probably declined immediately after large stand-replacing fires, then rebounded with large increases in forage availability and quality. Occasional areas of thick downfall may have limited ungulate movement and plant growth.

Past extensive road building and timber harvesting may have initially had negative security effects on ungulate populations because of increased and more effective access by hunters. Timber harvest has affected cover values and narrowed or severed forested connections in some areas. The conversion of mature forests into early succession habitats has generally provided increased levels of forage (Wallmo 1978, Witmer et al. 1985) and higher population potential for ungulates. Generally security cover is available in close proximity to foraging habitat. Large open areas may have adequate forage production but the lack of adjacent security cover makes some areas of forage unavailable (Reynolds 1966, Thomas et al. 1979, Thomas et al. 1988, Wisdom et al. 1986). An increased emphasis on road closures over the last fifteen years has probably had a generally positive effect on ungulate survivability during hunting seasons.

The 2003 fires primary effects on ungulate habitat include the increase of quality forage including grasses, forbs, and shrubs (Cook 2002, Wallmo 1978, Wisdom and Thomas 1996), and the reduction of thermal and hiding cover. Fire increases forage production and palatability, nutritional value of some forages, and the abundance of some important forbs (Cushwa et al. 1966, Landers 1987, Lay 1967). While deer are often referred to as browsers of twigs and other vegetative woody material, they tend to prefer herbaceous plants high in nutrition and digestibility (Gill 1976). Similar forage value increases often result for elk following fire (Cook et al. 1994, Lyon and Ward 1982). A considerable area of deer and elk summer habitat, some fall transition habitat, and relatively small amounts of winter range burned in the fires. Although there was an immediate loss of forage, there will be beneficial effects with regards to future forage production. Once forage is recovered and established a period of high forage value is expected to last 15-30 years depending on local site conditions. Areas with low burn intensity have a present and rapidly recovering understory. Areas of higher burn intensity will have a slower recovery, but forbs and grasses will still begin establishing almost immediately. Much of the area was recovering with young grass, forbs and sprouting shrubs during the spring and summer of 2004. Fires often revitalize many brush and shrub species and species such as willow, serviceberry, chokecherry, huckleberry, mountain maple, and Oregon grape have already begun to regenerate. The majority of security cover was lost in much of the burned areas. While fire-killed snags and downed wood may provide some level of hiding cover, they have little value as thermal cover.

Short-term reduction of cover and forage may lead to higher rates of hunting pressure, poaching, thermal stress, competition, winterkill and predation. Areas of low and moderate burn intensity will provide greater amounts of forage faster than areas of high burn intensity where the full benefits of increased forage may not occur for several years. With an increase in forage and berry production grizzly and black bear presence will also likely increase in the areas. This may lead to increased predation of fawns and calves. The presence of other forest carnivores may also increase where ungulate calving and fawning is concentrated.

High quality calving and fawning habitat includes proximity to thermal cover, security/hiding cover, forage, and water. Canopy cover provides thermal cover in winter and summer. The shrubby understory provides security cover for calves and fawns. The combination of timber and shrubby understory are also important security cover during the hunting season. Calving and fawning areas are sensitive to physical and noise disturbance during the early summer when calving/fawning is taking place. Energy needs are at there highest for cows and does while lactating and during the summer forbs, grasses, and to a lesser extent shrubs are utilized as forage. Aspen, snowbrush, snowberry, serviceberry, chokecherry, and other shrub and tree species are available for browse in fall and winter. Water is available in the form of abundant creeks, springs, and seeps.

Moist sites are identified as areas warranting management consideration in both the Forest Plan and "Coordinating Elk and Timber Management" (Lyon et al. 1985, Exhibit Rb-4). Moist sites are abundant in the fire perimeters and the greater analysis area, and are unlikely to be a limiting factor for elk in the area.

Ungulate habitat management considerations include providing all habitat components according to an area's potential. This will allow this species to persist and reproduce and provide for ecosystem health and recreational uses such as hunting, wildlife viewing, and photography. Although there is little winter range in the area, spring, summer, and fall are the seasons when these species give birth to and nurse calves and fawns, grow antlers, accomplish the majority of their growth, accumulate fat and energy reserves for winter, and endure big game hunting seasons.

Summer Range

Habitat effectiveness depends on factors affecting the use of habitat. On the Flathead National Forest these factors include road density, cover, and the amount of livestock grazing (Exhibit Rb-2). With the exception of occasional riding and pack stock, livestock grazing is absent within the analysis area. Habitat effectiveness generally increases with decreasing road density and increases with decreasing road density. The ungulates occurring in the proposed areas occurred with the road densities present at that time. The reduction in cover is the primary factor reducing habitat effectiveness in the analysis area following the fires. Security cover is reduced from pre-fire levels. A study investigating the importance of thermal cover for elk in summer and winter conducted in northeastern Oregon concluded that its influences on animal performance and population dynamics are rarely of consequence. Instead, they placed their emphasis on nutrition (Cook et al. 1998).

High quality summer range for elk and mule deer can be found in the higher elevations around Battery/Kah/Soldier Mountains and in the Bruce Ridge area; white-tailed deer will summer up to the mid-slope areas of the analysis area. Summer forage in burned areas is expected to be higher than before the fires for approximately 30 years. Moose, deer, and elk sign was frequently observed in burned and unburned areas during field surveys of proposed units the summer of 2004 (Rg-4).

Fall Transition Range

Fall transition range is generally between high elevation summer range and the low elevation winter range. Generally these areas are in mid-elevation forest habitat (4,500-5,500 feet) and are used until deeper snow sends elk and deer to winter range. Potential fall transition range is widely distributed throughout the analysis area, and the effectiveness of particular areas varying with annual snow conditions and climatic effects on forage production.

While security cover is reduced in much of the burned environment, the extensive forest cover in the greater area provides generally acceptable security cover at the analysis area scale. Open road density and security cover are the primary habitat factors affecting big game survival during hunting seasons. Areas of higher intensity burning will experience more and longer-term reductions in security cover. Areas of lower intensity burning will experience less and shorter-term reductions in security cover. Increasing open road density generally decreases big game survival during hunting seasons (Christensen et al. 1991, Lyon 1983, Unsworth et al. 1993, Unsworth et al. 1998, Wisdom and Thomas 1996). Areas of high open road density and low security cover result in increased vulnerability to human caused mortality and other predation. In areas of low open road density and low security cover, vulnerability is increased by hunters using ATVs, horses, or hiking to access an area. Areas of low open road density and high security cover provide areas with the highest survival of big game through the hunting seasons. Vulnerability can be increased by other factors such as early snowfall, which allows tracking and pushes big game to lower elevations where access is generally easier for hunters.

Winter Range

Big game experience relatively high stress and associated mortality during winter and spring as a result of interacting factors such as low forage availability, nutritional value, and digestibility. Thermal regulation, foraging effort, and increased energy expenditure for movement contribute to increased energy needs. In this time of stress, available forage, security cover, and to a lesser extent thermal cover, are important when avoiding and compensating for predation and human caused stress. Snow depth has a great influence on the movements of mule deer (Mackie et al. 1982). Thermal protection and shelter from deep snow provided by mature conifers with dense canopies are important habitat components for white-tail winter range (Halls 1984). Forage availability decreases with increasing snow depth, and ungulates may move to areas where forage is more accessible. Movement requires greater energy expenditure in deeper snow. With decreasing temperatures and windchill, thermal cover becomes more important and big game minimize their movements to conserve energy. The Forest Plan considers winter range to be acceptable when 30 percent of the area contains winter thermal cover (a stand of evergreen trees having a minimum height of 60 feet and a minimum crown canopy of 70%). During winter and early spring ungulates will often forage on south facing slopes with relatively low snow depth. Ungulates may also find winter range along valley and river bottoms where these areas also have relatively shallow snow. Ungulates can forage under closed tree canopies that provide snow capture (Hanley 1984). Spring ranges generally occurs in areas of early green-up where vegetation begins growing soon after the snow has melted off. These areas are generally on southerly and westerly slopes or flatter areas.

Winter range for moose, elk and mule deer occurs up the Sullivan Creek drainage and along the west and southwest facing slopes off of Kah Mountain; white-tailed deer winter along the South Fork Flathead River. Temperature and snow depth exert the strongest effects on white-tail activity in winter (Beier et al. 1990). White-tailed deer winter in mature forest that provides snow interception, and riparian or upland sites (Mundinger 1984). The importance of dense coniferous forest habitat to this species during winter is well documented (Ozoga 1968, Wetzel et al. 1975) and connecting patches of thermal cover appear to be important. Winter thermal cover is more important for white-tailed deer than elk or mule deer.

There is no Forest Plan designated winter range for elk and mule deer (Management Areas 13 and 13A) or white-tailed deer (Management Areas 9 and 9A) in any of the proposed salvage units (Exhibit Rb-1). However, approximately half of the proposed units in the Ball fire area were wholly or partially overlapped by elk winter range as identified using ungulate range maps produced during interagency efforts in 1993, primarily by MDFWP biologists (Exhibit Rb-1). There was no elk winter range identified by these efforts in salvage units proposed in the Beta, Doe, or Blackfoot fire areas. No white-tail or mule deer winter range identified by these interagency efforts occurs in any of the proposed salvage units. Where winter range was present, it was dramatically reduced across burned areas, with thermal cover reduction having a longer-term effect than forage loss. The loss of thermal cover may not be particularly detrimental for elk (Cook et al. 1998) and mule deer as it may have little influence on individual performance or population dynamics.

If unidentified winter range does occur in the analysis area it would be concentrated on gentle slopes of the lower elevations (3300'-4000'), and thermal cover would have been lost in areas of moderate to high burn intensity. The white-tailed deer affected environment is similar to that described for mule deer and elk except white-tails have a greater need for winter thermal cover, they typically do not migrate as far, and they generally remain in lower elevations. In the whitetail's northern range there are often pronounced seasonal migrations in response to snow depth and cold weather (Hoskinson and Mech 1976, Verme and Ozoga 1971,) and this is likely the case in this area.

Environmental Consequences

Three "Key Issues" discussed in Chapter 1 are directly related to effects on big game.

- #1, Not Enough Snags are Being Left on the Landscape
  Issue Indicators: Average density of large larch and Douglas-fir after salvage across salvage units that support these trees, by fire area; Percent of area with high densities of large larch and Douglas-fir after salvage.
- #6, Bald Eagle Security and Big Game Winter Range Quality Need to be Emphasized
  Issue Indicators: Acres of salvage in older Douglas-fir stands that burned at low or moderate intensity in known ungulate winter range.
- #7, Public Motorized Access is Reduced Too Much
  Issue Indicators: Miles of road closed to public wheeled motorized vehicles over the existing condition.

Three other "Key Issues" discussed in Chapter 1 are related to effects on big game.

- #2, Not Enough Snags are Proposed for Harvest
  Issue Indicators: Average density of large larch and Douglas-fir removed by salvage across salvage units that support these trees, by fire area; Percent of each fire area without high densities of large larch and Douglas-fir after salvage.
- #3, Not Enough of the Burned Areas are Being Salvage Logged
  Issue Indicators: Acres of salvage logging proposed.
- #5, Grizzly Bear Security is not Adequately Addressed in the Proposed Action
  Issue Indicators: Number of A19 component standards (security core, total road density, and open road density) met or exceeded across the six bear management subunits. There are a total of 18 of these components in the project area.

Direct and Indirect Effects

The following Effects Indicators were used to focus the big game analysis and disclose relevant environmental effects:

- Effects on seasonal forage values.
- Effects on security cover and distribution in and adjacent to salvage units.
- Effects on summer and winter thermal cover.
- Amount of winter range within proposed salvage units.
- An assessment of effects on winter range.
- Potential disturbance from implementation.
- Effects from proposed levels of motorized access.

The fire-killed snags provide some security cover in areas where security cover and subsequently habitat effectiveness have been substantially reduced. Winter range is limited in the analysis area and can be a limiting factor on big game populations, particularly in years with severe winter temperatures and snowfall. Open roads and motorized trails reduce big game security and habitat effectiveness, and increase vulnerability. None of the proposed alternatives would cause permanent loss of any habitat values. Of the proposed alternatives, the implementation of Alternative C would be the most beneficial to big game habitat effectiveness.

Alternative A (No Action)

No changes to access management, additional salvage, harvest, or other rehabilitation actions would occur with this alternative. This would allow ungulate habitat across the analysis area to continue to progress under relatively natural processes. Under this alternative, short-term effects on ungulates would be variable. Short-term effects of the initial loss of forage and thermal cover may increase over-winter mortality of ungulates, although there is relatively little identified winter range in the project areas for any of the three species (Exhibit Rb-1).

The potential mortality is largely dependent on climatic influences such as precipitation effecting forage production, and extreme winter temperatures and snow depths that affect winter caloric requirements. The occurrence and abundance of forage would fluctuate and change over time as the areas progress through successional pathways. As there would be no changes in the level of motorized access, the current level of related disturbance, hunting access, and associated results would continue.

Summer Range

As a result of reduced security cover, habitat effectiveness values would remain low in areas of moderate to high burn severity until vegetative recovery progresses sufficiently to provide cover (Exhibit Rb-2). Security cover and summer thermal cover would likely develop within 15 to 30 years, but this will vary with weather and local site factors such as aspect and elevation. Non-forested sites would likely remain non-forested and would be important foraging sites as succession reduces forage on recovering forested sites.

Fall Transition Range

Security cover in moderate to high burn severity areas would recover and return similarly as in summer range. Vulnerability of big game would initially be high in these areas and then decrease with vegetative recovery and succession. Reduced thermal and snow catching canopy cover through the next 15-30 years would likely result in ungulates being pushed to the lower elevations by fall snow earlier than in pre-fire years. This may result in increased vulnerability during the big game hunting seasons as access for hunters is generally easier at the lower elevations, adequate cover is reduced, and ungulates may concentrate in remaining areas of adequate cover.

Winter Range

This alternative would allow for natural recovery of fire-affected winter range. Populations may decline in the area with the initial reduction of forage and cover. This in the context that little winter range was identified in the burned areas before the fires. Winter range value would increase over time, particularly as shrubs recover (3+ years). Live trees and standing fire-killed snags would function as residual hiding cover. Many of the fire-killed snags will eventually fall over time, but vegetation recovery will be progressing over the same time period, contributing to security cover. Remaining live Douglas fir may be fire stressed and susceptible to the currently high levels of beetles. If mortality results, the contribution of Douglas fir to remaining thermal cover would be reduced. The availability of additional forage may somewhat compensate for the reduction of winter thermal cover by allowing greater levels of caloric intake.

Considerable downfall is likely throughout portions of unsalvaged winter range. This could limit ungulate travel and use of certain areas, effectively reducing winter range suitability. In Montana, Lyon et al. (1985; pg 9, Exhibit Rb-4) recommended that slash should be reduce to depths below 1.5 feet deep in clearcuts, otherwise elk use would be reduced by 50 percent. It is expected that excessive downed woody accumulations would reduce winter range habitat use to some extent. Downed wood accumulation will not occur at once, gradual accumulations of downed logs would occur over time.

Alternative B (Proposed Action)

This alternative includes salvage harvest in all four fire areas within specified units, the closing of some open roads and motorized trails, and some road decommissioning. The primary effects on movements and habitat use are associated with the reduction of security and thermal cover, with some increased security resulting from a reduction in open roads and motorized trails. Some additional effect may result from increased mobility in salvaged areas. If ungulates are in the area during salvage operations or other activities, there will be associated temporary and short-term disturbance and displacement. Salvage harvest and hauling may temporarily displace individuals but the impacts of these activities would be negligible at the population level. There would be the possibility individual mortality occurring from vehicles, falling snags, or fawns and calves becoming separated from their mothers during project activities. Such incidents would be rare and are not expected to have impacts at the population level.

The proposed reductions in open roads and motorized trails would benefit habitat effectiveness by increasing security and reducing displacement and disturbance. Reduced motorized trails would also provide for increased security and reduced disturbance. Decommissioning roads would result in short-term and temporary disturbance. The proposed temporary roads are short spurs and are not expected to have measurable impacts on either deer or elk utilizing these areas. The temporary roads would not be open for public motorized access and would be in use for a short time period.

While this alternative may slightly alter habitat use patterns, there would likely be no discernable change in ungulate populations or their availability as game and prey. At this point in time there is not a cause for concern regarding the persistence of elk, mule deer, or white-tailed deer in the South Fork of the Flathead River drainage or on the Flathead Forest.

Summer Range

This alternative would have subtle effects on forage or fawning and calving cover. Salvage activities may slightly benefit forage production of early seral vegetation and resprouting shrubs in some areas where high concentrations of standing and downed wood may otherwise have been a limiting factor. Some downed wood loss over time would result from salvaging that may have otherwise contributed to fawning and calving cover. Regrowth after salvage would provide the majority of adequate fawning and calving cover in salvaged areas. As dead trees contribute little to cover, salvage is expected to have a very minor effect on habitat effectiveness. The amount of hiding and thermal cover lost by the fires produced the primary reduction in habitat effectiveness. Reserve patches, riparian areas, dispersed large snags, and other leave criteria would provide additional fire-killed snags. Topography, distance from open roads, and the patches of green forest remaining within fire areas would also contribute to security cover.

Fall Range

Management activities affecting security cover and access can influence big game harvest. This alternative would decrease security cover and increase big game susceptibility to harvest.

This effect would gradually be reduced over the next approximately 20 years as vegetative recovery in the salvage areas occurs. Elk and mule deer often spend much of the hunting season at higher elevations. Early snow can push big game to lower elevations where they are more susceptible to harvest. If these species migrate to lower elevation salvaged units during hunting season they will be at greater risk with the decreased security cover. Salvage harvest will decrease down wood over time, which may result in easier travel by ungulates. Levels of motorized access affect the ease of hunter access and subsequently influences big game vulnerability. Since the mid 1970s, the Forest Service has closed a number of roads in the fire areas benefiting big game in these areas. This alternative further reduces open roads and motorized trails in the area.

Winter Range

Approximately half of the proposed Ball Fire units are in areas wholly or partially identified as elk winter range by interagency efforts (Exhibit Rb-1). The Ball Fire dramatically reduced winter range value in portions of the proposed areas through loss of winter browse and thermal cover. Areas of lower burn intensity and severity within the area would function again as winter range sooner than areas of higher burn intensity and severity. Thermal cover would be affected minimally by Alternative B as fire-killed snags have little to no thermal cover value in winter. The primary effect of the proposed salvage on winter range is on remaining security cover. Fire-killed snags provide little security cover relative to unburned forest, but they do constitute some of what security cover is left which emphasizes their value. Until vegetative recovery progresses to providing additional hiding cover, early deep snow could push elk and mule deer into low elevation winter range where reduced security cover in salvaged areas would increase susceptibility to harvest. However, much of the time spent on winter range is after the big game hunting seasons after which time security cover reduces vulnerability primarily to nonhuman predation. No salvage would be conducted on whitetail or mule deer winter range as identified in the Forest Plan or through interagency mapping efforts. No salvage is proposed in elk winter range in the Beta, Doe, or Blackfoot fire areas. No salvage is proposed in elk winter range in the Ball area as designated by the Forest Plan (MA 13,13A).

Some proposed salvage units have substantial amounts of live trees left in them that contribute to security and thermal cover. Salvage activities, helicopter logging in particular, may require the felling of live trees for safety concerns. This would reduce thermal and security cover value in these areas. Proposed road and trail closures and road decommissioning would have little to no effect on winter range as these areas are open for snowmobile use. Stress caused by snowmobiling on wintering elk and deer would be exacerbated by reduced cover and forage over the next few years. Any additional stress caused by humans during winter would be a negative effect. The effects on wintering ungulates from additional stress and energy expenditure resulting from project activities are not easy to predict, as other factors such as winter severity and condition of the animals going into the winter are also factors. Winter logging would add considerable stress to wintering ungulates in the Sullivan Creek area and other wintering areas of the Ball Fire. However, with the diminishment of winter range suitability in the area, there is likely to be fewer ungulates in the area during winter for the next several years.

Alternative C

Effects will be similar to those in Alternative B with the following exceptions and additions. This alternative includes a reduction of the area salvaged in areas identified as winter range through interagency mapping efforts in the Ball Fire area. This reduction is comprised of 96 acres of older Douglas-fir stands that burned at low or moderate intensity. In general, a decrease in the area and volume salvaged would decrease the loss of security cover and the potential for disturbance resulting from project activities. Increased snag retention would provide more hiding cover for deer and elk, thereby reducing human and other predation. Reducing open road density and motorized trails would benefit elk and deer by decreasing associated disturbance, decreasing easy hunting access, and increasing security for calving and fawning. Road decommissioning would cause short-term and temporary disturbance.

Alternatives D and E

Effects will be similar to those in Alternative B with the following exceptions and additions. In general, increases in the area and volume salvaged may slightly increase potential negative effects on elk and deer. Reducing snag retention, reducing snag leave patch size, and reducing densities of dispersed large snags would negatively affect security cover for ungulates in the area. Increased motorized access would reduce security and increase disturbance.

Cumulative Effects

Past and present cumulative effects have and are continuing to affect these species' habitats. Past fires, timber harvest, and salvage harvest across the analysis area have resulted in a complex matrix of forested interior habitat, edge, ecotones, and openings, in various stages of succession. Past timber harvest converted a considerable amount of the hiding and thermal cover into early seral and seedling stands. These areas provide forage and some have progressed to sapling hiding cover. No vegetation management activities are planned on national forest lands in the analysis area in addition to those proposed in the action alternatives.

Numerous recreational opportunities across the analysis area, including big game hunting, can cause displacement or mortality of big game species. Roads have fragmented habitat and increased the ease of access for hunters. Human populations and use have dramatically increased from historical conditions. Ease of human access has stabilized over the last decade or so, as new roads built for logging are generally reclaimed or closed soon after use.

Mushroom picking for several years post-fire may disturb elk and mule deer in the area in a minor and varying manner. Best Management Practices road maintenance work is scheduled to occur in the fire areas. Improving road drainage, upsizing culverts, and removing of fish barriers may cause temporary and short-term disturbance. The Roadside Hazard Tree

Removal Project increased visibility adjacent to open roads and trails reducing habitat security in the affected areas.

Effective fire suppression has reduced early post-fire seral stages across considerable areas. The cumulative affect of the 2003 fires and smaller fires that have occurred within South Fork drainage over the last couple of decades are expected to provide improved spring, summer and fall forage for approximately 30 years post-fire.

The area is largely open to snowmobiling which can cause avoidance of areas by ungulates and cause stress while energy reserves are at their lowest, causing the expenditure of vital and limited stored energy.

REGULATORY FRAMEWORK

Elk, mule deer, and white-tailed deer are identified as Management Indicator Species for commonly hunted big game in the Forest Plan for the Flathead National Forest. The analysis for Flathead National Forest's Plan Amendment 21 assessed the forest-level viability of these species (USDA Forest Service 1999a). The Forest Plan (III-35 to III-38) contains management direction and standards to guide project planning. The Forest Plan considers ungulate winter range to be acceptable when 30 percent of the area contains winter thermal cover (a stand of evergreen trees having a minimum height of 60 feet and a minimum crown canopy of 70 percent). The main Forest Plan goal for MA13 and MA13A winter range is to provide the size, age, diversity, and distribution of cover and forage suitable for elk and mule deer winter habitat. Management Area 13 allows for timber harvesting to improve or maintain the relationships of cover to forage and elk summer range habitat management direction relates to 'moist site' and security areas protection.

Amendment 21 of the Forest Plan establishes a Forest-wide goal to "provide appropriate habitat and access to maintain desired hunting, fishing, and viewing opportunities, in coordination with the Montana Department of Fish, Wildlife, and Parks." The Montana Elk Management Plan (1992) contains goals, objectives and strategies for perpetuating and managing elk populations for public benefit, as well as other emphasis items. The MDFWP includes habitat goal recommendations in their big game management plans, specifically the Statewide Elk Plan (MDFWP 1992). USFS Region One direction includes having at least one NEPA alternative comply fully with the State's plan, and Amendment 21 of the Forest Plan has an objective to provide sufficient habitat to contribute towards meeting the objectives of MDFWP's management plans.

Moist sites are identified as an important characteristic of elk habitat and management considerations have been outlined in the Forest Plan (pages II-22 and 23). These apply to all management areas, in accordance with the following selected recommendations from the Coordinating Elk and Timber Management, Final Report of the Cooperative Elk-Logging Study, 1970-1985, January 1985 (Forest Plan Appendix DD):

A. "Moist sites," composed of specific habitat types, topographic situations, and elevations, would be managed according to the habitat type moist site recommendations.

B. Areas with "Moist Sites" would be managed during the elk use period, with open road densities that average one mile or less per square mile.
C. "Security Areas," composed of areas associated with the moist sites that provide security and other necessary components of elk summer habitat, would be managed according to the security area recommendations.
D. In both "Moist Sites" and "Security Areas," slash in managed stands would be reduced to levels that do not impede elk movement.

REGULATORY CONSISTENCY

All of the proposed alternatives would comply with NFMA direction that wildlife habitat be managed to maintain viable populations of existing native and desired non-native species well distributed across the planning area. These ungulates are largely habitat generalists and are widespread across a considerable portion of the western United States. Regardless of scale, species viability is not a concern for elk, mule deer, or white-tailed deer, or the other species they represent as Management Indicator Species.

There is no Management Area 9 or 9B (white-tail winter range), 13 or 13A (elk and mule deer winter range) within any of the proposed units. The Forest Plan contains a standard that encourages winter logging to better assure a continuous supply of winter food. However, the standard relates to a "green" forest where it has been observed that deer tend to feed on lichen when trees are felled. Since the alternatives would fell few if any healthy live trees, this standard is not applicable in this situation. As a result of the existing condition of the winter range, none of the alternatives would alter either of the two important habitat components (thermal cover and forage). Therefore, it is believed that salvaging dead trees and planting trees for future thermal cover is consistent with winter range management.

Moist sites are abundant and unlikely to be a limiting factor on elk in the analysis area or fire perimeters. The Forest Plan Standards for moist sites would be met by all alternatives, despite the effects of nearby harvest and road construction. The analysis for Flathead National Forest's Forest Plan Amendment 21 assessed the forest-level viability of elk, mule deer, and white-tailed deer. Riparian area management and Amendment 19 motorized access restrictions will result in maintaining or improving habitat conditions consistent with Forest Plan direction.

The project area is within The Bob Marshall Wilderness Complex Elk Management Unit as defined in the Montana Elk Management Plan (MDFWP 1992, Exhibit Rb-3). All of the alternatives meet the two relevant habitat objectives for this unit as outlined in the plan. These include maintaining the current distribution of elk, and reducing the length of time that elk herds are dependent on winter ranges by managing productivity and security of fall elk habitats to delay migration to winter ranges (MDFWP 1992). The Montana Elk Management Plan also identifies the use of natural fire as a habitat management strategy for this unit. The proposed alternatives are in compliance with the goals, objectives, and strategies of The Montana Elk Management Plan (MDFWP 1992).

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