SNAGS AND DOWNED WOODY MATERIAL WILDLIFE HABITAT

Introduction

Snags, broken-topped live trees, downed logs, and other woody material are required by a wide variety of species for nesting, denning, roosting, perching, feeding, and cover. Within the Flathead National Forest, 42 species of birds and 10 species of mammals depend on cavity habitat for nesting, feeding, or shelter (Exhibit Rd-2). These include threatened and sensitive wildlife species (Tables 3-87 and 3-88) and Neotropical migrants that are "Birds of Conservation Concern" (Exhibit Rn-1).

The number, species, size, and distribution of available snags strongly affect snag-dependent wildlife (Bull, et al. 1997). An insufficient number of suitable snags may limit or eliminate populations of cavity-using species (Thomas, et al. 1979, Saab and Dudley 1998). Because most cavity-using birds eat insects, they can substantially reduce tree mortality and damage caused by forest pest insects (Torgersen, et al. 1990, Torgersen 1996, Jackman 1975, Bull, et al. 1997). Snags with old nesting cavities, broken tops, and decay are most likely to be used (Bull, et al. 1986). Although smaller creatures can use many sizes of dead trees, larger birds and mammals require larger snags. The larger the diameter of the snag, the less the nestlings are crowded and the better they are protected from weather and predators. In the Logan Creek area, western larch and black cottonwood snags appear to receive the most use by wildlife, with little use of spruce, subalpine fir, and lodgepole pine. This may be related to the fact that these latter species, live or dead, have less resistance to windthrow. The various species of cavity nesters all appear to use different microhabitats. For these reasons, homogenously managed stands are likely to not provide habitat for many species (Hutto 1995b).

Downed trees and other woody material are also critically important for many species (Bull 2002). Downed logs and stumps are required for resting and denning are vital for hunting below the snow in winter (Buskirk and Ruggiero 1994), and are used as travel cover, particularly when living plant cover is absent. American marten often den and forage in the under-snow cavities that occur under downed logs (Bull and Blumton 1999, Witmer et al. 1998). All 13 of the Canada lynx dens known in the Seeley-Swan area are associated with abundant woody debris, usually large diameter logs. Several amphibians and reptiles make use of large woody debris for shelter and breeding sites (Bull, et al. 1997). Many ant species that need large-diameter downed logs prey on substantial numbers of tree defoliating insects such as western spruce budworm (Torgersen and Bull 1995).

Larger-diameter downed trees are generally most important because they provide stable and lasting structures as well as better protection from weather extremes (Bull 2002). Longer pieces provide better runways, shelter under suspended logs, and access to under-snow habitats. A variety of sizes and decay classes are needed in downed wood "in order to conserve functional processes that foster sustainable forest ecosystems" (Torgersen and Bull 1995).

Timber harvest, insects, disease, fires, and firewood cutting can directly affect the availability of snag and downed wood habitat. Harvest activities often create large accumulations of downed woody material. However, this is generally of smaller diameter, and much of it is cleared from the forest floor for fuel hazard reduction and future tree regeneration. Removal of intact, windfirm snags such as western larch and Douglas-fir has greater impacts on wildlife species than removal of non-windfirm snags such as lodgepole pine. Stand-replacing wildland fires dramatically increase the availability of snag and downed wood habitat features unless they are consumed by reburn. See Exhibit Rd-4 for more information.

Effects on snag and downed wood habitat are directly related to four issues discussed in Chapter 1. There are ties between species using snag and downed woody material habitats and Issue 1, "Wildlife Security"; Issue 2, "Effects on existing old growth habitat and on late-seral/structural stage forests"; Issue 3, "Landscape dynamics—Connectivity"; and Issue 4, "Landscape dynamics--Seral/structural stage patch size and shapes." The No-Action Alternative could affect this habitat through an increased probability of stand-replacement fire. The action alternatives would remove some snags and downed woody material from proposed timber harvest and underburning units. It is prohibitively difficult to artificially restore snags or downed logs, and natural restoration of snag or downed wood habitat can take decades or even centuries.

Differences Between the DEIS and FEIS

This section of the FEIS entitled Snags and Downed Woody Material Wildlife Habitat differs from the same section in the DEIS in that analysis for Alternative F was included. Additional citations were referred to (Bull 2002, Bull and Blumton 1999, Witmer et al. 1998, and Hillis et al. 2003). Other changes include a reference to a Project File exhibit related to post-sale monitoring, a more complete explanation of Table 3-70, a correction in the maximum tonnages of downed wood expected after implementation, and a change in the text that describes how some piles would be left unburned.

Information Sources

Existing conditions and effects on snag and downed wood habitat were analyzed by evaluating the live tree and downed wood retention levels prescribed for the timber harvest and burning units (Exhibit Rd-3). Vulnerability to loss via firewood cutting was assessed via a GIS analysis that modeled areas within 200 feet of roads (Exhibit Rd-1). For a description of edge effects on these habitat features in old growth habitats, see the "Old Growth Habitat and Old Growth Associated Wildlife Species" section of this chapter. Population viability concerns at the Flathead National Forest and larger scales are assessed in Exhibit Rg-1. This analysis covered the standing and downed dead wood resource in terrestrial areas. See the Fisheries section of this document for consideration of "coarse woody debris" recruitment in aquatic systems.

Analysis Area

The analysis area for the snag and downed wood wildlife habitat resource is the Logan Creek watershed down to the confluence with Good Creek, but excluding the Griffin and Sheppard drainages. This area is the same as the Logan Geographic Unit used for Ecosystem Analysis at the Watershed Scale. At approximately 61,266 acres (96 square miles), it is large enough to include the home range of numerous wildlife species using snag and downed woody material habitats and is representative of effects of fires, natural tree mortality, timber harvest, and firewood cutting across the landscape. It is sufficiently large to evaluate the ability of the habitat to support populations of wildlife and plant species using dead wood habitats, but small enough to not obscure effects of the alternatives. All snag habitat attributes are distributed across this area. All of the actions proposed in the alternatives are contained within this area. A larger-scale assessment was also conducted to address cumulative effects and population viability concerns (Exhibit Rg-1).

Affected Environment

Large durable snags are believed to have decreased substantially west of the Continental Divide (Hillis et al. 2003; Exhibit Rd-9). Losses from timber harvest and firewood cutting have been substantial and widespread. In addition, there has been a dramatic decline in low to moderate severity fires, which are critical for the recruitment of large snags and for increasing snag durability (ibid).

The character of snag and downed wood habitat varies dramatically across the Logan Creek area, largely depending on recent disturbance history (Exhibit Q-8). Fire was the dominant disturbance in the watershed prior to the 1940s, and extensive areas of snag habitat often occurred in areas dominated by a stand-replacing fire regime. In mixed-severity fire regime areas, underburns occasionally killed large trees and stand-replacement fires were infrequent. Large larch snags are still well distributed across the area from fires early in this century. A mountain pine beetle epidemic swept through the area in early 1980s and many of the dead trees were salvaged. Since 1998, about 5500 acres have had high levels of mortality of large trees due to Douglas-fir beetles, with about 13,000 additional acres at moderate to high risk of this mortality (Exhibits P-1 and Rd-5). Western balsam bark beetle levels also appear to be high, possibly at the high end of endemic levels. Other tree-killing insects and diseases appear to be at endemic levels.

For downed wood habitat, we used data collected in the Good Creek drainage, immediately adjacent to the north and ecologically very similar to Logan Creek (Table 3-68 and Exhibit Rd-3). An analysis of downed wood data collected across the Good Creek analysis area for the evaluation of fuel hazard shows that the amounts of downed wood are highly variable across the landscape, ranging from less than one ton per acre to over 130 tons per acre. The distribution of sizes, species, and condition of downed wood also varies dramatically within and between stands, forest types, seral/structural stages, and fire regimes. “Late” seral-structural stage corresponds to the areas of high-quality downed log habitat; “mid” seral-structural stage corresponds to the areas of moderate-quality downed log habitat. Downed log surveys in the Logan Creek drainage were reviewed as a further check (Exhibit Rd-3). These

levels are not indicative of historical conditions because they reflect many years of fire suppression, tree harvest, and firewood cutting across the landscape.

Table 3-68. Downed wood habitat conditions in the adjacent Good Creek drainage extrapolated to areas of National Forest System Lands in the Logan Creek area.

Down Wood Habitat Class	Assumed Average Tonnage	Acres
Mid-seral/structural forest	19.7 tons per acre (>8 tons per acre 11 to 30" diameter)	12,365
Late-seral/structural forest	30.9 tons per acre (>17 tons per acre 11 to 30" diameter)	30,255

Past logging and firewood cutting have acted to reduce snag availability. About 26 percent of the analysis area has been clear-cut or seed-tree harvested. Most timber harvesting activities left relatively few snags and large pieces of downed wood, particularly when lodgepole pine stands were harvested. Only the Swaney Salvage Sale was completed after Flathead Forest Plan Amendment 21 (USDA 1999a) came into effect in January 1999 (post-activity monitoring of dead wood for this sale is shown in Exhibit Rd-10). In the Logan Creek area, 11,243 acres of regenerated stands (18 percent of the analysis area) have no snags visible on recent aerial photographs. Nevertheless, overall snag and downed wood habitat may be more available across the analysis area than in the past, as snags are visible in 73 percent of the unharvested areas (Exhibit Rd-8). These areas are well-distributed across the analysis area and are likely due to the current Douglas-fir beetle infestation and past epidemics of mountain pine beetles in lodgepole pine. Firewood cutters can remove dead trees from about 10 percent of the watershed, where over 5900 acres of forest are within 200 feet of roads that are open either yearlong or in July and August of each year (Exhibit Rd-1).

Recruitment snags (currently live trees) are abundant across the landscape, although in many stands desirable tree species for snags are sparse or do not occur. This would include dense lodgepole pine stands, which have few trees expected to provide either the green tree component or future high-quality snags for cavities and feeding. See the Vegetation and Fire sections of this document and Exhibit Q-8 for more information.

Numerous wildlife species make use of snag and downed wood habitat in the Logan Creek area. Exhibits Q-4 and Q-16 display occupation by old growth associated species.

For more information about dead wood habitat conditions across the Flathead National Forest, see the Final Environmental Impact Statement for the Flathead's LRMP Amendment 21 (USDA 1999a) and Exhibits Rd-9, Rg-1, and Rg-3.

Environmental Consequences

Direct and Indirect Effects

Alternative A – No Action

No new activities are proposed with this alternative. This would leave snag and downed wood habitat across the area to continue with relatively natural processes, along with fire suppression, occasional felling of hazard trees, and firewood gathering. Wind-firm snags would fall, taking one to over 100 years, depending on variables such as tree species, size, soil moisture, slope position, topography, wind patterns, and buffering by other standing trees or snags. Trees would continue to succumb to Douglas-fir beetles, along with lesser levels of mortality due to other insects and pathogens. In the Logan Creek area, this can be expected to create up to 40 Douglas-fir snags per acre, with up to 10 per acre of these being 20 inches at Diameter Breast Height (DBH) or greater. In the absence of windstorms or wildland fire, most stands dominated by dead and dying trees would gradually unravel, with few trees or snags standing in these stands after 10 to 50 years. However, even in some of the relatively high mortality areas, enough western larch and Douglas-fir would likely survive to provide both the green tree component and future high-quality snags for cavities and feeding. Downed logs, shading from snags, and lack of seed sources would delay the regeneration of new trees in some stands, with little or no potential for regeneration of western larch, which is preferred by numerous wildlife species for cavity nesting. The probability of stand-replacing wildland fire would increase in such areas as dead trees fall and new understory growth contributes more fine fuels, as discussed in the "Vegetation" and "Fire and Fuels" sections of this chapter. Such fire would increase the availability of snag habitat over the short term, along with the reduction of living tree canopy over large areas. Large stand-replacement fires would favor species associated with recent burns and the resulting large numbers of snags and woody debris. This array of effects would have positive aspects for some species and negative for others, depending on the intensity of the effects, as well as on varying spatial and temporal scales.

Preliminary research suggests that about half of the snags within 200 feet of roads are felled for firewood, especially when screening cover has been removed (Bate and Wisdom, in prep.). Large western larch, ponderosa pine, and Douglas-fir snags are very rare in such corridors in northwest Montana. No additional road closures are planned with implementation of this alternative, leaving approximately 1.27 miles per acre open across the analysis area in summer or yearlong (Exhibit Rg-8). This would leave valuable snag and downed wood habitat vulnerable to firewood cutting along open roads as shown in the Table 3-69, which also presents vulnerability to firewood cutting for the action alternatives B, C, D, E, and F. Firewood cutting is prohibited within 300 feet of any stream, river, or lake on the Tally Lake Ranger District (Exhibit Rd-7). This should help protect snags and downed, particularly along Logan, Reid, Taylor, and Oettiker Creeks.

Table 3-69. Vulnerability to loss of snag and downed wood habitat in forested stands due to firewood cutting (Exhibit Rd-1)

Alt.	Total acres within 200' of open roads	Mid-seral/structural Stage and Late-seral/structural Stage Stands		
		Acres within 200' of open road	% of area within 200' of open road	% of this habitat across analysis area
A	5887 ac	3706 ac	64%	8.8%
B	5410 ac	3016 ac	56%	8.3%
C	5410 ac	3100 ac	57%	8.0%
D	5410 ac	3173 ac	59%	8.2%
E	5410 ac	3065 ac	57%	8.3%
F	5410 ac	3065 ac	57%	8.3%

Alternatives B, C, D, E and F

These alternatives are discussed together due to the similarity of their effects on the snag and downed wood habitat resource. They propose timber harvest in up to 754 acres of mid-seral/structural forest and 4994 acres of late seral/structural forest, as shown in Table 3-70. The "late" seral-structural stage corresponds to the areas of high-quality downed log habitat; "mid" seral-structural stage corresponds to the areas of moderate-quality downed log habitat. Regeneration harvest (LDR and MDR in Table 3-70), would remove forested cover needed by many species using snags and downed wood, although the larger "legacy" material would persist into the next forest grown on these sites. Heavy retention areas would remain functional habitat for most of these species. Retention levels for live trees were increased in some units in Alternatives C, D, E, and F, which would result in additional snags over time.

Table 3-70. Acres of Timber Harvest and Burning Relevant to Snags and Downed Wood Habitat across the Analysis Area, in acres (Exhibit Rd-3).

Alt.	Acres, Mid-seral/structural Stage				Acres, Late-seral/structural Stage			
	LDR	MDR	HDR	HAR	LDR	MDR	HDR	HAR
B	316	439	243	193	695	4299	1185	20
C	115	381	320	193	403	2261	1302	20
D	29	206	432	193	294	2674	1644	20
E	298	433	248	193	621	3794	1477	20
F	192	282	447	193	418	2815	1825	116

Tree retention levels: LDR = Light dispersed retention, MDR = Moderate dispersed retention, HDR = Heavy dispersed retention, and HAR = Heavy Aggregated retention.

All live and dead larch and ponderosa pine greater than 18 inches at DBH would be left standing, unless this would compromise safety. All snags deemed to be hazardous could be felled in these areas, although they would be left on-site. Wherever present, at least two per acre Douglas-fir greater than 25 inches DBH would be retained, unless they are infested with Douglas-fir bark beetles at the time of marking, or where leaving them would compromise safety. Douglas-fir beetles are known to occur at relatively high levels in several units (Exhibit Rd-5). Efforts would be made to protect high-quality snags for wildlife, but skyline corridors and other safety concerns would necessitate felling some of them. No snags or logs would be salvaged from the Riparian Habitat Conservation Areas (RHCAs) in any alternative.

Additional snags are expected as retained trees die. Prescribed burning may consume some of the existing snags, an unavoidable consequence in order to achieve the desired fuel reduction, site preparation, and browse stimulation. Some of the live trees left in harvest units may also be killed by burning, but should remain standing.

Bark beetle populations may decrease, and thus fewer new snags created by bark beetle infestations would be expected over the larger landscape in the next few years, as described in the Vegetation section. See the description of alternatives in Chapter 2 of this document and Exhibit P-22 for more details about the snag and downed wood prescriptions.

Wherever present, at least 32 downed logs per acre that are at least 20 feet long and are 9 to 20 inches in diameter at the large end would be left evenly distributed across the units. If there are too few large logs, 6 to 9 inch diameter logs may be substituted to reach this number of pieces. Wherever present, at least 15 downed logs per acre that are greater than 20 inches in diameter and at least 6 feet long would be left evenly distributed across the units. Snags that are felled for safety concerns would be left. A range of 5 to 23 tons per acre of the largest available downed material is expected in most units, depending on the existing and potential vegetation of the sites and the proximity to private lands. Generally, the lesser amounts would be the result in stands where the bulk of the trees in these stands are smaller-diameter, or due to fuel hazard concerns, such as that in the urban interface. Larger amounts would be left in most of the intermediate harvest units.

Large-diameter logs and snags are not likely to be consumed in either site-preparation burns after harvest or in areas where under-burning is planned without harvest. This is because the prescriptions require allowing as few as possible of the large trees to be killed by prescribed fire. Tree planting and removal of smaller-diameter downed wood would accelerate regeneration of green canopy cover, which is required of most species that use snag and downed log habitats.

Most wind-firm green trees would be left unharvested except in some stands with Douglas-fir beetle concerns. This would help maintain green overstory over the short term. It should also help ensure that an adequate amount of cavity habitat and large woody material are available over time. In some stands, planted western larch and Douglas-fir would provide future higher-quality snags than the lodgepole pine, subalpine fir, and spruce that are expected to regenerate naturally.

This project is expected to reduce the potential for stand-replacing fires across the landscape (See the "Vegetation" and the "Fire and Fuels" sections of this chapter). In some areas the green canopy cover would be more likely to remain intact, in other areas fire-resistant trees such as western larch and Douglas-fir would be more likely to survive fires.

Most of the new construction of specified and temporary roads and of the new trail section near the campground would pass through late seral/structural forests, requiring the felling of snags and any other hazard trees in and along the travel corridors. The effect of road construction in old growth forests is discussed in the section of this chapter on "Old Growth Habitat and Old Growth Associated Wildlife Species."

All action alternatives would have the benefit of additional protection of dead wood habitat features through yearlong closure of 4.2 miles of roads. This would reduce the area accessible

to firewood cutters by about 700 acres. Regeneration harvest would reduce the acreage of currently forested habitat within this zone (Table 3-69, above; Exhibit Rd-1). The additional road closure for wildlife security would not protect snag and down log habitat features from loss, since this road would be open in the summer each year. Other actions included in these alternatives would not measurably affect snag and downed wood habitats.

Cumulative Effects

Throughout the Interior Columbia River Basin, densities of large-diameter snags (>21 inch DBH) have been reduced in roaded areas with a history of timber sales (Hann, et al. 1997; Hessburg, et al. 1999; Quigley, et al. 1996). Fire suppression efforts, salvage of fire-killed or insect-infested trees, beetle control efforts, firewood harvest, and prior harvest of extensive areas of dead and dying lodgepole pine and fire-killed trees have reduced the habitat potential for species that rely on dead and downed wood in northwest Montana (Harris 1999).

In the Logan Creek area, past timber harvest across the various ownerships has converted many stands containing large live and dead trees into stands of seedlings or saplings, or into pasture or hayfields. In many Forest Service stands, some of the larger trees were left, largely to provide seed sources or shelter for regenerating tree seedlings. After harvest, however, the tree densities and amounts of standing and downed dead wood were typically much less than would be left by natural processes, particularly in stand-replacement fire regimes, and the large live trees were often later removed. Douglas-fir beetle trapping has been used recently in parts of the analysis area, in an effort to reduce mortality to old large trees. No vegetation management activities are planned on national forest lands in the analysis area in addition to those proposed in the action alternatives. Timber harvest and road construction in the adjacent Good Creek drainage is expected to continue under the 2000 Good Creek Resource Management Project Record of Decision. The extent of the effects of the Good Creek Project on old growth wildlife would in part depend on which alternative is selected in the Logan Creek Ecosystem Restoration Project.

Across the analysis area, firewood cutters have removed many of the large snags from within 200 feet of open roads, as well as some of the downed logs (Exhibit Rd-1). Recent road reclamation and closures across the Sheppard and Griffin drainages have reduced the vulnerability of dead wood habitats across the Logan watershed. Current open road density averages 2.0 miles per square mile in summer and 1.5 from fall to spring (Exhibit Rg-8). In order to provide additional opportunities for firewood cutting, the Tally Lake Ranger District has opened 33 miles of roads in the Logan Creek area that are normally closed yearlong. In the summers of 1997 and 1998, 25.3 miles were opened in the upper Logan drainage; 7.7 miles were opened just south of Star Meadows in 2000 and 2001. Together, these temporary openings exposed 1560 additional acres to loss of snag and downed wood habitat. Higher-quality wildlife habitat snags were marked; monitoring in these areas has shown cooperation with efforts to protect these valuable habitat elements. In addition, the Tally Lake campground is expected to continue to operate, leaving snags and downed wood in short supply nearby.

Other cumulative effects on wildlife using snag and downed wood habitats are varied. In 2000, the Elk Mountain Fire and two much smaller fires burned in about 80 acres in the Sheppard drainage, but there are no plans to salvage the burned trees. The Little Wolf Fire of 1994 burned over 10,000 acres of the Tally Lake District, immediately west of the analysis area. Post-fire salvage and spruce beetle control actions reduced the number of dead trees associated with this fire. Some actions would have minor or negligible effects on snags and downed wood habitat. These include precommercial thinning, tree and shrub planting, Christmas tree harvesting, noxious weed treatment, and periodic maintenance of fuel reduction zones. Road maintenance and the construction and maintenance of trails would cause some hazard trees to be felled and fallen trees to be cleared from travel ways.

The affected environment described above has been shaped by past and present cumulative effects to these habitats. These effects would be cumulative to those discussed above for each alternative. For more information on cumulative effects relevant to snags and downed wood habitat, see the "Old Growth Habitat and Old Growth Associated Species," "Vegetation," "Water Resources," "Fire and Fuels," and "Soil" sections in this chapter. The analysis for Flathead National Forest's Forest Plan Amendment 21 individually assessed the viability of old growth associated species and many others that use snags and downed wood habitat (USDA Forest Service 1999a)." See also Exhibits Rd-9, Rg-1, and Rg-3.

REGULATORY FRAMEWORK AND CONSISTENCY

Pursuant to the National Forest Management Act, national forests must maintain habitat for viable populations of native plant and animal species occurring in the planning area. A wide variety of wildlife species are dependent on the existence of standing snags and downed woody material. Current direction is provided by the Flathead's Forest Plan Amendment 21 (USDA Forest Service 1999a). Sufficient vegetation structure is to be retained, including large diameter trees, in timber harvest areas other than personal-use firewood permits. To comply with Amendment 21, the retention amount must be consistent with native disturbance and succession regimes and provide for long-term snag and coarse woody debris recruitment, essential soil processes, species habitat (including feeding and dispersal habitat for small mammals and birds), and long-term structural diversity of forest stands. In the absence of a site-specific landscape analysis to derive retention levels for this standard, minimum retention levels apply beyond 200 feet from roads open to the public. These are as shown in Table 3-71, and include a requirement for five live replacement trees over 12 inches DBH for each snag over 20 inches DBH. If existing snag densities are below the following densities, live trees are to be retained as future snags where possible, and the reasons why conditions cannot be met are to be documented. All alternatives would comply with standards in the Flathead LRMP for general nongame wildlife and snag and downed wood habitat.

Table 3-71. Forest Plan Amendment 21 Snag and Downed Wood Standards.

Potential Vegetation Group	Snags per acre		Live Replacement trees >12" DBH	Pieces of downed wood >6 feet long/acre	
	12-20" DBH	20+" DBH		9-20" diameter	20+" diameter
Dry	2	1	5	15	10
Moist	6	2	10	32	15
Cold	6	1	5	30	15

The Flathead LRMP, as amended, has minimum numerical standards for snags that would be met or exceeded in all harvest and burning units in all alternatives (Exhibits Rd-3 and Rd-10). This is demonstrated by the following:

- All live and dead larch and ponderosa pine greater than 18 inches at DBH would be retained, unless leaving them would compromise safety.
- Wherever present, at least two per acre Douglas fir greater than 25 inches DBH would be retained unless they are infested with Douglas-fir bark beetles at the time of marking, or where leaving them would compromise safety.
- Few large live trees would be harvested, as the Logan Creek Ecosystem Restoration Project emphasizes retention of the largest trees (unless infested with Douglas-fir beetles) and management of the mid-story trees.
- Unharvested live trees would be available to provide future snags. In dispersed retention units, these would be fairly uniformly distributed. With few exceptions, the only stands where large wind-firm live trees would be removed are those that are dominated by larger larch and Douglas-fir trees, where at least 15 per acre of the larger trees, on average, would be retained after harvest. The exceptions would be: Douglas-fir trees infested with Douglas-fir beetles at the time of harvest (Exhibit Rd-5), and occasional trees in skyline corridors or new road construction locations.

The Flathead LRMP, as amended, has minimum numerical standards for downed woody material that would be met or exceeded in all harvest and burning units in all alternatives (Exhibits Rd-3 and Rd-10). This is demonstrated by the following:

- Snags that are felled for safety concerns would be left on site.
- Wherever present, at least 32 downed logs per acre that are 9 to 20 inches in diameter and at least 20 feet long would be left evenly distributed across the units. If there are too few large enough logs, 6 to 9 inches in diameter logs may be substituted to reach this number of pieces.
- Wherever present, at least 15 downed logs per acre that are greater than 20 inches in diameter and at least 6 feet long would be left evenly distributed across the units.
- Site-preparation prescriptions would be designed to maintain as much of the larger downed material as possible and practicable, given other resource objectives such as fire hazard reduction and reforestation.
- Some slash piles will be left unburned in units that have Heavy Dispersed Retention prescriptions, as described in Exhibit Rd-6.
- Unharvested dispersed and aggregated trees provide recruitment of future downed wood.
- Post-treatment monitoring for snag and downed wood amounts would be performed as stated in Chapter 2 of this document.

Additional standards given in Amendment 21 include managing for wildlife dependent on old growth. These are covered in the "Old Growth Habitat and Old Growth Associated Wildlife Species" section of this chapter.