OLD GROWTH HABITAT AND OLD GROWTH ASSOCIATED WILDLIFE SPECIES

Introduction

Over the last 100 years, old forests in the Interior Columbia Basin have declined by 27 to 60% and large residual trees and snags have decreased by 20% (Quigley et al. 1996). Fire exclusion and timber harvest practices have altered the structure and composition of remaining forests throughout the Basin. These changes have often resulted in increased susceptibility to insects, disease, and high intensity fire. These changes have also contributed to declining habitat conditions for numerous species of wildlife, particularly those associated with old growth forests. This decrease in old growth forest has occurred within all subbasins of the Flathead National Forest (Amendment 21 of the Forest Plan).

Old growth is defined in Amendment 21 of the Flathead Forest Plan as "a community of forest vegetation that has reached a late stage of plant succession. The generic description is as follows:

- The age of the dominant cohort of trees is significantly older than the average time interval between natural disturbances (interval will vary depending upon forest cover type and habitat type);
- The dominant trees are approaching their average life expectancy on the site;
- Forest composition and structure are different from younger stands;
- Rates of change in composition and structure of the stand are slow relative to younger forests; and
- There is a significant showing of decadence (wide range of defect and breakage in both live and dead trees)."

Across any given landscape, old forests tend to achieve old growth characteristics at varying time scales and with a range of characteristics. "Old-Growth Forest Types of the Western Montana Zone" were used for Forest Plan Amendment 21 and for the West-Side Reservoir Post-Fire Project as the criteria to identify stands that may qualify as old growth habitat (Green et al. 1992, Exhibit Q-1).

The cool-moist forest comprising the majority of this area often has high conifer species diversity, with shade intolerant species including western larch, Douglas-fir, western white pine, lodgepole pine, and rarely ponderosa pine. Shade tolerant conifer species include subalpine fir, grand fir, and Englemann spruce. Deciduous trees such as cottonwood and aspen are occasionally present. Historical fire regimes were quite variable in the area, ranging up to approximately 130 years. Stands currently featuring fire-dependent seral old growth trees are expected to become gradually dominated by shade tolerant species that are more prone to lethal stand replacement fires (Elzinga and Shearer 1997). Many species such as

western white pine, lodgepole pine, subalpine fir, grand fir, and Englemann spruce are very susceptible to even low intensity understory burning and subsequent windthrow. Douglas-fir and Englemann spruce are vulnerable to insect infestations following stress associated with fires.

Old growth stands provide key habitat for many wildlife species. Attributes of old growth stands important for associated species include large canopy trees, large diameter snags and downed wood, as well as abundant fungi, mosses, and lichens. Amendment 21 of the Forest Plan designated a list of 31 old growth associated wildlife species (Exhibit Q-4 and Table 3-94). Included are several federally listed species, forest service sensitive species, current and former old growth management indicator species, and Neotropical migrants.

Table 3-94. Indicates old growth-associated wildlife species and important habitat components (Based on Amendment 21 of the Forest Plan).

Species	Cover Type	Canopy	Edge	Larger Patch Size	Snags	Down Logs
Bald Eagle (T)	Montane, near water, nest stand 125-600 acres	Open		+	+	
Lynx (T)	Montane and subalpine, gentle terrain; snowshoe hares				+	+
Black-backed Woodpecker (S)	Lower montane and Montane; recent post-fire				+	
Fisher (S)	Montane, mesic forest	Closed	-	+	+	+
Flammulated Owl (S)	Lower montane and montane, single-story	Open			+	
Harlequin Duck (S)	Swift mountain streams, riparian old growth (weak association)					+
Northern Goshawk (S)	Forest mosaic; open understory	Closed		+	+	
Boreal Owl	Subalpine forest mosaic			+	+	+
Tailed Frog	Cold, high gradient headwater streams					+
Vaux's Swift	Large hollow trees in late seral forest				+	
Pileated Wood-pecker	Lower montane and Montane	Closed		+	+	+
Lewis's Wood-pecker	Lower montane and old burns	Open			+	
Hairy Woodpecker	Snags and down logs				+	+
Three-Toed Woodpecker	Montane and subalpine; post-fire				+	
Hammond's Flycatcher	Late seral open canopy	Open				
Chestnut-Backed Chickadee	Low elevation forest especially cedar-hemlock	Closed	-		+	
Red-Breasted Nuthatch	Drier open forest	Open		+	+	
Pygmy Nuthatch	Large single-story ponderosa pine	Open			+	
White-breasted Nuthatch	Large single-story ponderosa pine	Open			+	

Species	Cover Type	Canopy	Edge	Larger Patch Size	Snags	Down Logs
Brown Creeper	Montane and subalpine; forages on and nests in bark of large trees	Closed	-		+	
Winter Wren	Montane and Subalpine, esp. riparian and cedar-hemlock		-	+	+	
Golden-crowned Kinglet	Especially cedar-hemlock and spruce fir	High volume		+	+	
Hermit Thrush	Dry late seral forests, saplings and shrubs	Open		+		
Varied Thrush	Cedar-hemlock and spruce-fir, multi-story	Closed		+		
Swainson's Thrush	Mesic forest with shrub understory			+		
Townsend's Warbler	Mesic forest, high canopy volume, and dense understory	Closed, high volume	-	+		
Pine Grosbeak	Montane and subalpine; seeds and buds					
Silver-haired Bat	Lower montane and montane; caves & snags for roosting				+	
Northern Flying Squirrel	Montane and subalpine; fungi			+	+	+
Southern Red-backed Vole	Montane and subalpine; vegetation, seeds, and fungi				+	+
American Marten	Montane and subalpine; small mammals	Closed	-	+	+	+
Woodland Caribou	Cedar-hemlock to subalpine; lichens	Closed		+		+

T = Threatened, S = Sensitive, + indicates important component or positive correlation, - indicates negative correlation.

Many wildlife species require specific attributes of old growth for varying habitat needs, such as nesting, denning, security, and foraging habitat. Many species of lichens, mosses, and plants are primarily found in old growth habitat. A closed canopy provides snow capture and reduces snow depths, insulates plants and animals from cold winds, and provides protection from predators. Some species such as the fisher are strongly tied to canopy cover and mature forest structure for the majority of their habitat needs. Other old growth associated wildlife species need only a portion of their home range to be in old growth. Examples include the Canada lynx, northern goshawk (Reynolds et al. 1992), American marten, pileated woodpeckers (McClelland et al. 1979), and bald eagles. Other species such as southern red-backed voles, chestnut-backed chickadee, red-breasted nuthatch, winter wren, brown creeper, Swainson's thrush, varied thrush, hermit thrush, and northern flying squirrels have relatively small home range sizes (less than 100 acres), with the necessary proportion of this home range being in old growth unknown.

Many biological relationships sensitive to disturbance provide complex dynamics that contribute to sustaining ecological stages including old growth. This is illustrated by the

pileated woodpecker, a "keystone" species that commonly uses western larch snags and trees for nesting, and provides cavities for species such as boreal owls, flammulated owls, and many other secondary cavity nesting birds including songbirds and Neotropical migrants, as well as mammals such as flying squirrels (McClelland and McClelland 1999). A disturbance can reduce living tree canopy cover to levels below that needed by the pileated woodpecker's main food source, carpenter ants, forcing the pileated to forage and possibly nest elsewhere. Carpenter ants, which live mostly in standing and downed wood, can drastically reduce populations of insect species causing large tree mortality such as spruce budworm (Torgersen 1996), the most widely distributed and destructive defoliator of coniferous forests in Western North America.

Effects of disturbance on old growth associated species vary at the landscape level. Conversion from one stand condition to another can be detrimental to some old growth associated species if amounts of their preferred habitat are at or near threshold levels or are dominated by linear patch shapes and limited interconnectedness (Keller and Anderson 1992). Reducing the block sizes of many late-seral patches can further fragment existing and future old growth habitat (Richards et al. 2002). Depending on landscape position and extent, harvest or fire can remove forested cover that provides habitat linkages that appear to be "key components in metapopulation functioning" for numerous species (Lidicker and Koenig 1996, Witmer et al. 1998).

The ability of some wildlife species to move across the landscape has been reduced by past fires, timber harvest, salvage, and habitat conversion. Habitat fragmentation and reduced connectivity result in susceptibility to stochastic catastrophic events such as climatic factors and disease, and long-term loss of genetic interchange (Lesica 1996, U.S. Forest Service and Bureau of Land Management 1996 and 1997). Strips of riparian old growth, as well as forested ridges and saddles are important travel corridors for many old growth associated species. Riparian corridors are particularly important for species such as fishers, harlequin ducks, and a variety of Neotropical migrants.

Many native species of wildlife and plants that inhabit these old growth forest ecosystems have adaptations that respond to patterns and processes of fire disturbance and recovery, while others do not. Many species of wildlife benefit from fire and are attracted to burns for the flush of nutrients and new vegetation. Primary and secondary cavity nesters and denning species often benefit from snags and down logs created by fire (see Neotropical Migrant and Snags and downed wood sections). Species such as the black-backed woodpecker may flourish in burned old growth barring disturbance from activities such as salvage. Fires often burned in complex mosaics of different fire intensities and unburned areas. Where old growth in the mosaic is continuous with other larger areas it still functions as old growth for most if not all species. Areas with low to moderate severity fire often have an intact canopy and quickly recovering under- and mid-stories, and will continue to function, or soon function again, as old growth for many species. Where the burns resulted in a largely intact and live overstory with an open under- and mid-story, nesting habitat for species such as the flammulated owl and northern goshawk is retained and foraging conditions may actually be improved.

In the past, stand-replacing fires left mosaics of habitats affected by various fire severities and unburned areas. In mixed-severity fire regime areas, the forested cover patches themselves

probably were much more persistent, as most stands may have functioned as forested cover despite fairly frequent underburns. Connectivity cover is often most persistent along riparian zones in both fire regimes.

Isolated pockets or patches of unburned old growth or areas of low intensity burning are important habitat components. Depending on the size of the patch and the specific old growth associated species, these pockets still fully function as old growth habitat or provide the necessary old growth attributes for some old growth associated species. These pockets also contribute to diversity across the landscape, and become core areas or initial staging areas for old growth associates using and recolonizing burned areas.

Harvest or burning in stands immediately adjacent to old growth often negatively affects old growth and associated species, but may have some positive effects. Harvesting or burning can remove edge buffer, reducing the effective size of old growth stands by altering interior habitats (Russell and Jones 2001). Salvage can exacerbate the edge contrast between burned and unburned areas. Weather-related effects have been found to penetrate over 165 feet into a stand; the invasion of exotic plants and penetration by predators and nest parasites may extend 1500 feet or more (Lidicker and Koenig 1996). On the other hand, adjacent management can accelerate regeneration, reduce the risk of insect infestation, and increase the diversity of future buffering canopy. The occurrence of roads can cause substantial edge effects on forested stands, sometimes more than the harvest areas they access (Reed, et al. 1996; Bate and Wisdom, in prep., Exhibit Rd-7). Roads that are open to the public expose many important wildlife habitat features in old growth and other forested stands to loss through firewood gathering and increased fire risk.

Some effects on old growth habitats are seen most clearly at the stand level and may benefit or adversely affect old growth species. For example, opening the understory can have negative short-term effects on many old growth dependent species such as the pileated woodpecker, red-backed vole, or golden-crowned kinglet. Conversely, open understory forests tend to favor species such as the northern goshawk, and flammulated owl.

The old growth stage of forest development is ephemeral as are other forest stages. Where higher burn severities occurred in old growth stands, particularly when the burn killed the large old trees of the stand, the stands are no longer old growth. They stands revert to the initial post-fire stage and will not function as old growth again, barring disturbance, for approximately 150 years or more. This increases the importance of maintaining and managing for recruitment old growth, which is an objective of the Flathead Forest Plan (Amendment 21). Large canopy trees experiencing mortality become large diameter snags and eventually downed wood, which is highly valuable forest structure for wildlife habitat. Loss of varying amounts of remaining older trees in the surrounding area from insect infestation is possible, particularly for fir and spruce.

Moderate to high severity fire in old growth generally precludes the burned area from functioning as old growth habitat for old growth associated species. The recovering burned areas can serve as foraging habitat for some species when old growth habitat is adjacent. In moderate to high severity burn areas the fires created an abundance of snags and down wood in all areas that had not been previously harvested. Retaining these attributes will allow these areas to function as old growth again much sooner than if these attributes are reduced or

removed. The larger snags and down wood will not be produced onsite again for approximately 150 years. The snags and down logs that result from fire serve a vital role in the structure and function of healthy forest ecosystems and play an important role in post-fire recovery and long-term site productivity. Snags and down logs provide food and shelter to wildlife, fish, insects, microbes and fungi. Large snags and down logs serve as a substrate for microorganisms, provide cover and feeding opportunities for invertebrates, act as perching, nesting, and roosting sites for birds, and provide dens and escape cover for mammals. Reducing downed wood and snags can remove habitat features that are essential or very important to many species, particularly for denning habitat of species such as marten, fisher (Witmer et al. 1998), and Canada lynx. Large downed logs provide for long-term soil productivity and serve as horizontal travel, resting and denning cover for wildlife. See the snags and downed wood section of this document for more detailed information.

Habitat types in northwestern Montana are generally highly productive. Vegetative recovery of trees, shrubs, forbs, and grasses will progress through natural succession at a pace dependent on climatic factors. The new forest may often be dominated by lodgepole pine across substantial areas, as lodgepole pine is adapted to respond quickly after fires. Larch, a historically dominant species in this area, will return, but likely at a lower proportion than the historically. This is a result of lower seed source quantity from past timber harvest. The same is true for white pine and whitebark pine. These species would be underrepresented in the recovering composition as a result of past harvest and reduced seed sources, introduced disease (blister rust), and bark beetles.

Where substantial portions of the large old overstory remains alive, the areas will return to functioning old growth much faster as they retain the minimum criteria of large old trees. This relatively quick recovery is further hastened by the retention of old growth associated attributes such as snags and downed wood.

Analysis Area

All lands within the boundaries of the Beta, Doe, Blackfoot, and Ball Fires (Exhibit Rg-2) were considered for the evaluation of direct and indirect effects on old growth associated species and their habitats. This approximately 49 square mile area (about 32,000 acres) is large enough to include the home ranges of numerous individuals or pairs of wildlife species and is representative of the effects of fires, natural tree mortality, timber harvest, and firewood cutting across the landscape. All of the actions proposed in the alternatives that could directly or indirectly affect old growth associated species 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). See also Exhibits Q-3, Rd-1, Rg-1, and Rs-13 through Rs-16 for Region-wide assessments of some key old growth associated species.

Information Sources

Data used in this analysis included pre and post-fire aerial photography, stand exam data, post-fire old growth field surveys (Exhibit Q-2), forest-wide GIS layers such as forest type and elevation, post-fire fire severities (Exhibit P-1), Amendment 21 old growth data (Exhibit Q-2), wildlife monitoring and observations (Exhibit Q-6), and research literature.

Affected Environment

Old Growth

Relatively effective fire suppression for the last approximately 70 years may have not have provided the spatial distribution and percentage of forest stand ages typical of natural processes. Dense understories and mid-story canopies have increased, increasing the risk of stand-replacing fire. Structures and processes typically provided by fire appear to be inadequately represented for some species. Additional forest structure and attributes necessary for old growth associated species are less than ideal in terms of amount, shape, size, distribution, and connectivity.

Approximately 15 percent of the 31,600 acres in the fire areas had commercial regeneration timber harvest (33% of the suitable timber base) prior to the fires and the proposed project. Another six percent had non-regenerating timber harvest including some timber salvage. None of this harvesting was done after Amendment 21 to the Forest Plan (USDA 1999a) came into effect.

Some past timber harvest specifically targeted the large and old trees in a stand, which are the minimum criteria for old growth stands (Exhibit Q-1). The tree densities and amounts of snags and downed wood left after harvest were typically much less than what would be left by natural processes. In some places, the cycle of removing the large trees in a stand occurred more than once in the same area. Past timber harvest and the road construction created a substantial increase in “edge effect,” across much of the analysis area where sun, wind, predators, competitors, etc., can penetrate further into what was previously interior forest. The trend in harvesting late-seral/structural stage forests has slowed considerably, but fuel accumulation and conditions favoring insects and disease have often increased.

Old growth inventories were conducted in the area west of Hungry Horse Reservoir before the 2003 fires (Exhibit Q-5). This information was refined after the fires using pre- and post-fire aerial photographs, stand exam data, and on-the-ground knowledge (Exhibit Q-2). The definition of old growth habitat was based on Western Montana Zone criteria from Green et al. (1992) and includes considerations based on tree age, size, stand structure, downed logs, etc. Old growth stands that burned at high severity were no longer considered old growth after the fires. In addition, whitewood stands (Englemann spruce, grand fir, subalpine fir, and white pine) that burned were no longer considered old growth given the susceptibility of these

species to even low severity fire. Stands of pre-fire old growth that burned continue to contain a range of elements of structure and function associated with old growth. The range of conditions found in such stands that burned at moderate severity is wide.

The combined results indicate that there are between 677 and 2798 acres of old growth within the Westside Reservoir fire perimeters (Table 3-95 and Figures 3-19 through 3-21). An additional 1167 acres that appear to be nearing old growth characteristics burned with low severity or were not burned. These stands have at least 10 trees per acre of larch or Douglas-fir over 17" DBH and had low fire severity.

Table 3-95. Acres and Percents of Old growth Habitat Before and After the 2003 Fires and that with Unknown Status, burn severities, and remaining old growth within fire perimeters (Exhibit Q-5).

Fire Area	Old Growth Before Fires	Old Growth Lost Due Fires	Pre-fire Old Growth with Uncertain Status	Post-fire Old Growth	Recruitment Old Growth
Beta/Doris	641 ac (12.0%)	342 ac	297 ac	2 to 200 ac (0.0 to 5.6%)	195 ac (3.6%)
Blackfoot/Doe	3293 ac (18.2%)	2015 ac	834 ac	443 to 1277 ac (2.4 to 7.0%)	675 ac (3.6%)
Ball	2597 ac (32.0%)	1374 ac	990 ac	233 to 1222 ac (2.8 to 15.1%)	294 ac (3.6%)
Total within Fires	6531 ac (20.7%)	3731 ac	2121 ac	677 to 2798 ac (2.1 to 8.9%)	1167 ac (3.7%)

The range of natural variability in the amount of late seral or old forest in the watershed representing the fire areas range from 8.5 percent to nearly 19.0 percent of the land area (Exhibit Q-8). Large, stand-replacing wildfires with long fire-free intervals were not unusual for the natural disturbance regime of these generally moist and cool forests. Approximately 11,400 to 13,500 acres currently appear to be old growth following the fires within the analysis area (Exhibit Q-5). This represents 9.0 to 10.6 percent of the land base capable of producing old growth habitat in the analysis area, which is within the 75 percent range around the historic range of variability for old growth habitat. Approximately 74,000 acres (43%) of USFS land are also in a late seral/structural stage (Exhibit Q-5) but are lacking in attributes associated with old growth. Activities such as timber harvest have set back succession in many areas, and much of the area does not have the potential to function as old growth for decades.

The amount of edge between forested and early-seral/structural stage stands across the area is extensive. Edge habitat results from timber harvest and fire, as well as wetlands and rocky areas. Numerous widely scattered regeneration harvest units are adjacent to many isolated patches of old growth. As the land area occupied by younger stands has increased, patches of older forests invariably have become farther apart. This has reduced the "interior integrity" of these stands, reducing (though not negating) their value as old growth habitat. Forested connections between old growth patches have been narrowed or severed by past timber harvest. Effective corridors should be wide enough to "contain a band of habitat unscathed by edge effects" relevant to species that rarely venture out of their preferred habitats (Lidicker and Koenig 1996).

Figure 3-19. Status of Old Growth Habitat in the Beta and Doe Fire Areas.

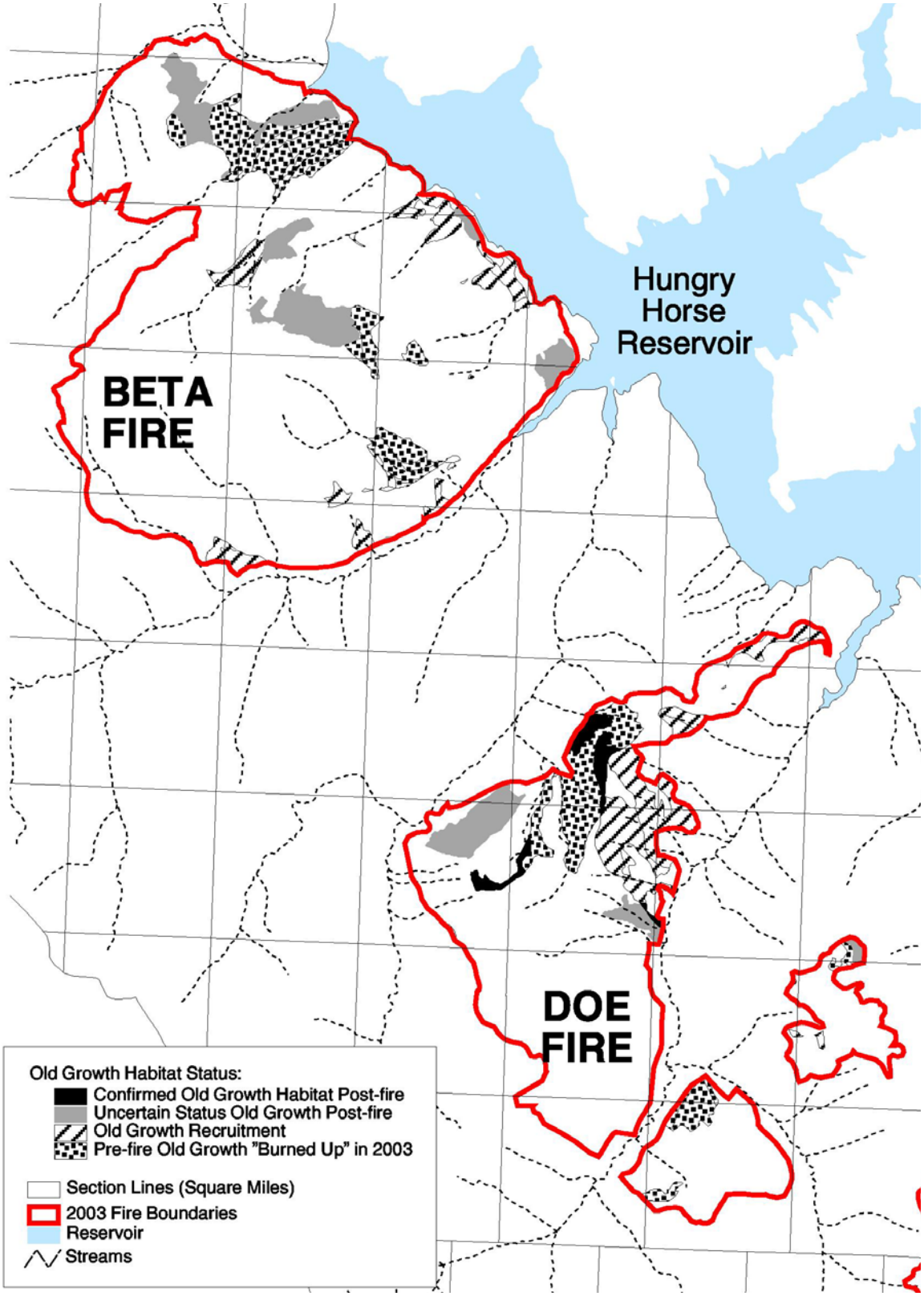


Figure 3-20. Status of Old Growth Habitat in the Blackfoot Fire Area.

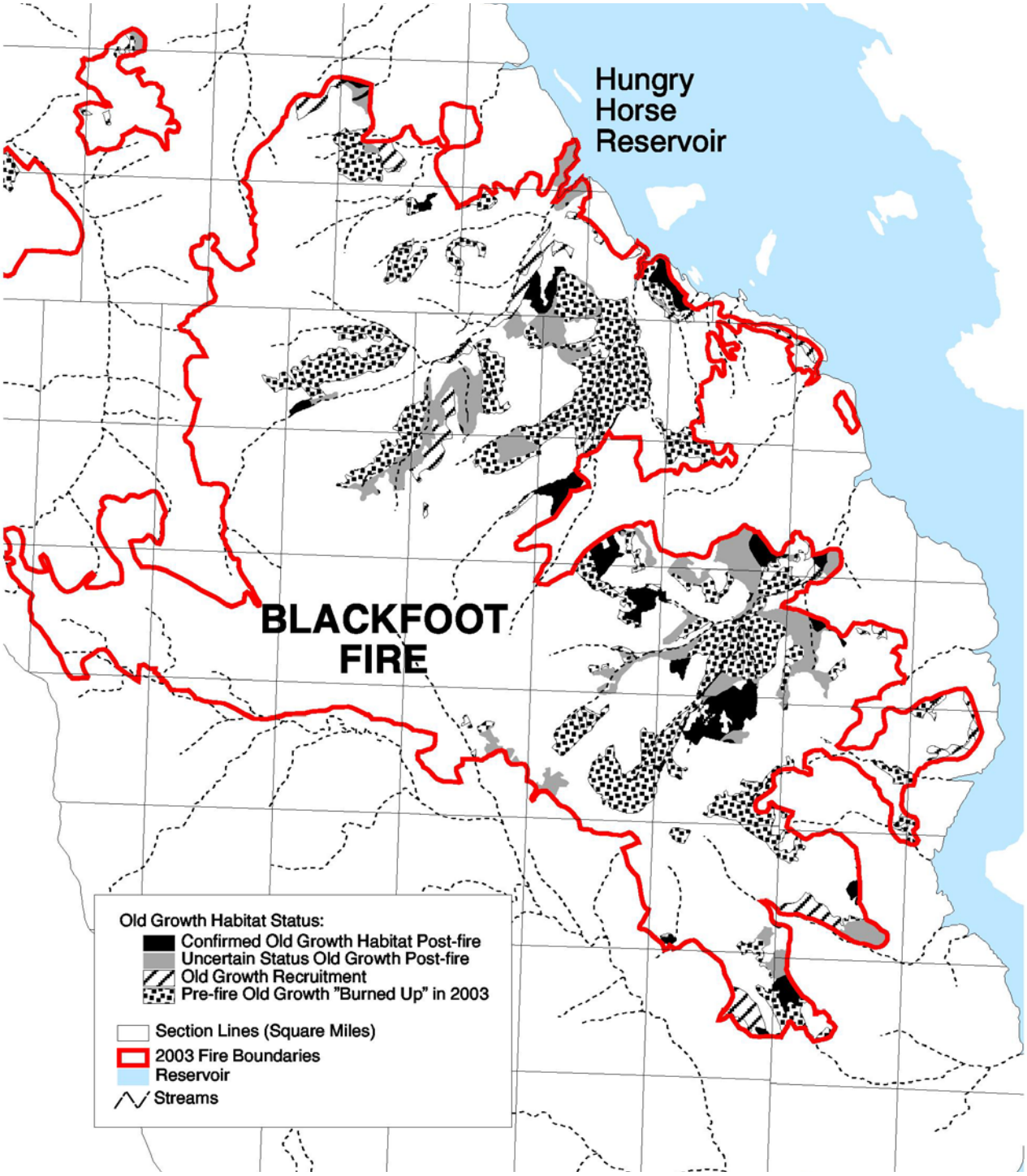
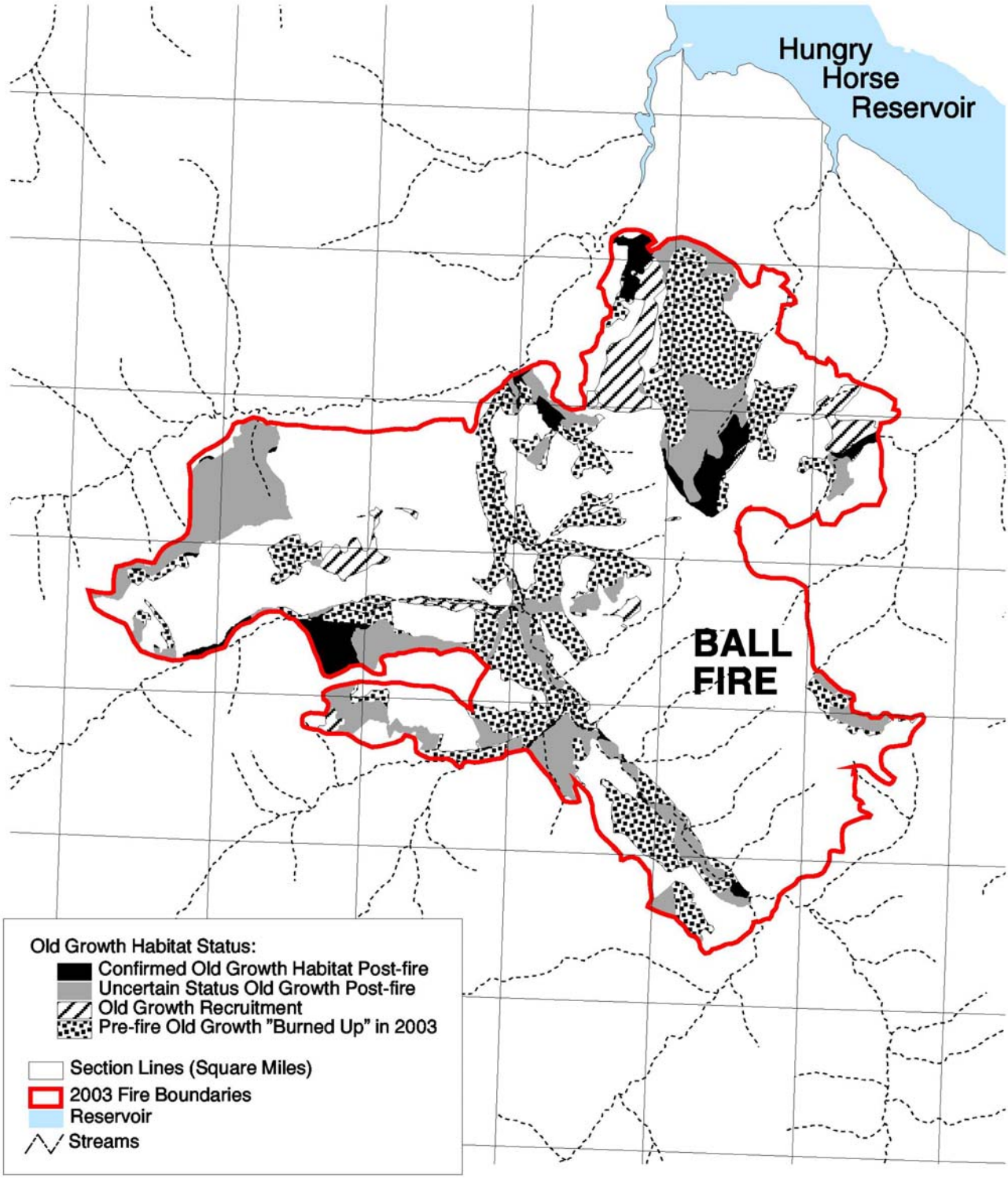


Figure 3-21. Status of Old Growth Habitat in the Ball Fire Area.



The fires burned in old growth habitat at varying severities (Table 3-95, above). From 677 to 2798 acres of old growth are estimated to remain in the burned area and would continue to provide the structure and function of old growth stands. Stands with substantial western larch and Douglas-fir often maintained a live canopy while much of the under and mid-stories burned. Other stands dominated by Englemann spruce, subalpine fir, and grand fir experienced high canopy mortality with even a low understory burn.

There are some relatively small pockets of old growth that survived within areas that burned at moderate to high severity. These pockets would function as old growth for some old growth associated species. These small pockets are highly valuable wildlife habitat and will likely provide key core areas as old growth associates again begin using the recovering burned area.

Old growth near water sources has particular value for wildlife providing travel corridors, summer thermal cover, old forest habitat, diverse foraging habitat, and a diversity of structural conditions. The strips of riparian forest are highly valued wildlife travel corridors, particularly in situations where past harvest has fragmented the forest cover to some degree and converted areas to early seral stages, as has occurred in much of the fire areas. A high proportion of old growth is typically located in riparian areas, as these areas contain productive growing sites and experience the longest fire-free intervals, as well as being less likely to have had timber harvest. The spruce and subalpine fir forest type dominates the riparian areas in most drainages of the South Fork Flathead River. In late seral/old forest stands, loss of many of the live, large diameter overstory trees in riparian and upland areas from beetles, fire stress, or harvest, would reduce this critical component of old growth. After dying, these large trees would still be highly valuable forest structural and wildlife habitat components as large diameter snags and eventually downed wood.

There are 2121 acres of post-fire old growth or older mature forests dominated by live western larch and Douglas fir overstories that experienced low to moderate burn severity (Exhibit Q-5). Much of these areas either remain old growth or have substantial old growth structure. Some of these areas fall short of containing all associated attributes at sufficient levels to be old growth. These areas contain much of the values associated with old or late seral forests, particularly the older, larger overstory tree layer, and would develop a full compliment of old growth characteristics sooner than other more burned or salvaged stands.

Environmental Consequences

Effects on old growth habitat and old growth associated species relate directly to two issues discussed in Chapter 1. These are Issue #9, regarding uncertain and recruitment old growth, and Issue #10, regarding burned-up old growth. The issue indicators used involve: acres of salvage harvest in these types of habitat. Issue #9 was instrumental in the development of Alternative C. One other issue, #5, which includes open road density standards is also related to old growth associated species due to the vulnerability of snag and downed wood habitats to firewood cutting.

Direct and Indirect Effects

Alternative A (No Action)

No management actions would be taken with this alternative, and barring future disturbance, old growth species and communities would eventually return to many of the burned areas. Barring disturbance, succession would progress until a late seral or "old growth" structure again develops in approximately 150 years or more. Some additional mortality would still occur in fire-stressed old growth trees from factors such as cambium damage, increased spruce and Douglas-fir beetle infestation, and blow down. These dead trees would contribute to high value wildlife habitat as standing snags and large downed wood.

Many of the old growth areas that experienced low to moderate burn severity have the associated attributes of live, old, large trees, pre- and post-fire snags, decay, and downed wood. The attributes that are most limiting in these areas following the fires are also the attributes capable of the most rapid recovery. Understory vegetation was already returning the summer of 2004 and mid-story vegetation will follow over the next approximately 5 to 15 years. Multiple canopy layers and substantial variation in diameters will take at least 30 years to develop.

Retaining all live trees, pre-fire and fire-killed snags, and downed logs would allow the area to recover to habitat suitable for old growth associates such as pileated woodpeckers, brown creepers, northern flying squirrels, southern red-backed voles, and many others (Forest Plan Amendment 21; Warren 1998) much sooner than if these attributes were removed or further reduced.

Alternative B (Proposed Action)

Salvage activities will influence time of recovery to old growth, patch size and shape, the degree of high-contrast edge, and levels of forested connectivity, which all affect wildlife and habitat use in the area. About 766 acres that may still be old growth are proposed for salvage in this alternative (Exhibit Q-7), as shown in Table 3-96. These areas will be field-reviewed for old growth habitat attributes in Summer 2004. In addition, Alternative B would salvage 179 acres identified as recruitment old growth. These stands have at least 10 trees per acre of larch or Douglas-fir over 17" DBH and had low fire severity, but do not quality as old growth habitat. It is likely that salvage would delay the attainment of old growth characteristics as well as result in lesser-quality habitat, due to the reduction in large snags and downed wood. Approximately 1279 acres of pre-fire old growth that burned and is clearly no longer old growth habitat is included within salvage units. No salvage is proposed within areas that are known to be old growth habitat.

Table 3-96. Proposed Salvage in Known, Uncertain, Old Growth Habitat (Exhibit Q-7).

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
Old Growth Lost Due Fires	0 ac	1279 ac	1166 ac	1271 ac	1271 ac
Recruitment Old Growth	0 ac	179 ac	0 ac	177 ac	177 ac
Pre-fire Old Growth with Uncertain Status (to be field checked, summer 2004)	0 ac	766 ac	0 ac	766 ac	766 ac
Known Post-fire Old Growth	0 ac	0 ac	0 ac	0 ac	0 ac

Within some of the more burned areas, there are patches of unburned old growth and low to moderately burned old growth with an intact live canopy. Where larger than 5 acres, these patches are excluded from salvage. Leaving all live trees in these and all other areas (Appendix E) would create additional patches of relatively intact old growth canopy which would allow these areas to recover to old growth habitat values much faster than if they had been felled or harvested.

New edge along remaining old growth would not be created, but edge contrast will increase as salvage units adjacent to remaining old growth are harvested. This high contrast edge increases edge habitat but is not the gradual ecotone often preferred by wildlife. Additionally there will be an increased risk of blowdown in the adjacent old growth.

Timber salvage may sever or narrow forested connections that served as wildlife travel corridors. Salvage would likely further contribute to the highly fragmented landscape that has resulted from the fires and past timber harvest. Leaving larger-diameter snag and downed-wood "legacy material" would improve the ability for recovering stands to provide connectivity. Fire-killed snags provide some security cover, and these fire-killed snags and downed wood increase the likelihood of traversal by species seeking more continuous live forest habitat. The retention of all live trees, western larch or Douglas-fir fire-killed snags above a certain DBH, riparian buffers, and some additional leave patch area would result in much better habitat than if these criteria were not maintained.

Where the fires burned at high intensities the salvage operations would incrementally increase the loss of old growth habitat values such as Canada lynx denning, fisher denning and foraging, marten denning and feeding, boreal owl nesting, and pileated woodpecker nesting and feeding. Salvage would lengthen the time interval until these habitat values return. Salvage would directly reduce habitat for some species such as the black-backed woodpecker. The proposed action targets dead or dying trees and would leave live trees where they occur, wildlife snags and other fire-killed snags according to the snag emphasis guidelines, and downed wood according to forest standards. Added snag retention emphasis in pre-fire old growth and the leaving of all live trees would allow the areas to progress to old growth again at a faster rate than if these components were further reduced.

Reducing open road density and motorized trail access in the area would have positive effects on old growth and associated species by decreasing the effects of fragmentation, firewood harvest, and disturbance. Road decommissioning will have minor effects where decommissioned roads traverse old growth habitat.

Alternative C

The effects of this alternative would be similar to those in Alternative B with the following exceptions and additions. In general, a decrease in the acreage salvaged would decrease the potential negative effects on old growth and old growth recruitment. Dropping the riparian "R" units proposed in Alternative B may prevent further severing of habitat along riparian corridors. This effect would be enhanced where the "R" units were along roads that would be closed as a result of access management and thus less susceptible to firewood cutting. Reducing motorized trails may provide for increased security. Road decommissioning would result in short-term and temporary disturbance. Decreased open road access with this alternative would protect additional snag habitat from firewood cutting, allowing more snags to be retained in salvage units along roads that would be open under Alternative B. Most of the reduction in the "low" snag emphasis level (Snags and Downed Wood section, Table 3-96) results from this change.

Of particular benefit or potential benefit to the old growth resource are the following alternative specifics: 1) Dropping all units or parts of units with low severity burn if the stand has a high level of live western larch and Douglas-fir. These stands are not currently old growth but may reach old growth status faster and be of higher quality if left unsalvaged. 2) Dropping all units or parts of units with low or moderate severity burns that were western larch and Douglas-fir old growth before the fire. Some of these units or parts of units may still be old growth habitat, which will be determined during field surveys in Summer 2004.

Alternatives D and E

The effects of Alternatives D and E would be similar to those in Alternative B with the following exceptions and additions. In general, increases in the area salvaged would increase the potential negative effects on old growth and old growth recruitment. Reducing snag retention emphasis, decreasing snag leave patch size, and increasing minimum snag diameters would remove additional snags and future large downed wood, increasing the length of time until these areas could again function as old growth habitat or supply the particular old growth habitat components necessary for specific old growth associated species. Salvaging the riparian "R" units may further sever riparian corridors. Increased motorized access would negatively affect snag habitat by allowing more snags to be cut as firewood, while decreasing snag retention emphasis in some units because of potential firewood cutting in some areas.

Cumulative Effects

Past fires, timber harvest, salvage, and habitat conversion have resulted in fragmented old growth forests and reduced habitat connectivity. This has reduced the ability of some wildlife populations to move across the landscape, resulting in greater susceptibility to stochastic events and long-term loss of genetic interchange (Lesica 1996). Some past timber harvest specifically targeted the minimum criteria for old growth stands and large, old trees. Large downed wood has often been reduced during harvest operations and the removal of large trees

reduces the accumulation of large downed wood for the foreseeable future. Increased edge and early seral habitat result in changing habitat conditions that favor non-old growth associates. These other species can prey on or compete with old growth associated species. Competition within old growth associated species may increase in the remaining old growth habitat. No vegetation management activities are planned on national forest lands in the analysis area in addition to those proposed in the action alternatives. Old growth habitat in a large area running east of the proposed actions was lost to submergence during the creation of the Hungry Horse Reservoir.

Fire suppression efforts contributed to a change in structure of some old growth habitat by increased understory growth and denser mid-canopy trees (Lesica 1996). This reduced foraging habitat for species preferring a more open understory such as flammulated owls and northern goshawks. These structural changes have resulted in an increased risk of a stand replacement wildfire in old growth areas.

Roads in the area dissect and fragment old growth habitat. Roads form physical and habitat barriers, increase risk of predation, create vehicle caused mortality, and increase access for trapping, hunting, and poaching. Across the analysis area, open roads facilitate access for firewood cutters, decreasing the snags and downed woody material important for many wildlife and plants using old growth habitat.

During the fires of 2003, fire suppression efforts and activities such as hazard tree felling affected old growth where they occurred in this habitat. Fire suppression efforts also protected old growth habitat from the fires.

Future road building, fire suppression, timber harvest, and other human activities in the area will have cumulative effects on old growth habitat. There may also be cumulative effects from future wildfires and insects and disease, particularly when affecting large old canopy trees.

See the Snags and Downed Wood Habitat section above for more information about cumulative effects relevant to old growth habitats.

REGULATORY FRAMEWORK

The National Forest Management Act (NFMA) requires forest plans “preserve and enhance the diversity of plant and animal communities” and that forests will manage for maintenance of “viable populations of existing native and desired non-native vertebrate species.”

Amendment 21 to the Forest Plan has a **goal** (B10) to “maintain and recruit old growth forests to an amount and distribution that is within the 75 percent range around the median of the historical range of variability. Where current conditions are below this amount, actively manage to recruit additional old growth.”

For species associated with old growth forests, the Forest Plan has **objectives** to “maintain ecological processes and provide for natural patch size distribution” (Objective A4g) and to “manage landscape patterns to develop larger old growth patch sizes where needed to satisfy

wildlife habitat requirements." Objective A6c(3) provides direction to "restore the amount and distribution of old growth forests to within the historical range of variability. At the stand level, Objective A6c(1)(a) protects existing old growth forests, prescribing management actions "when necessary to maintain or restore old growth forest conditions consistent with native disturbance and succession regimes." Objective A6c(2)(a) directs the emphasis of "old growth development in stands that are most likely to persist under native disturbance regimes, and that provide a patch size and pattern most advantageous to old growth associated wildlife species."

Standards given in Amendment 21 include managing for old growth associated wildlife by protecting old growth forest consistent with the Vegetation Standard Section H6. To the extent feasible, such vegetation management within old growth "shall retain old growth composition and structure consistent with native disturbance and succession regimes." In warm-moist and cool-moist Potential Vegetation Groups, "large multistory or single-story conditions and shade intolerant species such as western larch, western white pine, ponderosa pine, and Douglas-fir" are to be maintained or restored. Standard F4 requires the modification of treatments "as needed to meet habitat needs of old growth associated species", including modifying the "timing, extent, and intensity of vegetation treatments where needed to satisfy wildlife habitat requirements…."

The Flathead LRMP Amendment 21 named all sensitive wildlife species as Management Indicator Species (MIS), seven of which represent the spectrum of old growth habitats on the Flathead National Forest (Exhibit Q-4). These are the bald eagle, flammulated owl, boreal owl, black-backed woodpecker, fisher, Canada lynx, and northern goshawk. Conditions favorable to these species would generally also benefit other old-growth associated species found within the analysis area, such as brown creepers, Townsend's warblers, winter wrens, and northern flying squirrels, all of which are considered under the umbrella of MIS evaluation. The Flathead National Forest formerly used the pileated woodpecker, barred owl, and marten as Management Indicator Species (MIS) to represent species dependent on old growth stand characteristics. Amendment 21 replaced these by designating all sensitive wildlife species as Management Indicator Species and by developing a list of old growth associated species.

REGULATORY CONSISTENCY

Implementation of all alternatives would comply with the standards contained in the Forest Plan related to old growth. However, Alternatives B, D, and E would not respond as well as Alternatives A and C to the objectives and overall goals of old growth management on the Flathead National Forest. Alternatives B, D, and E would salvage in areas that were old growth before the 2003 fires and that may still function as old growth habitat. However, design criteria would require any areas that are still old growth to be dropped from units, and these areas will be field-reviewed for old growth habitat attributes in Summer 2004. Other areas within some of the proposed salvage units were identified as recruitment old growth. See Exhibit Q-10 for more information.

Effects on former Old Growth Management Indicator Species (pileated woodpecker, marten, and barred owl) are discussed in the section of this chapter on Snags and Downed Wood Habitat, in addition to this section (Exhibits Q-3, Q-4, Q-6, Q-9, Rd-1, and Rg-5).