Chapter 3: Affected Environment and Environmental Consequences

Vegetation Existing Conditions

Introduction: This section describes the existing vegetative conditions of the North Lochsa Face analysis area by landtype association (LTA). Species composition, age class structure, tree density, off-site tree species, vegetation patch size and ecological functions are discussed. The existing conditions of old growth and sensitive plants are also described. This section provides the contexts for evaluating the environmental consequences of the proposed action.

Regulatory Framework: The National Forest Management Act (NFMA) requires that Forest Plans "shall provide for diversity of plant and animal communities and tree species consistent with the overall multiple-use objectives of the planning area." (36 CFR 319.26) Clearwater Forest Plan goals also include maintaining a diversity of vegetation and habitat conditions across the forest to meet the needs of a variety of wildlife species, and to provide a sustained yield of timber (Clearwater Forest Plan p. II-2).

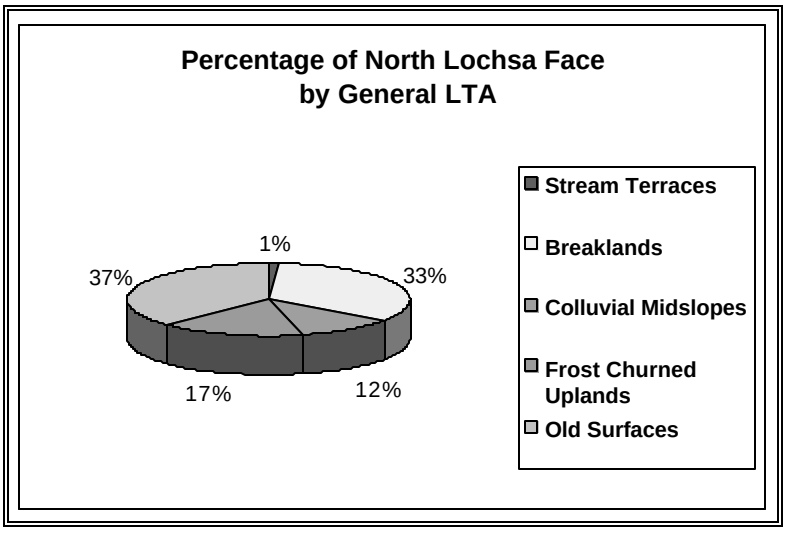
Landtype Associations: Forest vegetation develops through ecological processes that are constantly undergoing change. Some of these processes include changes in soils, weather, and disturbances.. Other processes involve the development of the vegetation itself, depending on whether an area contains young or old trees, or whether a particular type of vegetation can occupy a given site. To describe the structures, functions and composition of the North Lochsa landscape and the processes at work it is necessary to define areas that are relatively homogenous. These land classification units are best described by the way vegetation responds to the environment. LTAs display a similarity in potential natural vegetation, hydrology, nutrient cycling, successional change in vegetation, productivity, and fire frequency and severity.

There are five general categories of landtype associations within the 128,000-acre planning area. These include:

- Breaklands: steep aspects along rivers and major streams
- Colluvial midslopes: transition areas between the steep breaklands and more gentle, rolling uplands.
- Old surfaces: more gentle rolling uplands

- Frost churned ridges: higher elevation sites, occurring primarily along the Lolo Motorway
- Stream terraces: stream bottoms and meadows and found in lower Pete King drainage and Fish Creek drainage.

Figure 3-1: Percentage of North Lochsa Face by General LTA



Species Composition: Vegetation within the North Lochsa Face area is primarily coniferous forest. Much of the forest is a mix of tree species, dominated by grand fir, subalpine fir, Douglas-fir and western redcedar. North Lochsa Face is included within the area described by Losensky. This area has been described (B. John Losensky's *Historical Vegetation in Region One by Climatic Area* (1994)) as a large area occupying the central portion of north Idaho and western Montana. The Section lies between the Lochsa River north to Coeur D'Alene Lake and from the Palouse Prairie east to the Clark Fork River in Montana. The area is dominated by the maritime climatic influence with moderate temperatures and adequate moisture on most sites except high energy south and west slopes. Forested vegetation represents 97 percent of the area. The non-forest type was found on the western boundary and represents inclusions from the Palouse Prairie area.

Historically, the white pine type dominated the core of the area and probably represented some of the type's best development. Stands were generally not pure stands but mixtures of all of the other species found in the area. Ponderosa pine was found mainly along the western boundary at low elevations or along the eastern boundary in the Clark Fork Valley. These stands ranged from savannas to pure ponderosa pine to mixtures with Douglas-fir, larch and grand fir. The larch-Douglas-fir type was found in mixture with the white pine type on slightly warmer sites. Lodgepole pine was a minor type in the Section on upper slopes. Spruce-fir occupied the riparian and moist high basins. The subalpine type was a mixture of white bark pine, subalpine fir, spruce and lodgepole pine with areas of scattered grass types.

Age class distribution: Age classes were used to approximate stand structure and successional stages. Age classes are based on B. John Losensky's *Historical Vegetation in Region One by Climatic Area* (1994). They are as follows:

0-40 years - nonstocked, seedlings and saplings. The new forest or stand initiation stage, where new trees and species become established after a disturbance such as fire.

41-60 years - poles. The stem exclusion or young forest stage, where no new trees are being established, some of the existing trees have died, and the survivors grow larger.

61-100 years - immature. The immature or understory reinitiation stage when the understory vegetation and some small trees become established under the tree canopy.

101-160 years - mature. The young forest, multi-storied or mature stage, where several age groups have become established, but large trees are absent.

160+ years - potential old growth[1]. The old forest, multi-storied or late mature stage, where there is a diverse distribution of tree sizes and large trees are prominent in the overstory.

The current distribution of age classes is weighted heavily to the 41 to 60 and 61 to 100 year old age classes. This is primarily a result of the large fires (1910 and 1934) that burned here early in the last century. In general, the young age classes are higher than expected in previously harvested areas (LTA 84A), they are lower than expected in areas unaffected by timber harvest or where fire has not burned for 100 years or more.

Fire Regimes: There is a wide range of fire regimes present in the North Lochsa Face area, from mixed severity on south-facing breaklands with mean fire intervals of 26-50 years, to lethal severity on some of the old surfaces with mean fire return intervals of 300+ years. Fire impacted all landtype associations to some degree with either: (1) many small low intensity

---

1

The terms old growth habitat and late-successional forest have different meanings and therefore are not synonymous. Forest succession is a predictable process of changes in structure and composition of plant and animal communities over time. Conditions of the prior plant community or successional stage create conditions that are favorable for the establishment of the next stage. These successional stages are often referred to as seral stages (Upper Columbia River Basin DEIS, Chapter 5, page 51). Late-successional forest is considered a stand in the final stage of development often referred to as the old forest or old-growth stage (Oliver and Larsen, 1990, page 143). The late-successional stage of a forest is characterized by mortality of overstory trees and the emergence of understory trees into the overstory.

Old growth habitat on the other hand is a term used to describe stands having specific structural characteristics, regardless of the autogenic or allogenic processes that have led to these structures (Oliver and Larsen, 1990, page 153). Structural features of old-growth habitat include large, living old trees; large dead standing; massive fallen logs; relatively open canopies with foliage in layers including floristically diverse understories. These structures are achieved by a variety of major and/or minor disturbance patterns in single- or mixed-species stands and therefore do not represent a unique stage of forest succession. Many stands considered to be old-growth habitat are within the late-successional forest stage but it is not a requirement. Conversely, many stands considered to be within the late-successional forest stage do not contain the structures needed to qualify as old-growth habitat.

fires (non-lethal) that would smolder and creep around in the ground surface fuels; (2) mixed severity fires that would be of low intensity, underburning in some areas, occasionally burning more severely, killing patches of overstory trees; or (3) fires that were longer duration, stand replacing events (lethal severity).

Prior to effective fire suppression, fire played a major role in shaping and developing the vegetation and ecosystems within the analysis area. Forest fire history records indicate frequent large fires, over 1,000 acres, burned within and adjacent to the analysis area (see fire occurrence map in Appendix A). The 1910, 1919, 1924, and 1934 fires burned a total of 77,100 acres (61%) of this area at various intensity levels. Several of the major drainages burned 2 to 3 times between 1910 and 1934. Most of these double/triple burns set succession back, creating extensive seral shrubfields, still present today. A much lesser degree of non-lethal underburning also occurred. These fires contributed to a mosaic of vegetative conditions, reduced ground and ladder fuels, thinned stands, and favored larger individuals of fire resistant species.

The role of fire has been removed, to some extent, as a result of effective fire suppression. This has altered historical fire regimes, removing most fires of low and intermediate severity and increasing the proportion and potential of large, high severity fires. The vegetation has changed across the landscape to one of more ground and ladder fuels and denser stands of smaller diameter, fire susceptible tree species. There have been plenty of fires (457 fires between 1955 and 1994) that might have further altered the vegetative pattern had fire suppression not taken place. In general, it could be said that the probability of a large stand replacement fire occurring in the North Lochsa Face analysis area would have been likely and is even more likely now given changing conditions.

The report "Status of the Interior Columbia Basin, Summary of Scientific Findings" further illustrates the change in fire regimes. Pages 90 and 91 of the report present maps of the historic fire regimes and current fire regimes. The report, page 89, concludes, "In general lethal fires have increased. In particular, the lethal, very-infrequent fire regime class has increased substantially, while nonlethal, very frequent fires have declined from historic conditions."

Approximately 28,000 acres or 22 percent of the analysis area have a high density of trees

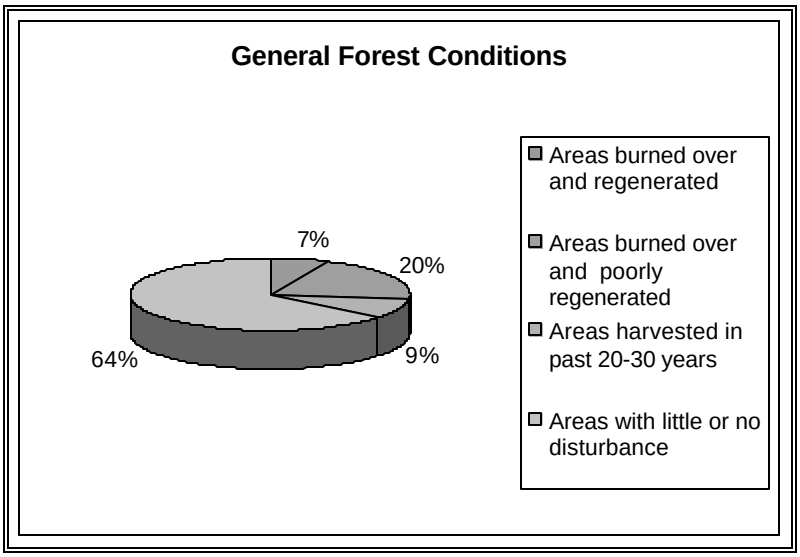
Tree Density: Stand densities in the North Lochsa Face analysis area are generally experiencing an upward trend due to successful suppression of fire here over the last 60 years. The density of vegetation influences the type and severity of fire that will occur in a timber stand. It also affects susceptibility and spread of insects and disease through timber stands. Density affects tree vigor. Competition for nutrients, sunlight, growing space, and moisture increases as density increases, causing stress to the trees and eventually reducing vigor. Reduced vigor in turn makes trees increasingly susceptible to the lethal effects of insects and disease. Many of these dense stands now support active root disease centers with associated bark beetle mortality. Approximately 28,000 acres within the analysis area have a high density of trees. For this analysis high density stands, are considered to have greater than 200 square feet of

basal area per acre and/or having over 500 trees per acre. Appendix A includes a map showing the stands that are considered to be highly dense.

The GAO Report "Western National Forests, A Cohesive Strategy is Needed to Address Catastrophic Wildfire Threats" states, "The most extensive and serious problem related to the health of national forests in the interior West is the over-accumulation of vegetation, which has caused an increasing number of large, intense, uncontrollable, and catastrophically destructive wildfires. According to the Forest Service 39 million acres on national forests in the interior West are at high risk of catastrophic wildfire. Past management practices, especially the Forest Service's decades-old policy of putting out wildfire on the national forests, disrupted the historical occurrence of frequent low-intensity fires, which had periodically removed flammable undergrowth without significantly damaging larger trees. Because this normal cycle of fire was disrupted, vegetation has accumulated, creating high levels of fuels for catastrophic wildfires and transforming much of the region into a tinderbox."

Dead Wood: Dead wood both standing and on the forest floor are ecologically important elements. Standing wood in the form of snags provide a variety of habitats for native wildlife species. Down wood also provides important habitat for many species but also plays an important role in the cycling of nutrients and soil productivity. Available dead wood, both standing and down, varies by condition of the forest. There are four general conditions found in the North Lochsa Face area: 1) areas burned over and since regenerated, 2) areas burned over and poorly regenerated, 3) areas harvested in the past 20 to 30 years, and 4) areas that have had little or no disturbance for over 90 years. Here are generalized views of those four conditions.

Figure 3-2: General Forest Conditions



Areas that have burned over and regenerated are generally found on north aspect breaklands (LTAs 21C and 23C), colluvial midslopes (LTAs 61 and 63), and moist old surfaces (LTA 81A). An estimated 7% of the analysis area is in this condition. They probably only experienced one, or maybe two, stand replacing fires in the early part of this century. These stands have remnants of the previous forest still contributing to the structure, and providing a continuous source of new snags. Older snags are also present. Most of these stands have reached a large enough size class that they can provide snags usable by a wide variety of wildlife, as well as providing other ecological benefits such as nutrient cycling.

Areas that burned over and have not regenerated well are generally on southerly aspects with shallow soils (LTAs 21A, 23A), OR, burned multiple times so that the soil microflora and -fauna were destroyed, limiting reforestation, OR burned multiple times and did not regenerate because there was no conifer seed source left. For whichever reason, these sites have few to no standing dead trees, and logs are rare. An estimated 20 percent of the analysis area is in this condition.

Areas that have been harvested in the past 20 to 30 years were mostly clearcuts, or shelterwoods that have since had a final removal cut. Most of the harvest has been on the old surfaces, with some on colluvial midslopes. Only the most recent harvest prescriptions called for retention of standing dead and live trees. Large down logs often survived slash burning after harvest, and are still available on site. An estimated 9 percent of the analysis area is in this condition.

Areas that have not burned, or only underburned, and which have not been harvested, have higher levels of dead wood on site. The breaklands in particular have a higher component of standing dead because there have been increased levels of root rot and bark beetles due to drier than normal conditions for the past decade. Other LTAs have also experienced elevated rates of mortality, also due to root rots and bark beetles. The Canyon drainage is a part of an ongoing study of root rot activity. Regional pathologists have measured up to 5 percent mortality per year in some stands, scattered across all LTAs. The remainder of the analysis area, 64 percent, falls into this category.

Patch Size: A patch can be defined as an area having a distinct boundary or "edge" that is created by differences in structure, age, species composition, density, growth rates or spatial distribution of vegetation. Different patches are caused by variations in environmental conditions that alter the relative sizes, growth, or competitive advantage of the vegetation within each patch. Differences in soil conditions, climatic conditions, disturbance regimes and timing of disturbance are responsible for the creation of a distinct patch of vegetation.

Historically patches in the analysis area have been created by a variety of physical and biological factors. Patches created due to varying soil conditions, usually the presence or absence of volcanic ash soils, vary from small areas of less than an acre to large areas of 200 to 500 acres. Patches created as a result of climate variation due to differences in slope and aspect are also common. The streams in the analysis area and the various aspects they create cause these microclimate variations. These patches are larger than those resulting from soil variation. Typically, these aspect-influenced patches are quite large, ranging from 100 to

2000 acres and are quite apparent on historical aerial photos. Insect and disease activity also creates patches in the analysis area. Patches created by root disease typically range from 1/4 to 5 acres. Insect epidemics typically do not kill entire stands of trees but have the effect of altering stands to a point at which they would be distinctly different from surrounding stands that are not attacked. These patches range from one to thousands of acres but usually are less than 100 acres.

Wind is also a major factor in the creation of patches. The size of these patches varied from small areas where only a few trees were toppled to large swaths of trees up to 200 acres. The most obvious factor, affecting patches and their size within the analysis area, is fire. The patch sizes created historically by fire varied depending on the fire regime operating on that area. Patches created in western redcedar forest often were small due to fire backing down into them whereas fire occurring on midslope grand fir or lodgepole pine stands could be very large. Aerial photos taken in and around the analysis area show large patches created by the 1910 and 1934 fires. These fires also created small patches as well. Other small fires, occurring previously, are also easily seen on historical photos. Patches created by fire are quite variable, ranging from a few acres to over 1,000 acres within and adjacent to the analysis area. Appendix A includes a map that displays historic patch sizes in the North Lochsa Face analysis area.

Insect and Disease: Insects and disease that kill vegetation are called pathogens. Countless numbers of insects and diseases that feed on vegetation inhabit the analysis area. However, many do not kill vegetation thus are not technically considered a pathogen. Many do reduce a plant's vigor that may make them more susceptible to pathogens in the area. Common pathogens the analysis area include many root rot and insects. Armillaria is the most commonly occurring root rot in the Lochsa Subbasin and is considered the most virulent. Other root rots include Schweinitzii, Annosus, and Phellinus. These too can kill trees but don't tend to be as virulent as Armillaria.

The most common insect pathogens are bark beetles. The spruce beetle, western balsam bark beetle, Douglas-fir beetle, fir engraver beetle and mountain pine beetle all historically killed trees within the analysis area. Western spruce budworm was also common to the area. Budworms as well as bark beetles tend to create the highest mortality in old stands having a high density of susceptible species. All of these pathogens were an important source of disturbance helping to drive forest succession. Stress caused by lack of water nutrients or growing space makes trees much more susceptible to pathogens. Older, larger trees are much more likely to be killed by forest pathogens. Trees become stressed as they grow larger and older and more and more energy is devoted to maintenance of cell respiration. Consequently, less energy is available for reproduction, growth and defense from insect and disease attack. Increasing mortality in aging stands increases fuel loads while encouraging the establishment and growth of understory vegetation (fuel ladders) in gaps snag created by this mortality. This increased the likelihood of a stand replacing fire with the passing of time.

Analysis Process

The Interdisciplinary Team developed desired conditions for species composition, age class distribution, snags, and patch sizes are based on information from B. John Losensky's *Historical Vegetation in Region One by Climatic Area* (1994). The desired conditions are based on historic processes and functions of these landtype associations over the entire climatic zone (NFMA and Watershed Assessment, project file document Vol. 1A).

The following sections compare the distribution of desired and existing species composition, age classes, and fire regimes and discuss patch sizes and tree density in relation to the specific LTA.

Stream Terraces

The **stream terraces** have a western redcedar component, which is a desired shade tolerant species due to its ability to survive pathogenic effects of root diseases. Surviving stands in Fish Creek contain cedar trees over 400 years old, 8 to 10 feet in diameter. However, most of this area was severely burned in 1934. It is now forested with hardwoods (alder and some cottonwood with shrubs), and a seedling conifer understory. This conifer understory is primarily grand fir and western redcedar that are the desired species.

LTA 10A

?? Stream bottom and terraces

?? Poorly adapted to fire

?? Ecological processes: flooding, windthrow

?? Fire return interval 300+

?? Primary species: Cedar, grand fir

?? 1% of the analysis area

Mid-seral stands will continue to mature. Western redcedar will become a more significant component of the stands as succession proceeds. Fire exclusion has had minimal impact in this LTA and there are relatively few insect and disease problems. LTA 10A is a stable component of the landscape that functions as a nutrient sink and sediment filter for material displaced from adjacent steeper landscapes (Project File Doc 641, Integrated LTA descriptions).

Table 3-1: Existing Species Composition of Stream Terraces, LTA 10A

LTA	Major Species (Forest Type)	Desired (%)	Existing (%)
10A	Cedar	50-60	27
	Grand fir	30-40	25

Table 3-2: Existing Age Class Distribution (%) of Stream Terraces, LTA 10A

Age Class	Desired	Existing
0-40	5-20	2
41-60	5-10	2
61-100	5-15	46
101-160	5-15	27
161+	55-75	18
non-forest/unknown		5

Breaklands

The **breaklands** have a Douglas-fir component, which is a desired early-seral species, but also have a higher than desired level of grand fir. Other early seral types (i.e. western larch, ponderosa pine, and western white pine) are lacking. Those species only occur occasionally as minor stand components. This higher presence of grand fir, and lack of fire-tolerant early seral species, has resulted in lowered resilience to fire events. In a healthy breakland system on south aspects, much of the natural fire would occur as underburns, with occasional patches of lethal fire. Those patches could regenerate relatively quickly because seed would be available from nearby fire-resistant trees. Now, the grand fir is likely to be killed in even low intensity fires, with only a few, widely scattered fire-resistant trees left to reforest the burned area. Existing patches are about the expected size, though a few have been broken up by timber harvest.

LTA 21A/23A:

?? High-energy, thin soils, on steeper canyons, dry sites.
?? Mixed fire regime,
?? Low to moderate fire intensity,
?? Fire intervals of 25 to 50 years.
?? Primary species: Douglas-fir, ponderosa pine
?? 16% of the analysis area

LTA 21B/23B:

?? High-energy, deeper soils, intact volcanic ash cap.
?? Mixed fire regime:
?? Low to moderate fire intensity,
?? Fire intervals of 50 to 100 years
?? Primary species: Douglas-fir, ponderosa pine
?? 10% of the analysis area

LTA 21C/23C:

?? Low energy, granite, deep soils.
?? Lethal fire regime,
?? Fire intervals of 75 to 150 years
?? Primary species: Douglas-fir
?? 7% of the analysis area

Table 3-3: Existing Species Composition on Breaklands, LTA 21A/23A, 21B/23B, 21C/23C

Major Species	Desired (%) LTA 21A/23A	Existing (%) LTA 21A/23A	Desired (%) LTA 21B/23B	Existing (%) LTA 21B/23B	Desired (%) LTA 21C/23C	Existing (%) LTA 21C/23C
Ponderosa pine	25-40	5	20-35	3	5-10	2
Douglas-fir	45-55	41	40-55	40	55-70	40
Larch	5-10	0	8-15	0	10-15	0
Grand fir	5-10	31	10-15	11	10-15	32
Cedar	5-10	11	0	2	8-15	19
Lodgepole pine	0	0	0	2	0	0
Subalpine fir	0	2	0	1	0	4
Western white pine	na		0	0	0	1

Table 3-4: Existing Age Class Distribution on Breaklands, LTA 21A, 21B, 21C

Age Class	LTA 21A		LTA 21B		LTA 21C	
	Desired	Existing	Desired	Existing	Desired	Existing
0-40	15-30	6	25-45	4	20-40	2
41-60	8-15	7	10-20	7	10-20	5
61-100	15-25	40	20-30	44	15-30	52
101-160	25-35	38	8-15	40	10-20	39
161+	15-30	4	7-15	4	5-10	3
nonforest		5		1		0

Table 3-5: Existing Age Class Distribution on Breaklands, LTA 23A, 23B, 23C

Age Class	LTA 23A		LTA 23B		LTA 23C	
	Desired	Existing	Desired	Existing	Desired	Existing
0-40	15-30	11	25-45	3	20-40	3
41-60	8-15	11	10-20	13	10-20	2
61-100	15-25	34	20-30	58	15-30	61
101-160	25-35	38	8-15	23	10-20	31
161+	15-30	1	7-15	0	5-10	2
nonforest		4		4		1

Colluvial Midslopes

The **colluvial midslopes** are also lacking the same fire-tolerant early seral species as the breaklands. Some grand fir is acceptable on these slopes, but it is found in greater abundance than the more desirable Douglas-fir. These higher levels of grand fir tip the fire hazard toward stand replacing fires and away from mixed severity fires or non-lethal underburns. This is because grand fir often creates fuel ladders because it grows well in the understory and it has a lower resistance to fire. Patches have been broken into smaller units by past timber harvest in a few places.

LTA 61A/63A:

?? Highly weathered granitic, colluvial midslopes. Transition between breaklands and old surfaces.
?? Mixed fire regime, low to moderate intensity,
?? Fire intervals of 75-150 years.
?? Primary species Douglas-fir
?? 12 percent of the analysis area

Table 3-6: Existing Species Composition on Colluvial Midslopes, LTA 61/63

Major Species (Forest Type) LTA 61/63	Desired (%)	Existing (%)
Douglas-fir	45-60	29
Grand fir	10-20	40
Larch	10-15	0
Ponderosa pine	5-15	3
Cedar	5-15	18
Western white pine	0	1
Subalpine fir	0	3
Lodgepole pine	0	0

Table 3-7: Existing Age Class Distribution on Colluvial Midslopes, LTA 61/63

Age Class	LTA 61		LTA 63	
	Desired (%)	Existing (%)	Desired (%)	Existing (%)
0-40	30-55	4	30-55	13
41-60	10-20	13	10-20	12
61-100	10-20	44	10-20	20
101-160	15-25	28	15-25	44
161+	10-30	10	10-30	8
Nonforest		2		4

Frost Churned Uplands

The **frost-churned uplands** should be primarily lodgepole pine, Douglas-fir, and western larch, with inclusions of Engelmann spruce, mountain hemlock, and subalpine fir. The spruce and fir would be found on moist areas within 71C. Subalpine fir is infested with balsam wooly adelgid all across the Lochsa District, and there has been notable mortality in fir of all ages. It is partly because of this infestation that subalpine fir is not one of the desired species on these LTAs. Until biological controls are found for this insect, it is not likely that subalpine fir can be maintained as a major stand component. Where there is a subalpine fir component, a higher fire risk exists and a higher likelihood of more intense fire behavior due to the high flammability and firebrand production of dead subalpine fir. The desired species composition is lodgepole pine in either pure or mixed species patches. Instead, subalpine fir dominates 41-58 percent of the area, and lodgepole pine only 3-11 percent. Patches are about historical size. Little timber harvest has occurred on these LTAs.

LTA 71B/71C

?? 71B Upper slopes and ridges and high-energy slopes within subalpine fir zone. LTA 71C adjacent to 71B on cooler, moister aspects.
?? High intensity fire regime
?? Fire intervals of 76-200 years.
?? Primary desired species: lodgepole pine
?? 17 percent of the analysis area

Table 3-8: Existing Species Composition on Frost Churned Uplands, LTA 71B/71C

Major Species	Desired (%) LTA 71B	Existing (%) LTA 71B	Desired (%) LTA 71C	Existing (%) LTA 71C
Douglas-fir/larch	15-25	58	10-20	10
Lodgepole pine	50-65	11	40-55	3
Grand fir	5-10	17	5-10	35
Cedar	3-8	0	3-8	0
Mountain hemlock	5-10	1	5-10	1
Subalpine fir/Englemann spruce	15-25	58	20-30	41

Table 3-9: Existing Age Class Condition on Frost Churned Uplands, LTA 71B/71C

Age Class	LTA 71B		LTA 71C	
	Desired (%)	Existing (%)	Desired (%)	Existing (%)
0-40		2		1
41-60	50-70	7	50-70	8
61-100		47		42
101-160		39		42
161+		4		5
Nonforest		1		2

Old Surfaces

The **old surfaces/rolling hills**: Western redcedar and grand fir should be, and in fact are, the major components in these long-fire-interval groups. What is missing is the inclusion of small patches of early seral trees. These would be western white pine, western larch, lodgepole pine, Engelmann spruce and ponderosa pine, that would have regenerated after small spot fires that burned in root rot centers or small patches of windthrown trees. Past timber harvest has left 15 to 40 acre patches of early seral species, but those patches are generally larger than we would expect from insect and disease processes (1/4 to 5 acres), and smaller than expected for stand replacement events due to fire (1000 or more acres).

LTA 81A/83A/94A

?? Granite old surfaces, non-umbric
?? Lethal infrequent fire regime
?? Fire intervals 150-300 years
?? Primary species: Grand fir, cedar, western white pine
?? 24percent of the analysis area

LTA 81B

?? Granite old surfaces, umbric
?? Lethal infrequent fire regime
?? Fire intervals 150-300 years
?? Primary species: Grand fir, Englemann spruce, subalpine fir
?? 14 percent of the analysis area

Off-site Species: Reforestation of many of the burned areas following the fires early in the twentieth century was done using trees grown from seed not adapted to the site. These trees have poor vigor and are prone to attacks by needle blight and needle casts. These trees have established and grown, producing both pollen and seed that degrade the genetic integrity of native tree populations present in the analysis area. The majority of these off-site plantations occur on old surfaces in Bimerick Creek but there is also some found near Boundary Peak.

Table 3-10: Existing Species Composition on Old Surfaces, LTA 81A/83A/84A, 81B

Major Species	Desired (%) LTA 81A/83A/84A	Existing (%) LTA 81B	Desired (%) LTA 81A/83A/84A	Existing (%) LTA 81B
Ponderosa pine	0	3	0	1
Douglas-fir/larch	15-25	14	10-15	11
Western white pine	20-30	1	5-10	1
Grand fir	25-45	52		
Cedar	25-35	16	5-15	8
Subalpine fir/lodgepole pine	0	5	na	na
Mountain hemlock	na	na	0	1
Grand fir/Engelmann spruce	na	na	35-45	51
Subalpine fir/Englemann spruce	na	na	35-45	24

Table 3-11: Existing Age Class Distribution on Old Surfaces, LTA 81A/83A/84A, 81B

Age Class	LTA 81A		LTA 81B		LTA 83A		LTA 84A	
0-40	25-45	6	30-50	3	25-45	2	25-45	6
41-60	15-15	19	5-15	9	5-15	23	5-15	40
61-100	10-20	23	10-20	17	10-20	46	10-20	28
101-160	20-35	30	20-35	54	20-35	21	20-35	20
160+	20-40	17	20-40	15	20-40	3	20-40	0
Non-forest/unknown		5		1		5		5

Vegetation Environmental Consequences

Analysis Process: This section describes the effects on vegetation from implementation of the alternatives. Alternative 1 (No Action) provides a baseline for comparison of effects from the action alternatives. The effects of Alternative 1 represent natural changes over time. Effects from the treatment proposed by the action alternatives are described in terms of changes in species composition, fire risk, age class distribution, patch size, standing dead and woody debris, density, and function. Also discussed are the effects to old growth and threatened and sensitive plants. The description of effects incorporates the most recent research, stand data and monitoring results. In some cases the numbers vary from those reported in the North Lochsa Face FEIS. This is due, in part; to the way data for unsampled stands are now computed (see project file SEIS Vegetation section for more detail). Additional stand examinations have also been completed and this new data is now part of the Timber Stand Data Base and better reflect current conditions. The North Lochsa Face Vegetation Report, dated March 19, 2001 and the NLF SEIS – MIS & TES Wildlife and Plants Resources Status Report, dated March 26, 2001 provide additional detail used in the

analysis. The project file SEIS Vegetation and Wildlife Sections also provide the references used, and data and queries.

Analysis Area: The analysis area for the direct, indirect and cumulative effects discussion on vegetative processes is the North Lochsa Face analysis area. This 128,000-acre area is large enough to evaluate the changes in vegetative conditions and provides a context for how the vegetation changes over a large landscape.

Alternative 1, No Action

Little change in species composition is expected in the short term under Alternative 1. Early seral species would continue to be replaced by late seral and climax species. Over a 30 to 50 year period, the current skewed species composition would shift even further toward the late seral and climax species. Over time the risk of wildfire increases, this could affect the late seral and climax species more severely than early serals. Fire could result in widespread stand-replacement, with few early seral seed sources available for regenerating the forest. Consequently, there could be extended reforestation periods, and low stocking levels.

Insects and diseases (especially root rot) tend to lead to a climax plant community, though at very high innoculum levels, shrubs could dominate. The more tolerant species, grand fir and cedar, would dominate stands as the early serals die out and disturbances (windthrow, root rot pockets, etc.) are on such a small scale that they do not provide the open conditions needed to allow early serals to establish. These disturbances also do not remove competing shrubs, which also inhibits early seral conifer regeneration. In the long term, dead fuel accumulation and development of green canopy layers that reach from the ground up into the dominant canopies raise the risk for crown fire. The more time that passes before a wildfire, the fewer early seral species would remain. These trees tend survive wildfires and produce the seed for reforestation. The likelihood rises that there would be a limited seed source after a wildfire.

Little change is expected in age class distribution in the short term. As trees age over the next 10 to 25 years, stands would begin to enter the older age classes that are in short supply now, as long as there is no major wildfire. Much of the Canyon, Apgar, and Glade drainages are currently at high risk of lethal wildfire, rather than the mixed severity fire that occurred historically. Forest structures and densities are such that fire would carry very well both horizontally and vertically, creating a large patch (1000s of acres) of deforested landscape. Over the following 25 to 50 years, if stands at high risk to wildfire succumb, age distribution would tend to be more simple, mostly very young stands, with a low representation of older age classes. (See the modeling done for the Boise Cascade Company by independent scientists, titled *Forest Ecosystem Management: A Graphic Overview*, page 25.) The result would be large acreages of the same age class. This would be similar to the current age classes (skewed to the 60 year old class) created by the 1934 fire. This change in fire regime, caused by a change in vegetation structures and composition, is pervasive throughout the Upper Columbia River Basin (see *An Assessment of Ecosystem Components in the Interior Columbia River Basin and Portions of the Klamath and Great Basins, Volume II*, p. 856).

Table 3-12 displays the estimated age class breakdown that exists now and would be present in 25 years, assuming fires are successfully suppressed in the analysis area.

Density: No action would occur in the 28,000 acres that have a high density of trees. Stands with few trees per acre would gradually increase in density as existing trees grow, and more trees become established. Most of these stands are found on LTAs 21B and 23B, and are still only partially stocked following the 1910, 1919, and 1934 fires. The relative density of stands with canopies that are just closed would continue to increase as the established trees become larger, and utilize more of the available water and nutrients. Those stands that have had high densities for some time, would be experiencing declining density as trees succumb to competition, insects, or diseases. Stands in this category can be found in the Mex Mountain vicinity, south of Walde Mountain, and in the dense young forests in the Pete King drainage. This would act to increase the level of standing and down dead wood in those areas.

Insect and disease activity levels would continue to rise and fall with stocking levels and moisture conditions. In areas away from existing roads, dead wood would accumulate until the next fire return. Dead wood levels and multi-storied structures could contribute to more severe and intense fires than were common historically, and would be difficult to control. LTAs that would have experienced underburns or mixed severity fires may instead be susceptible to stand-replacing lethal fires.

Patch sizes would change little in the short term. However, if the expected large wildfires occur, patch sizes could move to 1000s of acres. This is the typical size for old surfaces, but for other landtype associations, 100 to 500 acres is the expected range. Under this alternative, current dead wood conditions would be maintained for the short term. In the Canyon, Apgar, and Glade Creek drainages, many stands have large amounts of dead standing wood due to extensive insect and disease activity. Dead wood is lacking where several fires burned in the early 1900s. Lower Pete King Creek, the east half of the Deadman drainage, the face of the Lochsa from Deadman to Fish Creek, and the lower Fish and Hungery drainages are in this condition. However, as dead wood of all sizes accumulates, and fire risk continues to rise, large-scale wildfires could occur, and result in extensive standing dead. This would be followed by a long period of very low snag/down wood densities; such as occurs now in the areas that burned in 1934.

Effects of the Action Alternatives

Table 3-12 describes different vegetative management prescriptions and their general effects on species composition, age class distribution, patch size, standing dead and woody debris, tree density and ecological functions. Table 3-13 describes the specific changes in species composition by alternative. Tables 3-14, 3-15, 3-16, 3-17, 3-18, and 3-19 describe the specific changes to age class distribution, by alternative, in the short-term, and in the mid-term (25 years) given successional processes. Refer to these tables when reading the effects by alternative.

Description of Regeneration Harvest: Regeneration harvest is not a "one-size-fits-all" prescription. Rather the prescription, or retention of trees, changes within a unit or patch depending on site conditions. The prescriptions were developed recognizing the natural fire disturbance regimes. Natural fire processes on steep *breaklands* LTAs 21A, B, and C and 23A, B, and C, would typically retain approximately 50 percent of the existing canopy cover across the slope after low to moderate intensity fire. The typical canopy retention after natural fire was distributed as follows: (1) in riparian areas and concave dissections, fire burned much less intensely due to moist, humid conditions and 70 to 100 percent of the trees were retained; (2) on well-drained, secondary, convex (rounded) ridges, running down the slope, fire burned more intensely due to drier conditions, and 0 to 30 percent of the cover was retained; (3) in areas between the two preceding zones, fire would burn a variable amount of canopy, depending on fuel conditions, wind directions, etc., and an intermediate amount of cover, 30 to 70 percent would typically remain after a wildfire. Overall, approximately 50 percent of the trees would remain across the entire breakland slope after a historic fire, with actual retention of 0-100 percent within the three preceding areas.

The vegetative management treatments would follow these fire patterns on the breaklands. Overall regeneration harvest on the breaklands would retain 50 percent of the existing vegetation. One hundred percent would be retained adjacent to the riparian areas in the PACFISH buffers; on convex slopes 0 to 30 percent would be retained and on concave slopes 30 to 70 percent would be retained. This results in a patch with variable retention and structure, much like what would occur under a natural fire process. Similar prescription patterns would be used on the gentler LTAs, but the overall canopy retention would be less. On colluvial midslopes 35 percent would be retained. On old surfaces, which are low-relief, rolling hills, 25 percent would be retained.

Table 3-12: General Effects of Vegetation Management

Proposed Treatment	Species Composition	Age Class Distribution	Patch Size	Standing Dead and Woody Debris	Tree Density	Ecological Functions
Regeneration Harvest	Removes most mature trees of all species and replaces them with a mix of species dominated by early seral/fire tolerant tree species.	Replaces mature stands with young stands.	Creates opening of various sizes all within the historical range.	Removes large amounts of standing wood. Existing snags and some live trees would be retained to provide snag habitat and a long-term supply of needed woody debris for the cycling of nutrients in the soil.	Reduces tree density an average of 50% to 75%.	Mature stands are harvested removing, in most cases, the stands having the highest potential for wildfire and/or insect and disease problems. This tends to reduce the threat to surrounding stands.
Conversion	Trees not	Replaces 40 to	Creates	Removes large	Reduces	Stands

Proposed Treatment	Species Composition	Age Class Distribution	Patch Size	Standing Dead and Woody Debris	Tree Density	Ecological Functions
	adapted to the site are removed and replaced with a mix of species historically found here.	60 year old stands with young stands.	opening of various sizes all within the historical range.	amounts of standing wood. Existing snags and cull tree would be retained to provide snag habitat and a long-term supply of needed woody debris for the cycling of nutrients in the soil.	tree density by 100%.	containing off-site species are harvested. This tends to reduce the threat to surrounding stands. This also reduces the likelihood of gene pool pollution, and allows these stands to provide natural ecological conditions (especially wildlife habitat) that are limited by the current composition..
Commercial and Pre-commercial Thinning	Adjusts species composition, favoring early seral/fire tolerant species.	Doesn't change age class	Doesn't affect patch size	Decreases down woody debris. The potential for future snags would be reduced because trees more likely to become snags would be cut.	Reduces tree densities by 30% to 35%	The reduced stand densities and adjustment of species composition favoring fire-tolerant early seral species would reduce future wildfire risk and lower insect and disease hazard by reducing competition among the remaining trees.
Salvage	Tends to remove Douglas-fir and grand fir, which are the species most susceptible to pathogens. This favors early serals where they are present or cedar (a climax species)	Doesn't change age class	Doesn't affect patch size	Increases down woody debris. The potential for future snags would be reduced because trees more likely to become snags would be harvested.	Expected to reduce stand densities by 5% to 15%.	Removes trees likely to succumb in the short term. This reduces levels of fuel and insects within the stand and reduces risk to surrounding stands.

Proposed Treatment	Species Composition	Age Class Distribution	Patch Size	Standing Dead and Woody Debris	Tree Density	Ecological Functions
	where it is present.					
Mixed Severity Burns	Reduces the presence of fire-intolerant species while favoring retention more fire tolerant species.	Age classes can be affected in portions of treated areas where the fire is more of a stand-replacing event. Little age class change is expected.	Tends to create small patches in a mosaic across the treated area but within historical averages.	Substantially increases snags and the potential for down woody debris.	Reduces stand densities on average of 15% to 60% in a non-uniform pattern.	Stresses and kills many trees. Increased insect and disease activity would be expected for up 3-10 years following the treatment thus increasing risks to surrounding untreated stands. Long term insect and disease levels would be reduced.
Underburning	Reduces the presence of fire-intolerant species while favoring retention more fire tolerant species.	Doesn't change age class	Doesn't affect patch size	Slightly increases snags and the potential for future down woody debris. Existing levels of down wood would shift closer to historical averages.	Reduces stand densities on average of 5% to 15% in a non-uniform pattern.	Stresses and kills some trees. A slight increase insect and disease activity would be expected for up 3-10 years following the treatment thus increasing risks to surrounding untreated stands. Ground fuels would be reduced lowering catastrophic fire risk. Long term insect and disease levels would be reduced.

Table 3-13: Changes in Species Composition by Alternative

LTA	Major Species	Desired (%)	Existing (%)	Alt 2 (%)	Alt3 (%)	Alt3a (%)	Alt4 (%)	Alt5 (%)	Alt6 (%)

LTA	Major Species	Desired (%)	Existing (%)	Alt 2 (%)	Alt3 (%)	Alt3a (%)	Alt4 (%)	Alt5 (%)	Alt6 (%)
10A	cedar	50-60	27	22	22	22	27	22	22
	grand fir	30-40	25	23	23	23	25	23	23
21A/ 23A	ponderosa pine	25-40	5	7	7	7	5	6	7
	Douglas-fir	45-55	41	43	43	44	41	44	43
	larch	5-10	0	0	0	0	0	0	0
	grand fir	5-10	31	26	26	25	30	28	26
	cedar	5-10	11	10	10	9	11	10	9
	lodgepole pine	0	0	0	0	0	0	0	0
	subalpine fir	0	2	2	2	2	2	2	2
21B/ 23B	ponderosa pine	20-35	3	3	3	3	3	3	3
	Douglas-fir	40-55	40	43	43	43	40	43	43
	larch	8-15	0	0	0	0	0	0	0
	grand fir	10-15	38	35	35	35	37	35	35
	cedar	8-15	11	10	10	10	11	10	10
	subalpine fir	0	2	2	2	2	2	2	2
	lodgepole pine	0	1	1	1	1	1	1	1
	western white pine	0	0	1	1	1	1	1	1
21C/ 23C	Douglas-fir	55-70	40	42	42	39	37	42	43
	larch	10-15	0	0	0	0	0	0	0
	grand fir	10-15	32	28	28	28	30	28	27
	ponderosa pine	5-10	2	2	2	2	2	2	2
	cedar	8-15	19	16	16	18	19	16	16
	subalpine fir	0	4	4	4	4	4	4	4
	lodgepole pine	0	0	0	0	0	0	0	0
	western white pine	0	1	6	6	6	6	6	6
61/63	Douglas-fir	45-60	29	33	33	31	29	34	33
	grand fir	10-20	40	34	35	36	38	35	34
	larch	10-15	0	0	0	0	0	0	0
	ponderosa pine	5-15	3	3	3	3	3	3	3
	cedar	5-15	18	17	17	18	18	17	17
	western white pine	0	1	5	4	5	4	4	5
	subalpine fir	0	3	3	3	3	3	3	3
	lodgepole pine	0	0	1	1	0	0	1	1
71B	subalpine fir/spruce	15-25	58	57	51	58	58	51	51
	lodgepole pine	50-65	11	16	16	11	11	16	16
	Douglas-fir/larch	10-15	10	12	12	10	10	12	12
	grand fir	5-10	17	16	16	17	17	16	16
	cedar	3-8	0	0	0	0	0	0	0
	mountain hemlock	5-10	1	0	1	1	1	1	1
71C	subalpine fir/spruce	20-30	41	38	38	40	41	38	38

LTA	Major Species	Desired (%)	Existing (%)	Alt 2 (%)	Alt3 (%)	Alt3a (%)	Alt4 (%)	Alt5 (%)	Alt6 (%)
	lodgepole pine	40-55	3	5	5	3	3	5	5
	Douglas-fir/larch	10-20	10	13	13	12	10	12	13
	grand fir	5-10	35	34	34	34	35	34	34
	cedar	3-8	0	0	0	0	0	0	0
	mountain hemlock	5-10	1	1	1	1	1	1	1
81A/ 83A/ 84A	grand fir	25-45	52	44	44	45	48	48	45
	western white pine	20-30	1	5	5	5	2	2	5
	cedar	25-35	16	15	15	15	15	15	14
	Douglas-fir/larch	15-25	14	19	19	19	19	17	19
	subalpine fir/lodgepole pine	0	5	5	5	7	6	5	5
	ponderosa pine	0	3	3	3	3	3	3	3
81B	grand fir/ spruce	35-45	51	47	47	48	48	47	47
	subalpine fir/spruce	35-45	24	23	23	23	23	23	25
	Douglas-fir/larch	10-15	11	15	15	14	14	15	14
	cedar	5-15	8	8	8	8	8	2	2
	western white pine	5-10	1	2	1	2	2	2	1
	ponderosa pine	0	1	1	1	1	1	1	1
	mountain hemlock	0	1	1	1	1	1	1	1

Gray highlighted percentages indicate that the species is within the desired range; underscored percentages indicate a shift towards the desired range. Alternative 4a would result in the same effects as Alternative 4

The following tables display the anticipated effects to age class distributions. Age class changes are based on regeneration and conversion harvest. Mixed severity burns could alter age classes in portions of the patch but based on predicted mortality of 15 to 60 percent were assumed that they would not alter the age classes. These tables include potential changes given succession, but do not include potential effects from wildfires since the location and timing of wildfire is unknown.

The first column for each alternative is how the alternative effects age class distribution once implemented. The second column is how the alternative would affect age class distribution in 25 years given normal succession.

Table 3-14: Effects on Age Class Distribution in Stream Bottoms, LTA 10A

Age Class	Desired	Alt 1	Alt 1F	Alt 2	Alt 2F	Alt 3	Alt 3F	Alt 3a	Alt 3aF	Alt 4	Alt 4F	Alt 5	Alt 5F	Alt 6	Alt 6F
0-40	5-20	4	2	4	2	4	2	4	2	4	2	4	2	4	2
41-60	5-10	29	2	29	2	29	2	29	2	29	2	29	2	29	2
61-100	5-15	29	46	29	46	29	46	29	46	29	46	29	46	29	46
101-160	5-15	19	27	19	27	19	27	19	27	19	27	19	27	19	27
161+	55-75	14	18	14	18	14	18	14	18	14	18	14	18	14	18

Table 3-15: Effects on Age Class Distribution in Breaklands, LTA 21A/21B/21C, 23A/23B/23C

Age Class	Desired	Alt 1	Alt 1F	Alt 2	Alt 2F	Alt 3	Alt 3F	Alt 3a	Alt 3aF	Alt 4	Alt 4F	Alt 5	Alt 5F	Alt 6	Alt 6F
LTA 21A															
0-40	15-30	16	6	18	8	18	7	18	7	16	6	16	6	18	8
41-60	8-15	27	7	27	7	27	7	27	7	27	7	27	7	27	7
61-100	15-25	29	40	29	40	29	40	29	40	29	40	29	40	29	40
101-160	25-35	22	38	20	36	21	37	21	37	22	38	22	38	20	36
161+	15-30	1	4	1	4	1	4	1	4	1	4	1	4	1	4
LTA21B															
0-40	25-45	13	4	14	5	14	5	14	5	14	5	14	5	14	5
41-60	10-20	28	77	28	7	28	7	28	7	28	7	28	7	28	7
61-100	20-30	35	44	35	44	35	44	35	44	35	44	35	44	35	44
101-160	8-15	22	40	21	39	22	39	21	39	21	39	21	39	22	39
161+	7-15	1	4	1	4	1	4	1	4	1	4	1	4	1	4
LTA21C															
0-40	20-40	11	2	11	3	11	3	11	3	11	3	11	3	11	3
41-60	10-20	29	5	29	5	29	5	29	5	29	5	29	5	29	5
61-100	15-30	41	52	41	52	41	52	41	52	41	52	41	52	41	52
101-160	10-20	19	39	18	38	18	39	18	38	18	38	18	38	18	38
161+	5-10	0	3	0	3	0	3	0	3	0	3	0	3	0	3
LTA23A															
0-40	15-30	24	11	32	19	32	19	32	19	32	12	32	12	32	19
41-60	8-15	17	11	16	11	16	11	16	11	17	11	17	11	16	11
61-100	15-25	37	34	33	32	33	32	33	32	37	34	37	34	33	32
101-160	25-35	18	38	15	33	15	33	15	33	15	38	15	38	15	33
161+	15-30	0	1	0	1	0	1	0	1	0	1	0	1	0	1
LTA23B															
0-40	25-45	24	3	24	3	24	3	24	3	24	3	24	3	24	3
41-60	10-20	26	13	26	13	26	13	26	13	26	13	26	13	26	13
61-100	20-30	40	58	40	58	40	58	40	58	40	58	40	58	40	58
101-160	8-15	6	23	6	23	6	23	6	23	6	23	6	23	6	23
161+	7-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LTA23C															
0-40	20-40	5	3	12	10	12	10	12	10	12	10	12	10	12	10
41-60	10-20	42	2	39	2	39	2	39	2	39	2	39	2	39	2
61-100	15-30	41	61	39	58	39	58	39	58	39	58	39	58	39	58
101-160	10-20	11	2	9	27	9	27	9	27	9	27	9	27	9	27
161+	5-10	0	0	0	2	0	2	0	2	0	2	0	2	0	2

Table 3-16: Effects on Age Class Distribution on Colluvial Midslopes, LTA 61A, 63

Age Class	De-sired	Alt 1	Alt 1F	Alt 2	Alt 2F	Alt 3	Alt 3F	Alt 3a	Alt 3aF	Alt 4	Alt 4F	Alt 5	Alt 5F	Alt 6	Alt 6F
LTA 61A															
0-40	30-55	22	4	24	6	24	6	24	6	24	6	24	6	24	6
41-60	10-20	25	13	25	13	25	13	25	13	25	13	25	13	25	13
61-100	10-20	28	44	28	44	28	44	28	44	28	44	28	44	28	44
101-160	15-25	19	28	18	26	18	26	18	26	18	26	18	26	18	26
161+	10-30	3	10	3	9	3	9	3	9	3	9	3	9	3	9
LTA63															
0-40	30-55	25	13	36	23	36	21	36	23	36	22	36	22	36	23
41-60	10-20	10	12	9	12	9	12	9	12	9	12	9	12	9	12
61-100	10-20	28	20	23	18	23	18	23	18	23	18	23	18	23	18
101-160	15-25	31	44	27	36	29	38	27	36	27	37	27	37	27	36
161+	10-30	1	8	1	7	1	7	1	7	1	7	1	7	1	7

Table 3-17: Effects on Age Class Distribution on Frost Churned Uplands, LTA 71A/C

Age Class	Desired	Alt 1	Alt 1F	Alt 2	Alt 2F	Alt 3	Alt 3F	Alt 3a	Alt 3aF	Alt 4	Alt 4F	Alt 5	Alt 5F	Alt 6	Alt 6F
LTA 71A															
0-40		12	2	12	2	12	2	12	2	12	2	12	2	12	2
41-60	50-70	23	7	23	7	23	7	23	7	23	7	23	7	23	7
61-100		44	47	44	47	44	47	44	47	44	47	44	47	44	47
101-160		20	39	20	39	20	39	20	39	20	39	20	39	20	39
161+		0	4	0	4	0	4	0	4	0	4	0	4	0	4
LTA71C															
0-40		10	1	13	3	13	3	13	3	13	3	13	3	13	3
41-60	50-70	25	8	22	8	22	8	22	8	22	8	22	8	22	8
61-100		39	45	39	40	39	40	39	40	39	40	39	40	39	40
101-160		23	45	23	42	23	42	23	42	23	42	23	42	23	42
161+		0	5	0	5	0	5	0	5	0	5	0	5	0	5

Table 3-18: Effects on Age Class Distribution on Old Surfaces, LTA 81A/81B

Age Class	Desired	Alt 1	Alt 1F	Alt 2	Alt 2F	Alt 3	Alt 3F	Alt 3a	Alt 3aF	Alt 4	Alt 4F	Alt 5	Alt 5F	Alt 6	Alt 6F
LTA 81A															
0-40	25-45	26	6	36	17	36	17	36	17	28	8	28	8	36	16
41-60	5-15	15	19	12	19	12	19	12	19	15	19	15	19	12	19
61-100	10-20	21	23	18	19	18	19	18	19	21	23	21	23	18	19
101-160	20-35	27	30	23	25	23	25	23	25	26	29	26	29	24	25
161+	20-40	5	17	5	15	5	15	5	15	5	16	5	16	5	16
LTA81B															
0-40	30-50	12	3	16	7	16	7	16	7	16	6	16	6	16	7
41-60	5-15	8	9	7	9	7	9	7	9	8	9	8	9	7	9
61-100	10-20	28	17	28	17	28	17	28	17	28	17	28	17	28	17
101-160	20-35	49	54	46	52	46	52	46	52	46	52	46	52	46	52
161+	20-40	2	15	1	14	1	14	1	14	1	14	1	14	1	14
LTA 83A															
0-40	25-45	30	2	31	2	31	2	31	2	31	2	31	2	31	2
41-60	5-15	31	23	31	23	31	23	31	23	31	23	31	23	31	23
61-100	10-20	17	46	16	46	16	46	16	46	16	46	16	46	16	46
101-160	20-35	15	21	15	21	15	21	15	21	15	21	15	21	15	21
161+	20-40	3	3	3	3	3	3	3	3	3	3	3	3	3	3
LTA84A															
0-40	25-45	62	6	62	6	62	6	62	6	62	6	62	6	62	6
41-60	5-15	5	40	5	40	5	40	5	40	5	40	5	40	5	40
61-100	10-20	15	28	15	28	15	28	15	28	15	28	15	28	15	28
101-160	20-35	12	20	12	20	12	20	12	20	12	20	12	20	12	20
161+	20-40	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 3-19: Acres of High Density Stands Treated by Alternative

	Alt 1	Alt 2	Alt 3	Alt 3a	Alt4	Alt5	Alt 6
Acres of High Density Stands Treated	0	4,000	3,345	3,605	2,510	3,580	3,450
Percent of High Density Stands Treated	0	14	12	13	9	13	12
Total Acres Treated	0	21,885	21,230	16,755	6,870	18,695	21,120

Alternative 2

Description: Alternative 2 would implement the following vegetative management actions. These acreages do not reflect the acres that would be untreated because of PACFISH buffers. Actual acres treated would average 32% less than shown:

Regeneration Harvest:	2,860 acres
Offsite Conversion:	2,220 acres
Commercial Thin:	2,520 acres
Salvage:	465 acres
Mixed Severity Burn:	5,485 acres
Underburn:	7,045 acres
Precommercial Thin:	1,290 acres
Total:	**21,885 acres**

Species composition would shift toward early seral species. Regeneration harvest blocks would be reforested with early seral species. The 2,520 acres of thinning would favor early seral species already present, with the majority of trees removed being the late seral and climax species. This would give these trees more growing space, so that they would be more vigorous when or if the existing stand is regenerated, and be available as seed sources for the following stand. A higher percentage of early serals, and fewer small understory trees would also make these thinned stands less susceptible to damage from fire. Understory burns, 7,045 acres, would have similar effects to the commercial thins. Small understory trees, and late seral or climax trees, would be most susceptible to fire, leaving a higher percentage of early serals, and a more fire-resistant stand. Mixed severity burns, 5485acres, which are partially stand replacing, (in the Fish Creek drainage and along the Lochsa River breaks), would also provide the environmental conditions that would favor early seral species by leaving fire-resistant early serals and creating openings that favor early seral tree regeneration.

> The end result is that the assessment area would be more resilient to the risk of a major wildfire because early seral species, particularly ponderosa pine, Douglas-fir, larch, western white pine, and grand fir (on cedar sites), are well adapted to fire. They either survive it, or regenerate prolifically after a fire, or both.

Currently, species composition is skewed from the desired mix toward the late seral and climax species on the breaklands and colluvial midslopes. This means there is more grand fir, and less ponderosa pine than desired and in some cases Douglas-fir. On the frost-churned uplands, grand fir and subalpine fir are above desired levels, while lodgepole pine is below desired levels. Old surfaces generally are lacking the white pine that was present prior to introduction of white pine blister rust. This leaves stands more vulnerable to fire effects. All treatments would favor early seral species, and make stands less susceptible to severe fire effects. Regeneration harvest, mixed severity burns, and species conversion would be most

effective in establishing early seral species. Thinning, salvage harvest, and underburns would shift the species mix in existing stands by removing some late seral and climax trees, favoring early seral species, but not eliminating the late seral and climax species.

Alternative 2 has the potential to shift many acres out of the grand fir type on the old surfaces. Thinning and salvage would likely leave the treated stands in a grand fir or cedar type, but with the percentage of early seral species higher than current levels. This would limit disease spread, maintaining a healthier grand fir/mixed species stand for a longer period. Regeneration harvests are designed to result in a mixed species stand that includes significant numbers of grand fir and cedar on the old surfaces. Conversion of ponderosa pine and regeneration harvests planned within western redcedar habitat types would be replanted with significant numbers of western white pine. A marked shift towards desired levels of western white pine representation in the breaklands, colluvial midslopes, frost churned uplands, and old surfaces is expected.

Density: Alternative 2 would lower stand densities on approximately 4,000 acres that are considered highly dense at present. All of the vegetation management proposed, for all of the action alternatives, would reduce stand densities to some degree. Stands that have excessive density for the site on which they are growing were high priority for thinning. Some of those stands were not proposed for treatment because of poor access. Insect and disease activity and fire risk would increase in those stands.

The 1,290 acres of precommercial thinning would result in reduced stand density, and increased long term health of the stands. Moisture, sunlight, and nutrients would not be so limiting, and trees would be more vigorous, with more resistance to insects and diseases, particularly the root rot cycle. Salvage and stocking control would reduce stand densities so that trees can be more vigorous and resist insects or diseases. If stands are already infected with root rot, this treatment risks facilitating root rot spread.

Prescribed burns designed to mimic stand-replacing fire (either lethal or mixed severity) would also reduce stand densities. Not all of these burns are planned in areas that have high densities. Regeneration harvests would also effectively reduce excess stand densities outside of the riparian habitat areas. Canopies left would range from 10 percent to 50 percent of the existing forest cover.

Stream Terraces - LTA 10A is relatively unaffected by Alternative 2 in both the short term and long term when compared to the No Action Alternative.

Breaklands

LTA 21A retains the 0-40 age class within the desired range but proposed conversion harvest and regeneration harvest reduce the amount of the 101-160-age class moving them away from the desired levels in the short term. However, in the long term (+25 years) the 101-160-age class moves within the desired range.

In **LTA21B**, both the 0-40 and 101-160 age classes move closer to the desired range in both the short and long term.

Regeneration harvest and conversion reduce the 101-160 age class in **LTA23A** moving this age class away from the desired while producing an overabundance of the 0-40 age class. Age classes 41-60 and 61-100 show a shift towards desired levels. However, in the long term many of the young stands grow older producing a deficit in the 0-40 age group. The effect is that the 41-60 age group then falls within the desired range as well as the 101-160-age class.

LTA23B is unaffected by Alternative 2 in both the short term and long term when compared to the No Action Alternative.

Regeneration harvest and conversion planned for **LTA23C** reduce the amount of the 101-160-age class below the desired levels but conversely move the 0-40 age class closer to the desired levels. Harvest planned for the 41-60 and 61-100 age groups move both of these age classes towards desired levels in the short term. The long term effect of Alternative 2 shifts the 0-40, 61-100 and 101-160 age classes closer to the desired levels.

Colluvial Midslopes

In **LTA61** there is a shift towards desired levels in the 0-40 age class. The 101-160-age class remains within the desired range. Over the long term, there is a shift toward desired levels in the 0-40, 101-160, and 161+ age groups.

Harvest planned within the 61-100 and 101-160 age groups of **LTA63** would move them closer to the desired levels while moving the 0-40 age group within the desired levels. In the long term, LTA63 would continue to have the 41-60 and 61-100 within the desired range. Age classes 0-40,101-160, and 161+ age groups would also move closer to desired levels.

Frost Churned Uplands

LTA71B is unaffected by Alternative 2 in the short term when compared to the No Action Alternative. In the long term, it comes close to the desired age distribution.

LTA71C would be little changed in either the short term or the long term by Alternative 2.

Old Surfaces

Within **LTA81A,** 0-40, 41-60 and 101-160 age groups would be maintained at desired levels while the 61-100 age group move within the desired levels in the short term. The long term shows a shift towards desirable levels in the 160+ age group while the 61-100 and 101-160 age groups move closer to the desired levels.

Alternative 2 would shift 0-40 and 101-160 age classes towards desired levels in the short term within **LTA81B**. The long-term effect would be age groups 41-60 and 61-100 would

move within the desired ranges. Age groups 0-40, 101-160 and 161+ would show a shift toward the desired levels compared with the No Action Alternative.

Little or no change is expected when compared to the No Action Alternative for **LTAs 83A and 84A** in both the short and long term.

Patch size: Treatments were proposed and designed to match historical patch sizes in each LTA. Long-term, treatments would enable patches to be maintained at historical sizes.

There would still be patches that are less homogeneous than desired, due to past harvest and the need to maintain the older stands that are in short supply. For example, several patches are mostly mature or late mature forest, but have old clearcuts within them. To keep a similar age/structure within the patch, the only treatment option is to regenerate the remainder (with fire or timber harvest). Those areas were deferred to maintain the older age classes in a mixed age/structure "patch". This is consistent with what could happen with a mixed severity fire. A mixed severity fire would burn hot enough to replace some portion of the area, but underburn or even skip other portions of the patch.

Standing dead and woody debris: Standing dead wood, snags, are in short supply where fires burned extensively in 1910, 1919, and 1934, and in existing clearcuts. Down wood is low in areas that were covered by multiple fires in the early years, but at adequate levels in old clearcuts where prescribed slash burning removed finer fuels but not large logs. Prescriptions for all treatments, both harvest and burning, address the need for standing and down wood to meet the desired conditions for that particular LTA. Prescriptions for harvest are designed to create enough snags to meet desired levels with the prescribed burning after harvest (see design criteria, SEIS Chapter 2). There are sample prescriptions in the Appendix of the EIS. Some dead wood would remain after harvest, and of course, prescribed burning would create more dead trees. Overall, treatments should have a neutral to positive effect on the status of standing and down dead wood.

Functions: Endemic levels of insects and disease would be maintained; with elevated levels where stocking levels cannot be reduced or where higher levels already exist. Fire would be returned as a low-intensity function on appropriate LTAs, and as a mixed-severity fire or lethal fire on some LTAs, in Fish Creek and the face watersheds

Summary of Alternative 2

?? Improves species composition
?? Reduces tree density on 14% of the overstocked areas
?? Reduces potential fire intensity on those lands treated
?? Removes offsite species and reforests with species adapted to the ecosystem
?? Reintroduces fire into the ecosystem
?? Improves age class distribution, especially in the long-term
?? Improves patch size
?? Maintains snags to meet desired levels
?? Maintains endemic levels of insect and disease.

Alternative 3

There would be little measurable difference in vegetation changes between Alternative 2 and this one. Alternative 3 would regenerate 405 fewer acres and commercially thin 250 acres fewer acres than Alternative 2. Approximately 12 percent (versus 14 in Alternative 2) of the high-density stands would be treated.

Regeneration Harvest:	2,455 acres
Offsite Conversion:	2,220 acres
Commercial Thin:	2,270 acres
Salvage:	465 acres
Mixed Severity Burn:	5,485 acres
Underburn:	7,045 acres
Precommercial Thin:	1,290 acres
Total:	**21,230 acres**

Alternative 3a

Alternative 3a differs from Alternative 2 by not regenerating 160 acres, and only initiating mixed severity burns on 925 acres (versus 5,485 acres in Alternative 2). It would also underburn 410 acres less than Alternative 2.

Regeneration Harvest:	2,700 acres
Offsite Conversion:	2,220 acres
Commercial Thin:	2,520 acres
Salvage:	465 acres
Mixed Severity Burn:	925 acres
Underburn:	6,635 acres
Precommercial Thin:	1,290 acres
Total:	**16,755 acres**

Species composition would shift toward early seral species. Regeneration harvest blocks would be reforested with early seral species. Thinning would favor early seral species already present, with the majority of trees removed being the late seral and climax species. This would give these trees more growing space, so that they would be more vigorous when or if the existing stand is regenerated, and be available as seed sources for the following stand. A higher percentage of early serals, and fewer small understory trees would also make

these thinned stands less susceptible to damage from fire. Understory burns would have similar effects to the commercial thins. Small understory trees, and late seral or climax trees, would be most susceptible to fire, leaving a higher percentage of early serals, and a more fire-resistant stand. The majority of mixed severity fires (in the Fish Creek drainage and along the Lochsa River breaks) would not occur; therefore species composition in these areas would not improve.

Currently, species composition is skewed from the desired mix toward the late seral and climax species. On the breaklands and colluvial midslopes. There is more grand fir, and less ponderosa pine and Douglas-fir than desired. On the frost-churned uplands, grand fir and subalpine fir are above desired levels, while lodgepole pine is below desired levels. Old surfaces generally are lacking the inclusions of white pine that were present prior to introduction of white pine blister rust. All treatments would favor early seral species. Regeneration harvest, stand-replacing fire, and species conversion would be most effective in establishing early seral species. Thins, salvage harvest, and underburns would shift the species mix in existing stands by removing some late seral and climax trees, favoring early seral species, but not eliminating the late seral and climax species.

Alternative 3a has the potential to shift too many acres out of the grand fir type on the old surfaces. Excluding Alternative 4, which does not treat any stands in the Fish Creek drainage, this is the most conservative of grand fir and cedar on old surfaces of any of the alternatives. Thinning and salvage would likely leave the treated stands in a grand fir type, with the percentage of early seral species higher than current levels. This would limit disease spread, maintaining a healthier grand fir/mixed species stand for a longer period. Regeneration harvests are designed to result in a mixed species stand that includes significant grand fir on the old surfaces. Conversion and regeneration harvests planned within western redcedar habitat types would be replanted with significant numbers of western white pine. A marked shift towards desired levels of western white pine representation in the breaklands, colluvial midslopes, frost churned uplands, and old surfaces is expected.

> The end result is that the assessment area would be more resilient to the risk of a major wildfire because early seral species, particularly ponderosa pine, Douglas-fir, larch, western white pine, and grand fir (on cedar sites), are very well adapted to fire. They either survive it, or regenerate prolifically after a fire, or both. However areas in Fish Creek would not be as resilient as in Alternative 2, because of no treatment.

Density: Alternative 3a would lower stand densities on approximately 3,605 acres (13 percent) that are considered highly dense at present.

Breaklands

LTA 21A retains the 0-40 age class within the desired range but proposed conversion harvest and regeneration harvest reduce the amount of the 101-160-age class moving them away

from the desired levels in the short term. However, in the long term (+25 years) the 101-160-age class moves closer to the desired range.

In **LTA21B,** both the 0-40 and 101-160 age classes move closer to the desired range in both the short and long term.

Regeneration harvest and conversion reduce the 101-160 age class in *LTA23A* moving this age class away from the desired while producing an overabundance of the 0-40 age class. Age classes 41-60 and 61-100 show a shift towards desired levels. However, in the long term many of the young stands grow older producing a deficit in the 0-40 age group. The effect is that the 41-60 age group then falls within the desired range as well as the 101-160-age class.

LTA23B is unaffected by Alternative 3a in both the short term and long term when compared to the No Action Alternative.

Regeneration harvest and conversion planned for **LTA23C** reduce the amount of the 101-160-age class below the desired levels but conversely move the 0-40 age class closer to the desired levels. Harvest planned for the 41-60 and 61-100 age groups move both of these age classes towards desired levels in the short term. The long term effect of Alternative 3a shifts the 0-40, 61-100 and 101-160 age classes closer to the desired levels.

Colluvial Midslopes

In **LTA61** there is a shift towards desired levels in the 0-40 age class. The 101-160-age class remains within the desired range. Over the long term, there is a shift toward desired levels in the 0-40, 101-160, and 161+ age groups.

Harvest planned within the 61-100 and 101-160 age groups of **LTA63** would move them closer to the desired levels while moving the 0-40 age group within the desired levels. In the long term, LTA63 would continue to have the 41-60 and 61-100 within the desired range. Age classes 0-40,101-160, and 161+ would also move closer to desired levels.

Frost Churned Uplands

LTA71B is unaffected by Alternative 3a in both the short term and long term when compared to the No Action Alternative.

LTA71C would experience a drop in the amount of the 41-60-age class, moving it away from the desired in the short term. This would continue in the long term.

Old Surfaces

Within **LTA81A,** 0-40, 41-60 and 101-160 age groups would be maintained at desired levels while the 61-100 age group move within the desired levels in the short term. The long term shows a shift towards desirable levels in the 160+ age group while the 61-100 and 101-160 age groups move to the desired levels.

Alternative 3a would shift 0-40 and 101-160 age classes towards desired levels in the short term within **LTA81B.** The long-term effect would be age groups 41-60 and 61-100 would move within the desired ranges. Age groups 0-40, 101-160 and 161+ would show a shift toward the desired levels compared with the No Action Alternative.

Little or no change is expected when compared to the No Action Alternative for **LTAs 83A and 84A** in both the short and long term.

Patch size: Treatments were proposed and designed to match historical patch sizes in each LTA. Long-term, treatments would enable patches to be maintained at historical sizes. This alternative differs from other alternatives in several ways. Alternatives 2, 3, 4, and 5 essentially have the same patches proposed for treatment. This alternative placed a higher emphasis on matching proposed patch sizes to desired patch sizes, and less emphasis on matching age class distributions to the desired ranges. So, for this alternative, since fewer treated patches adjoin each other, patch sizes would tend to be a little smaller, within the desired size range. These differences should be viewed within the context of the natural range of variability, which is 2 acres to 100,000 acres on any LTA.

Standing dead and woody debris: Because there is not a good inventory of standing or down dead wood, this assessment is based on qualitative information. Snags are in short supply where fires burned extensively in 1910, 1919, and 1934, and in existing clearcuts. Down wood is also low in the old burns, but at adequate levels in old clearcuts where prescribed slash burning removed finer fuels but not large logs. Prescriptions for all treatments, both harvest and burning, address the need for standing and down wood to meet the desired conditions for that particular LTA. Prescriptions for harvest are designed to create enough snags to meet DFC levels with the prescribed burning after harvest. There are sample prescriptions in the Appendix of the EIS. Some dead wood would remain after harvest, and of course, prescribed burning would create more dead trees.

Summary Alternative 3a

?? Improves species composition, except in Fish Creek
?? Reduces tree density on 13% of the overstocked areas
?? Reduces potential fire intensity on those lands treated, except in Fish Creek where mixed severity burns would not be initiated
?? Removes offsite species and reforests with species adapted to the ecosystem
?? Reintroduces fire into the ecosystem, except in Fish Creek
?? Improves age class distribution, especially in the long-term
?? Improves patch size
?? Maintains snags to meet desired levels
?? Maintains endemic levels of insect and disease.

Functions: Endemic levels of insects and disease would be maintained; with elevated levels where stocking levels cannot reduced or where higher levels already exist. Fire would be returned as a low-intensity function on appropriate LTAs and as a mixed-severity fire or lethal fire on some LTAs, in Fish Creek and the face watersheds.

Alternatives 4/4a

Alternative 4 differs from Alternative 2 by regenerating 755 acres fewer acres, not removing the offsite ponderosa pine in Bimerick Creek, and commercial thinning 215 fewer acres. In addition, under Alternative 4 no mixed severity burns would occur and only 705 acres would be underburned. Alternative 4a results in 35 fewer acres of underburning than Alternative 4, therefore the Alternative 4a effects are considered the same as Alternative 4.

Regeneration Harvest:	2,105 acres
Offsite Conversion:	0 acres
Commercial Thin:	2,305 acres
Salvage:	465 acres
Mixed Severity Burn:	0 acres
Underburn:	705 acres
Precommercial Thin:	1,290 acres
Total:	**6,870 acres**

Species composition Alternative 4 has the potential to shift many acres out of the grand fir type on the old surfaces, but harvests or burns fewer acres than any other alternative. Thinning and salvage would likely leave the treated stands in a grand fir type, with the percentage of early seral species higher than current levels. This would limit disease spread, maintaining a healthier grand fir/mixed species stand for a longer period. Regeneration harvests are designed to result in a mixed species stand that includes significant grand fir on the old surfaces.

Alternative 4 would not convert the offsite ponderosa pine to Douglas-fir and larch that are adapted to the site. This would result in an area that is less resilient more prone to lethal wildfire because of the fuels buildup.

Density: Alternative 4 would lower stand densities on approximately 2,510 acres or 9 percent of the areas considered highly dense at present. Stands that have excessive density for the site on which they are growing were high priority for thinning. Some of those stands could not be treated because of poor access. Insect and disease activity and fire risk would increase in those stands.

Precommercial thinning would result in reduced stand density, and increased long-term health of the stands. Moisture and nutrients would not be so limiting, and trees would be more vigorous, with more resistance to insects and diseases, particularly the root rot cycle. Additional cedar and grand fir may become established in the understory after this thinning activity. They would be slow-growing, overtopped trees that can be removed in the future during commercial thins, or by underburning. Underburning would be most successful if the thinned stand is primarily Douglas-fir and ponderosa pine, though evidence of underburning in grand fir and even cedar does occur in the analysis area.

Stocking control would reduce stand densities so that trees can be more vigorous and resist insects or diseases. If stands are already infected with root rot, this treatment risks facilitating the root rot spread. Stands known to have extensive root rot infections have already been dropped from consideration for thinning.

Mixed severity burns would not occur; therefore their potential to reduce stand densities would not be seen.

Regeneration harvests would also effectively reduce excess stand densities outside of the riparian habitat areas. Canopies left would range from 10 percent to 50 percent of the existing forest cover. Underburns, which are very limited in this alternative, would also thin stands, favoring early seral species and larger diameter trees.

Lower densities in the forest allow a more diverse, vigorous understory to establish and develop. This would result in layers of trees, shrubs and forbs that are available for forage and habitat for wildlife. These structures would be appropriate on most LTAs, with the exceptions of 21C and 23C. Forests on these LTAs are typically very dense limiting understory vegetation once stands are about 30 years of age.

Stream Terraces

LTA 10A is unaffected by Alternative 4 in both the short term and long term when compared to the No Action Alternative.

Breaklands

LTA 21A retains the 0-40 age class within the desired range and regeneration harvest reduces the amount of the 101-160-age class moving them away from the desired levels in the short term. However, in the long term (+25 years) the 101-160-age class moves within the desired range.

In **LTA21B**, both the 0-40 and 101-160 age classes move closer to the desired range in both the short and long term.

Both **LTA23A and LTA23B** are unaffected by Alternative 4 in both the short term and long term when compared to the No Action Alternative.

Regeneration harvest in **LTA23C** reduces the amount of the 101-160-age class below the desired levels but conversely move the 0-40 age class closer to the desired levels. Harvest planned for the 41-60 and 61-100 age groups move both of these age classes towards desired levels in the short term. The long term effect of Alternative 4 shifts the 0-40, 61-100 and 101-160 age classes closer to the desired levels.

Colluvial Midslopes

In **LTA61** there is a shift towards desired levels in the 0-40 age class. The 101-160-age class remains within the desired range. Over the long term, there is a shift toward desired levels in the 0-40, 101-160, and 161+ age groups.

Harvest planned within the 61-100 and 101-160 age groups of **LTA63** would move them closer to the desired levels while moving the 0-40 age group within the desired levels. In the long term, LTA63 would continue to have the 41-60 and 61-100 within the desired range. Age classes 0-40,101-160, and 161+ age groups would also move closer to desired levels.

Frost Churned Uplands

LTA71B and LTA71C are unaffected by Alternative 4 in both the short term and long term when compared to the No Action Alternative.

Old Surfaces

Within **LTA81A,** 0-40, 41-60 and 101-160 age groups would be maintained at desired levels while the 61-100 age group move within the desired levels in the short term. The long term shows a shift towards desirable levels in the 160+ age group while the 61-100 and 101-160 age groups move to the desired levels.

Alternative 4 would shift 0-40 and 101-160 age classes towards desired levels in the short term within **LTA81B**. The long-term effect would be age groups 41-60 and 61-100 would move within the desired ranges. Age groups 0-40, 101-160 and 161+ would show a shift toward the desired levels compared with the No Action Alternative.

Little or no change is expected when compared to the No Action Alternative for **LTAs 83A and 84A** in both the short and long term.

Patch size: Treatments were proposed and designed to match historical patch sizes in each LTA. Long-term, treatments would enable patches to be maintained at historical sizes. This alternative differs from other alternatives in several ways. Alternatives 2, 3, 3a, and 5 essentially have the same patches proposed for treatment. This alternative placed a higher emphasis on matching proposed patch sizes to desired patch sizes, and less emphasis on matching age class distributions to the desired ranges. So, for this alternative, since fewer treated patches adjoin each other, patch sizes would tend to be smaller, but still within the historical size range. These differences should be viewed within the context of the natural range of variability, which is 2 acres to 100,000 acres on any LTA.

There would be some patches less homogeneous than desired. This is due to past harvest and our need to maintain the older stands that are in short supply. For example, there are several patches that are mostly mature or late mature forest, but have old clearcuts within them. To keep a similar age/structure within the patch, the only treatment option is to regenerate the

remainder (with fire or timber harvest). These areas were deferred to maintain the older age classes in a mixed age/structure "patch".

Standing dead and woody debris: Because there is not a good inventory of standing or down dead wood, this assessment is based on qualitative information. Snags are in short supply where fires burned extensively in 1910, 1919, and 1934, and in existing clearcuts. Down wood is also low in the old burns, but at adequate levels in old clearcuts where prescribed slash burning removed finer fuels but not large logs. Prescriptions for all treatments, both harvest and burning, address the need for standing and down wood to meet the desired conditions for that particular LTA. Prescriptions for harvest are designed to create enough snags to meet desired levels with the prescribed burning after harvest. There are sample prescriptions in the Appendix of the EIS. Some dead wood would remain after harvest, and of course, prescribed burning would create more dead trees.

Functions: Endemic levels of insects and disease would be maintained; with elevated levels where stocking levels cannot be reduced or where higher levels already exist. Levels of insect and disease would increase in the offsite ponderosa pine area. Fire would be returned as a low-intensity function on appropriate LTAs.

Summary Alternative 4/4a

?? Improves species composition in many areas, but doesn't improve composition in Bimerick because offsite trees are retained.

?? Reduces tree density on 9% of the highly dense areas, less than all other alternatives

?? Does not reintroduce fire into the ecosystem, resulting in an ecosystem less resilient to disturbance processes

Alternative 5

Alternative 5 differs from Alternative 2 by regenerating 755 acres fewer acres, not removing the offsite ponderosa pine in Bimerick Creek, and commercial thinning 215 fewer acres.

Regeneration Harvest:	2,105 acres
Offsite Conversion:	0 acres
Commercial Thin:	2,305 acres
Salvage:	465 acres
Mixed Severity Burn:	5,485 acres
Underburn:	7,045 acres
Precommercial Thin:	1,290 acres
Total:	**12,530 acres**

Species composition: Alternative 5 has the potential to shift many acres out of the grand fir type on the old surfaces. Thinning and salvage would likely leave the treated stands in a

grand fir type, but with the percentage of early seral species higher than current levels. This would limit disease spread, maintaining a healthier grand fir/mixed species stand for a longer period. Regeneration harvests are designed to result in a mixed species stand that includes significant grand fir on the old surfaces.

The end result is that the assessment area would be more resilient to the risk of a major wildfire because early seral species, particularly ponderosa pine, Douglas-fir, larch, western white pine, and grand fir (on cedar sites), are very well adapted to fire. They either survive it, or regenerate prolifically after a fire, or both. Regeneration harvests planned within western redcedar habitat types would be replanted with significant numbers of western white pine. A shift closer toward historical levels of western white pine representation in the breaklands, colluvial midslopes, frost churned uplands, and old surfaces would occur, but less than alternatives that include offsite conversion.

Density: Alternative 5 would lower stand densities on approximately 3,580 acres or 13 percent of the stands considered highly dense at present. The effects would be similar to Alternative 2

Stream Terraces - LTA 10A is unaffected by Alternative 5 in both the short term and long term when compared to the No Action Alternative.

Breaklands

LTA 21A retains the 0-40 age class within the desired range. Regeneration harvest reduces the amount of the 101-160-age class moving them away from the desired levels in the short term. However, in the long term (+25 years) the 101-160-age class moves within the desired range.

In **LTA21B,** both the 0-40 and 101-160 age classes move closer to the desired range in both the short and long term.

Both *LT***A23A and LTA23B** are unaffected by Alternative 5 in both the short term and long term when compared to the No Action Alternative.

Regeneration harvest in **LTA23C** reduces the amount of the 101-160-age class below the desired levels but conversely move the 0-40 age class closer to the desired levels. Harvest planned for the 41-60 and 61-100 age groups move both of these age classes towards desired levels in the short term. The long term effect of Alternative 5 shifts the 0-40, 61-100 and 101-160 age classes closer to the desired levels.

Colluvial Midslopes

In **LTA61** there is a shift towards desired levels in the 0-40 age class. The 101-160-age class remains within the desired range. Over the long term, there is a shift toward desired levels in the 0-40, 101-160, and 161+ age groups.

Harvest planned within the 61-100 and 101-160 age groups of **LTA63** would move them closer to the desired levels while moving the 0-40 age group within the desired levels. In the long term, LTA63 would continue to have the 41-60 and 61-100 within the desired range. Age classes 0-40,101-160, and 161+ age groups would also move closer to desired levels.

Frost Churned Uplands

LTA71B and LTA71C are unaffected by Alternative 5 in both the short term and long term when compared to the No Action Alternative.

Old Surfaces

Within **LTA81A,** 0-40, 41-60 and 101-160 age groups would be maintained at desired levels while the 61-100 age group move within the desired levels in the short term. The long term shows a shift towards desirable levels in the 160+ age group while the 61-100 and 101-160 age groups move to the desired levels.

Alternative 5 would shift 0-40 and 101-160 age classes towards desired levels in the short term within **LTA81B.** The long-term effect would be age groups 41-60 and 61-100 would move within the desired ranges. Age groups 0-40, 101-160 and 161+ would show a shift toward the desired levels compared with the No Action Alternative. Little or no change is expected when compared to the No Action Alternative for LTAs 83A and 84A in both the short and long term

Patch size: Treatments were proposed and designed to match historical patch sizes in each LTA. Long-term, treatments would enable patches to be maintained at historical sizes.

There would be some patches less homogeneous than desired, due to past harvest and our need to maintain the older stands that are in short supply. For example, there are several patches that are mostly mature or late mature forest, but have old clearcuts within them. To keep a similar age/structure within the patch, the only treatment option is to regenerate the remainder (with fire or timber harvest). These areas were deferred to maintain the older age classes in a mixed age/structure "patch".

Standing dead and woody debris: Alternative 5 would result in similar effects as Alternative 2.

Functions: Endemic levels of insects and disease would be maintained; with elevated levels where stocking levels cannot be reduced or where higher levels already exist. Fire would be returned as a low-intensity function on appropriate LTAs, and as a mixed-severity fire or lethal fire on some LTAs, in Fish Creek and the face watersheds. Insect and disease levels would increase and stand resiliency would decrease in the offsite ponderosa pine stands in Bimerick Creek. Fire risk and potential intensity would increase as the offsite trees die.

Summary Alternative 5

?? Improves species composition in many areas, but doesn't improve composition in Bimerick because offsite trees are retained.
?? Reduces tree density on 13% of the highly dense areas, less than all other alternatives
?? Reintroduces fire into the ecosystem, resulting in an ecosystem more resilient to disturbance processes
?? Improves patch size, especially in the long term
?? Improves age classes, especially in the long term

Alternative 6

Alternative 6 differs from Alternative 2 by regenerating 140 acres fewer acres, commercial thinning 485 fewer acres, salvaging 150 acres less, and 295 acres less of precommercial thinning. Alternative 6 however would implement an additional 170 acres of mixed severity burns, and 135 acres more of underburns than Alternative 2.

Regeneration Harvest:	2,720 acres
Offsite Conversion:	2,220 acres
Commercial Thin:	2,305 acres
Salvage:	315 acres
Mixed Severity Burn:	5,655 acres
Underburn:	7,180 acres
Precommercial Thin:	995 acres
Total:	**21,120 acres**

Species composition: Alternative 6 has the potential to shift many acres out of the grand fir type on the old surfaces. Thinning and salvage would likely leave the treated stands in a grand fir type, but with the percentage of early seral species higher than current levels. This would limit disease spread, maintaining a healthier grand fir/mixed species stand for a longer period. Regeneration harvests are designed to result in a mixed species stand that includes significant grand fir on the old surfaces.

The end result is that the assessment area would be more resilient to the risk of a major wildfire because early seral species, particularly ponderosa pine, Douglas-fir, larch, western white pine, and grand fir (on cedar sites), are very well adapted to fire. They either survive it, or regenerate prolifically after a fire, or both. Conversion and regeneration harvests

planned within western redcedar habitat types would be replanted with significant numbers of western white pine. A marked shift towards desired levels of western white pine representation in the breaklands, colluvial midslopes, frost churned uplands, and old surfaces is expected.

Density: Alternative 6 would lower stand densities on approximately 3,450 acres, 12 percent of the stands that are considered highly dense at present. Precommercial thinning would result in reduced stand density, and increased long term health of the stands. Moisture and nutrients would not be so limiting, and trees would be more vigorous, with more resistance to insects and diseases, particularly the root rot cycle. Alternative 6 precommercially thins 295 acres less than all the other action alternatives.

Salvage and stocking control would reduce stand densities so that trees can be more vigorous and resist insects or diseases. If stands are already infected with root rot, this treatment risks facilitating the root rot spread.

Prescribed burns designed to mimic stand-replacing fire (either lethal or mixed severity) would also reduce stand densities. Not all of these burns are planned in areas that have high densities. Regeneration harvests would also effectively reduce excess stand densities outside of the riparian habitat areas. Canopies left would range from 10 percent to 50 percent of the existing forest cover.

Stream Terraces

LTA 10A is unaffected by Alternative 6 in both the short term and long term when compared to the No Action Alternative.

Breaklands

LTA 21A retains the 0-40 age class within the desired range but proposed conversion harvest and regeneration harvest reduce the amount of the 101-160-age class moving them away from the desired levels in the short term. However, in the long term (+25 years) the 101-160-age class moves within the desired range.

In **LTA21B,** both the 0-40 and 101-160 age classes move closer to the desired range in both the short and long term.

Regeneration harvest and conversion reduce the 101-160 age class in **LTA23A** moving this age class away from the desired while producing an overabundance of the 0-40 age class. Age classes 41-60 and 61-100 show a shift towards desired levels. However, in the long term many of the young stands grow older producing a deficit in the 0-40 age group. The effect is that the 41-60 age group then falls within the desired range as well as the 101-160-age class.

LTA23B is unaffected by Alternative 6 in both the short term and long term when compared to the No Action Alternative. Regeneration harvest and conversion planned for LTA23C

reduce the amount of the 101-160-age class below the desired levels but conversely move the 0-40 age class closer to the desired levels. Harvest planned for the 41-60 and 61-100 age groups move both of these age classes towards desired levels in the short term. The long term effect of Alternative 6 shifts the 0-40, 61-100 and 101-160 age classes closer to the desired levels.

Colluvial Midslopes

In **LTA61** there is a shift towards desired levels in the 0-40 age class. The 101-160-age class remains within the desired range. Over the long term, there is a shift toward desired levels in the 0-40, 101-160, and 161+ age groups.

Harvest planned within the 61-100 and 101-160 age groups of **LTA63** would move them closer to the desired levels while moving the 0-40 age group within the desired levels. In the long term, LTA63 would continue to have the 41-60 and 61-100 within the desired range. Age classes 0-40,101-160, and 161+ age groups would also move closer to desired levels.

Frost Churned Uplands

LTA71B is unaffected by Alternative 6 in both the short term and long term when compared to the No Action Alternative.

LTA71C would experience a drop in the amount of the 41-60 age group, moving it away from the desired in the short term. This would continue in the long term.

Old Surfaces

Within **LTA81A,** 0-40, 41-60 and 101-160 age groups would be maintained at desired levels while the 61-100 age group move within the desired levels in the short term. The long term shows a shift towards desirable levels in the 160+ age group while the 61-100 and 101-160 age groups move to the desired levels.

Alternative 6 would shift 0-40 and 101-160 age classes towards desired levels in the short term within **LTA81B.** The long-term effect would be age groups 41-60 and 61-100 would move within the desired ranges. Age groups 0-40, 101-160 and 161+ would show a shift toward the desired levels compared with the No Action Alternative.

Little or no change is expected when compared to the No Action Alternative for **LTAs 83A and 84A** in both the short and long term.

Patch size: The effects to patch size would be similar to Alternative 2. Patch sizes would improve in the long term as similar age classes grow together.

Standing dead and woody debris: The effects to standing dead and wooding debris would be similar to Alternative 2. All alternatives incorporate the snag requirements identified in chapter 2, Design Criteria. Alternative 6 would result in improved structural diversity in the long term.

Functions: Endemic levels of insects and disease would be maintained; with elevated levels where stocking levels cannot be reduced or where higher levels already exist. Fire would be returned as a low-intensity function on appropriate LTAs, and as a mixed-severity fire or lethal fire on some LTAs, in Fish Creek and the face watersheds.

Summary Alternative 6

?? Improves species composition
?? Reduces tree density on 14% of the overstocked areas
?? Reduces potential fire intensity on those lands treated
?? Removes offsite species and reforests with species adapted to the ecosystem
?? Reintroduces fire into the ecosystem
?? Improves age class distribution, especially in the long-term
?? Improves patch size
?? Maintains snags to meet desired levels
?? Maintains endemic levels of insect and disease.

Cumulative Effects: The cumulative effects of the North Lochsa Face Project on vegetation need to be seen in the broad geographic context. Those geographic boundaries vary for different aspects of vegetation character. Old Forest, species composition, and processes such as insect and disease activity, should be considered as a part of the entire landscape Section, M333D, used in the Upper Columbia River Basin assessment. The planning area itself is the area of cumulative effects for sensitive plants, standing and down dead wood, forest density, and patch sizes.

It is also important to consider the cumulative effects time frame of the action. In this case, the time frame considered was up to 15 years after the last North Lochsa Face project related timber harvest, the year 2025. By that time, new forests would be established and growing rapidly where regeneration harvest was completed if the any of the action alternative are implemented. In any case, many stands that are now approaching the old forest (160 years and more) age, would be there, and many of the stands regenerated after the Pete King fire in 1934 would be in the next age class also, changing the overall age class distribution.

Past, present, and future actions were also considered during this cumulative effects analysis. Past actions considered include timber sales, fire suppression, and extensive fires in the early part of the century. Present actions considered include district salvage sales, and ongoing fire suppression. Effects of past and present actions are considered/portrayed in the existing condition of the area. Future activities that are likely to occur include district salvage sales, ongoing root rot and bark beetle activity, and wildfires.

Within ecoregion section M333D, moist forests are dominated by shade-tolerant species at three times the historic level. Conditions in the North Lochsa Face area are consistent with the section conditions. Section M333D is also dominated by mid-early seral forest types at

twice the historic level, also true of the North Lochsa Face area. With the dominance of the mid-early seral forests, early and late seral forests are below the historical levels.

Alternative 1: Little change in species composition is expected by 2025. Early seral species would continue to be slowly replaced by late seral and climax species. The North Lochsa Face area would continue to be outside the historical range with no treatment. Timber harvest on National Forest Lands within the Lochsa Basin would continue. Reforestation done with a mix of early seral species would also continue. Regeneration harvest of private timberland in the upper Lochsa Basin is currently done in such a manner that enough trees are retained so that planting is not required by the Idaho Forest Practices Act. However, in most cases the trees retained are often shade tolerant (late-seral) species with little fire resistance. This practice would cumulatively contribute to the shift to late seral species.

The Crooked and Bear Camp 2 fires of 2000 in the upper Lochsa basin were a stand replacing fires in most areas. These areas would require tree planting on both private and Forest Service System lands. A large number of acres also burned within the Selway Bitterroot Wilderness in 2000. These would not be planted but are also expected to have a beneficial effect on species composition and shift species towards a more desirable mix with a greater proportion of early seral species. Scheduled timber harvest or recent wildfires make up only a small fraction of the entire area. The magnitude of the effects created by these disturbances is only slight in relation to unharvested or unburned areas. Overall, the Lochsa Basin is expected experience a shift towards late seral species similar to the current trend in the North Lochsa Face Analysis Area. As the risk of wildfire grows through time, a fire similar to the 1910, 1919 or 1934 fire could occur. A fire of this magnitude could have a significant effect of the species composition of the entire Lochsa River Basin.

No change in early seral stage structure is expected in the absence of wildfire with Alternative 1. As trees age over the next 10 to 25 years, stands would begin to enter the older age classes that are in short supply now, as long as there is no major wildfire. This trend would also generally occur in most of the Lochsa Basin with the exception of the private timberlands in the upper basin where the retention of late-successional stands is not economically favorable. Ongoing harvest of private timberland in the upper Lochsa coupled with the stand-replacing effects of wildfire experienced in 2000 has turned back the successional clock in many areas creating a number of early successional stands.

Insect and disease activity levels would continue to rise and fall with stocking levels, stand structures, and moisture conditions. Intermediate harvest treatments (salvage) would have little effect on infestation and infection levels for most of the insects and diseases currently present in the Lochsa River Basin.

A salvage program, one that continually removes the dead and dying trees in accessible areas, could result in conversion of some stands to shrubfields. Patch sizes would change little in the short term.

Under this alternative, current dead wood conditions would be maintained for the short term. In the Canyon, Apgar, and Glade Creek drainages, many stands have high levels of dead

standing wood, due to extensive insect and disease activity. Dead wood is lacking where multiple fires burned in the early 1900s. Lower Pete King Creek, the east half of the Deadman drainage, the face of the Lochsa from Deadman to Fish Creek, and the lower Fish and Hungery drainages are in this condition.

Action Alternatives: Cumulative effects are expected to be similar for all action alternatives. On such a broad scale, the range of environmental effects between alternatives is not significant.

By 2025, species composition is expected to shift toward more early seral species because of the vegetation manipulation called for in all of the action alternatives. This would move the North Lochsa Face area and Ecoregion Section M333D to a lesser degree, closer to the historical composition.

As trees age over the next 10 to 25 years, stands would begin to enter the older age classes that are in short supply now, as long as there is no major wildfire. This trend would also generally occur in most of the Lochsa Basin and section M333D with the exception of the private timberlands in the upper basin where the retention of late-successional stands is not economically favorable. Ongoing harvest of private timberland in the upper Lochsa coupled with the stand-replacing effects of wildfire experienced in 2000 has turned back the successional clock in many areas creating a number of early successional stands. Stands in Canyon, Apgar, and Glade Creeks that are approaching the late seral stage have been classed as high risk for major wildfire, which could occur in the next 25 years. A fire in this area would likely reset the successional clock.

Insect and disease activity levels would continue to rise and fall with stocking levels, stand structures, and moisture conditions. The ongoing forest salvage program would have little effect on infestation and infection levels for most of the insects and diseases currently present. Regeneration harvests followed by reforestation with a mix of early seral species would reduce susceptibility to insects and diseases on those acres. Thinning would also reduce the risk of a spruce budworm epidemic by reducing the number of stands with multi-layers of shade tolerant species. Reduction of the conditions conducive to insect and disease outbreaks can indirectly affect surrounding areas by reducing the risk of outbreaks spreading to unaffected areas. Patch sizes would show the results of correction from small, fragmented openings to the larger patch sizes typical on this landscape. In the Canyon, Apgar, and Glade Creek drainages, many stands have high levels of dead standing wood, due to extensive insect and disease activity. Dead wood is lacking where multiple fires burned in the early 1900s. Lower Pete King Creek, the east half of the Deadman drainage, the face of the Lochsa from Deadman to Fish Creek, and the lower Fish and Hungery drainages are in this condition.

Forest Plan Consistency: All proposed treatments in all action alternatives are consistent with the Forest Plan Standards for vegetative management. The action alternatives would result in maintaining a diversity of vegetation and habitat conditions across the forest to meet the needs of a variety of wildlife species, and to provide a sustained yield of timber.

Consistency with the National Forest Management Act: The National Forest Management Act and implementing regulations (1982) require specific findings be made when implementing the Forest Plan. Those findings include the following:

- **Suitability for timber production:** Harvest units proposed on suitable lands have been reviewed and determine that they are located on suitable lands and are capable of being regenerated in five years of timber harvest.
- **Clearcutting and even-aged management:** The Clearwater Forest Plan favors the use of even-aged silvicultural systems within the suitable management areas proposed harvest. The ID team and silviculturist have determined that prescribing even-aged systems for the specified units is appropriate. In order to meet the purpose and need of the project, some proposed units are prescribed as clearcuts with reserve trees. The off site ponderosa pine would be clearcut and reforested to species adapted to site conditions. This is the optimum method of treatment for this site due to the existing deteriorating conditions of the off site ponderosa pine. Removal of the pine would improve vegetative diversity and forest health conditions.
- **Vegetative manipulation:** The National Forest Management Act provides that timber harvest and other silvicultural practices shall be used to prevent damaging population increases of forest pest organisms and treatments shall not make stands susceptible to pest-caused damage levels inconsistent with management objectives. Harvest of trees provides social and economic benefits, reduces potential losses attributed to insects and disease, and manipulates forest vegetation to enhance wildlife habitat and increase vegetation resiliency. The silvicultural prescriptions are designed to meet Forest Plan goals and objectives for forest productivity and wildlife habitat improvement, while achieving ecosystem objectives.
- **Regeneration potential:** The National Forest Management Act specifies, "timber would be harvested from National Forest system lands only where there is assurance that such lands can be adequately stocked within five years after final harvest (16 USC 1604). Determination of adequate stocking is based on reforestation surveys conducted within a five-year period following harvest or site preparation. Results of these surveys are compared with the desired and minimum levels identified in a site-specific silvicultural prescription. Restocking is considered satisfactory when the harvest area contains the minimum number, distribution, and species composition of vegetation specified in the prescription. Proposed treatments include regeneration harvest in order to move the area towards desired conditions. These harvest openings would be planted or seeded naturally to create a diverse community of vegetative conditions. Survey records on the Clearwater National Forest have been reviewed to determine the probability of reforestation success. Monitoring results show that areas regenerated are adequately reforested in five years 96 percent of the time (Clearwater Forest Plan Monitoring Reports, 1999, 2000). Harvest would occur on similar sites as evaluated in these reports. Based on this information reforestation on suitable lands would be accomplished in accordance with the National Forest Management Act.
- **Size of openings:** The National Forest Management Act 36 CFR 219.27(d)(2)(i) states "Cut openings lager than those specified (40-acres in this case) may be permitted

where larger units will produce a more desirable combination of net public benefit". Prior to fire suppression efforts, the natural fire events that influenced the North Lochsa Face ecosystem ranged from spot fires less than one acre in size to large stand replacement fires 1000+ acres in size. The ID team considered the effects of past management and concluded that in many cases smaller openings have had detrimental effects, including: 1) fragmentation of large patches of mature or late mature forest; 2) creating openings that did not meet scenic quality objectives, because they did not match form, texture, or scale of natural disturbances; and 3) the small scale treatments did not allow the effective return of fire to the landscape or effectively lessen the risk of wildfire. Proposed treatment units were designed to fit desired patch sizes and to maintain manageable boundaries for burning and logging systems. A range of possible opening sizes is included in each alternative description, with the high range representing a worst-case scenario. As per Forest Plan direction and the Northern Regional Guide, Forest Supervisor approval was obtained on all proposed openings between 40 and 60 acres, and Regional Forester approval was obtained on proposed openings over 60 acres.

Old Growth Existing Conditions

General Information: In 1992, a Forest-wide old growth survey was done using the stand data base, photo interpretation and local knowledge. Per interim CNF direction (July 1998), old growth habitat is generally defined on the CNF as "…a stand of trees 160 years or older and 25 acres or larger in size." The purpose of the initial identification of old growth was to assess whether the CNF was meeting the FP standard for 10 percent old growth across the CNF. To complete this assessment, the CNF was sub-divided into old growth analysis units, average approximately 10,000 acres in size. These analysis areas were identified and mapped to conform to 'compartments' identified through the timber data base recording keeping system. The resulting old growth analysis units very often were aligned along topographic breaks, like major drainages.

On the Lochsa Ranger District, foresters and biologists pooled their data base information, aerial interpretation and local on-the-ground knowledge to tentatively identify growth stands. This 1992 survey identified approximately 12,500 acres of old growth forest (*Old-Growth Forest Types of the Northern Region*, Green et. al., 1992) within the NLF. Most identified old growth stands were clustered in areas missed by the large wildfires in the early 1900's. Analysis indicated the bulk of the old growth was in the cedar/grand fir forest types.

Between 1993 and 1996, most of these stands were visited and survey data collected to field verify stands that did qualify as old growth. Per the interpretation of the '93-'96 field survey data, approximately 5000 acres of tentatively identified stands were eliminated as old growth. A 1998 review of the old growth data base records for the Lochsa Ranger District, indicated that 172 stands identified in the 1992 Forest old growth query had been overlooked during the preparation of the NLF DEIS.

Review of the stand data base and stand exam records indicated approximately 30 of these stands had been re-delineated in to larger stands. This practice occurred primarily in the headwaters of Deadman Creek where a mosaic of vegetation had been originally mapped into very small, difficult to locate stands. Review of the stand examination records indictated many of the remaining stands failed to meet north Idaho old growth forest criteria and were subsequently dropped with rationale. Where data was sufficient to indicate a stand may qualify as old growth, it was retained in the old growth data base as "tentatively identified" old growth. Stands lacking field survey and stand examination data were also retained as "tentatively identified" old growth. Restoration/evaluation of 172 stands suspected of being old growth (but missed by the data base queries) were added as "tentatively identified" old growth (pending verification from field or stand examinations).

Ecologist/Silviculturist Hazelbaker and wildlife biologist Talbert, reviewed 57 "tentatively identified" old growth stands within the NLF. These stands were primarily identified in 1992 CNF old growth status report, March 1992. A combination field review, stand data records, personal site knowledge and professional judgement was used to determine the validity of the "tentative old growth" determinations. Per the CFP (Appendix H, III-3), the minimum size of an area that can be considered old growth is 25 acres…larger stands of approximately 80 acres are preferred." Analyses of these stands determined that 15 of these stands meet north Idaho old growth forest characteristics (as described by *Old-Growth of the CNF*, A Status Report, October 1998).

Three verified old growth forest stands were dropped from consideration for timber harvest (including portions of planned units adjoining these stands that were not old growth) with the original FEIS. A fourth stand, though verified not to be old growth, was dropped from timber harvest because it contributed to the pending future development of a larger patch of older forest. Another stand, that was actually an existing plantation, had been mis-identified as tentatively identified old growth. The remaining 37 stands that were verified to not be old growth were retained in planned harvest units.

Existing Condition: Approximately 11,000 acres of coniferous forest stands within the NLF are considered old growth. Table 3.5, identifies by old growth analysis area, the approximate acreage and percentage of old growth within each old growth analysis area occuring in the NLF.

Table 3-20: Existing Coniferous Old Growth Forest (OG) Within the North Lochsa Face Analysis Area

OG Analysis Unit (Area & Id #)	Analysis Unit Area (ac)	Field Verified OG (ac)	Tentatively Identified OG (ac)	Total Old Growth (ac)	Total Old Growth (%)
Upper Hungery Cr (01)	11,300	0	220	220	2
Lower Hungery Cr (02)	11,600	0	170	170	1
Willow Creek (03)	11,700	0	0	0	0
Black Cany'n Face (09)	9,100	0	0	0	0
Lower Fish Creek (10)	11,700	0	260	260	2
Upper Fish Creek (11)	10,200	0	1260	1260	12
West Canyon (12)	10,500	240	2830	3070	29
Canyon/Glade (13)	10,300	2410	470	2880	28
Deadman (14)	11,900	350	1260	1610	14
Bimerick Creek (15)	7,700	90	260	350	5
East Pete King (20)	9,100	330	570	910	10
West Pete King (21)	12,400	290	640	930	7
TOTALS	**127,500 ac**	**4810**	**6870**	**11,680**	**9.2 %**

An additional 700 acres in the NLF have been identified through the Clearwater National Forests stand database as possibly qualifying as old growth forest (but needing field verification to confirm or refute). Approximately 400 acres of verified or tentatively identified old growth stands included in Table 3.2, have a dense understory of smaller, commercial-size trees. The ability of these stands to resist disease and stand-replacing fire (i.e., stand health) is being compromised by competition between trees. Forest fuel loadings (i.e., and associated potential to carry intense fire) are believed to be increasing (as trees die and accumulate on the forest floor).

Old Growth Environmental Consequences

Analysis Process: The Clearwater Forest Plan requires that a minimum of 5 percent old growth be provided in "…within forested non-wilderness areas…"(CFP, II-23, 5d), per Old Growth Analysis Unit (OGAU). The analysis evaluates the changes in the amount of old growth provided by OGAU within the North Lochsa Face analysis area. Table 3-21 displays the amount of old growth remaining by OGAU.

Direct and Indirect Effects

Alternatives 1 and 6: would not treat any tentatively identified old growth in the NLF. Old growth stands would be retained undisturbed except by natural disturbance factors (other than wildfire). Wildfire in old growth stands in MAs E1 and C4 (including M1 within these MAs) would be suppressed. Wildfire in old growth stands in MAs outside of these areas may

or may not be suppressed, depending on appropriate fire management prescriptions for the general area. Identified old growth in the NLF would comprise approximately 9.2 percent of the North Lochsa Face 128,000 acres. Old growth stands with indications of pending demise (due to increased tree competition, often attributed to, but not restricted to, the exclusion of low/mixed severity fires) would remain at high risk of tree mortality. Deteriorating stand health, due to high tree mortality and/or reduced tree vigor (resulting in increased pathogen induced death) would threaten the capability of these stands to continue as old growth.

Alternatives 2 through 5: continue with natural disturbance factors influencing the distribution and abundance of old growth forest stands throughout most of the North Lochsa Face. Field and tentatively identified old growth would comprise approximately 8.5 percent of the 128,000 acres. Wildfire in old growth stands in MAs E1 and C4 (including M1 within these MAs) would be suppressed. Wildfire in old growth stands in MAs outside of these areas may or may not be suppressed, depending on appropriate fire management prescriptions for the general area.

Alternatives 2 through 5, would specifically evaluate twelve verified old growth stands that are showing signs of pending demise, for possible silvicultural treatment (i.e., "stocking control"). The twelve stands total 400 acres (the reader should note that acreages of these stands are gross stand acres and include riparian areas --- estimated at 25-30 percent of any stand --- where full default PACFISH buffers would be applied). Eleven of these stands range in area from 17 to 44 acres; the twelfth stand, totaling 89 acres, surrounds an existing 20 to 30 acre clear-cut. Each of these verified old growth forest stands would require intensive field review by an Ecologist-Silviculturist.

Silvicultural prescriptions in stands determined suitable for treatment in Alternatives 2 through 5 would be implemented only to retain the old growth character of these stands via retention of old growth features and improved longevity. Stocking control would be accomplished via commercial thinning logging practices. Stand health would be expected to improve due reduced competition from smaller, understory trees within these stands. This practice would emulate low/mixed severity fire killing some trees and consuming some dead wood on the forest floor. Silvicultural treatment would be expected to reduce the risk of a stand being lost to a stand-replacing fire. Improved stand health would also allow these stands to maintain their old forest character (structure and function) for a longer period of time.

Within the twelve stands considered for treatment in Alternatives 2 through 5, some or portions of these stands that demonstrate moderate to high levels of root rot, would be excluded at this time from silvicultural treatment (i.e., stocking control via commercial thinning). Harvest in these stands would only exacerbate the root rot and promote more rapid decline in stand health.

It is important to note that although Table 3-21 indicates a reduction in old growth in Alternatives 2 through 5, the intent of these alternatives is not to reduce old growth, but enhance the old growth conditions so that the old growth can be carried through time. Table 3-21 can be viewed as a “worse case” scenerio.

Table 3-21: Available Coniferous Old Growth Forest by Alternative

OG Analysis Units	Alt 1		Alt 2		Alt 3		Alt 3a		Alt 4		Alt 4a		Alt 5		Alt 6	
	(ac)	%)	(ac)	(%)	(ac)	(%)	(ac)	(%)	(ac)	(%)	(ac)	(%)	(ac)	(%)	(ac)	(%)
Upper Hungery Cr (01)	220	2	220	2	220	2	220	2	220	2	220	2	220	2	220	2
Lower Hungery Cr (02)	170	1	170	1	170	1	170	1	170	1	170	1	170	1	170	1
Willow Creek (03)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Black Cany'n Face (09)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lower Fish Creek (10)	260	2	260	2	260	2	260	2	260	2	260	2	260	2	260	2
Upper Fish Creek (11)	1260	12	1260	12	1260	12	1260	12	1260	12	1260	12	1260	12	1260	12
West Canyon (12)	3070	29	2680	26	2680	26	2680	26	2680	26	2680	26	2680	26	3070	29
Canyon/Glade (13)	2880	28	2730	27	2730	27	2730	27	2730	27	2730	27	2730	27	2880	28
Deadman (14)	1610	14	1580	13	1580	13	1580	13	1580	13	1580	13	1580	13	1610	14
Bimerick Creek (15)	350	5	300	4	300	4	300	4	300	4	300	4	300	4	350	5
East Pete King (20)	910	10	750	8	750	8	750	8	750	8	750	8	750	8	910	10
West Pete King (21)	930	7	920	7	920	7	920	7	920	7	920	7	920	7	930	7
TOTALS	**11,650**	**9.2**	**10,860**	**8.5**	**10,860**	**8.5**	**10,860**	**8.5**	**10,860**	**8.5**	**10,860**	**8.5**	**10,860**	**8.5**	**11,650**	**9.2**

Cumulative Effects

The geographic boundary for assessing cumulative effects of each alternative for old growth coniferous forest is the North Lochsa Face study area. Though several timber harvest projects are in close proximity (but otherwise outside) to the study area, these projects must also meet Clearwater Forest Plan direction for old growth coniferous forest, by OGAU. The time frame for the cumulative effects assessment is 2012. Present and foreseeable future management actions and natural events in the NLF study area which could effect old growth include: 1) Salvage harvest implemented through the Ranger District small timber sale program; 2) Large or severe wildfires; and 3) Advancing forest succession.

Advancing forest succession throughout the NLF would continue the trend of increasing old forest towards the over-all Forest Plan standard of 10 percent (CFP, II-23, 5d). In addition, forest succession, as indicated by planned actions, would continue to advance and promote re-establishment of larger patches of older forest typical for given LTA. Though the old growth forest stands currently comprise an estimated 9.2 percent of the NLF, many small, typically narrow patches of large, old trees occur in riparian areas, adjoining immature or mature forest. The estimated 9.2 percent old growth neither includes: 1) Small patches occurring within or adjoining larger stands; nor 2) Stands recently identified from stand

database queries as containing old growth forest features, requiring field review to validate.

In Alternatives 2 through 5, declines in old growth would be offset by practices intended to maintain existing stands of old growth longer than would be expected without treatment. Old growth features would expect to be restored as some trees die and fall, while younger trees re-establish in the understory. Advancing forest succession in mature stands would be expected to replace harvested old growth stands in 2 or 3 decades, as stands age sufficient to meet old growth characteristics. Where current patch size has been reduced by regeneration timber harvest practices, many of the planned prescriptions to be implemented by the NLF are intended to promote the development of larger patches of older trees. Prescribed silvicultural practices would promote more rapid tree growth (diameter and height) in younger stands of dense forest.

In the long-term, the planned actions in Alternatives 2 through 5, when compared to existing patch size and historic timber harvest practices, would enhance the development of larger patches of older trees within the NLF. This would accomplished by: 1) Retaining many patches (which include primarily mid-seral and old forest) and 2) Promoting increased tree growth in younger patches of dense forest. Alternatives 1 and 6, in the long-term, would also allow larger patches of older forest to develop. Existing old growth stands that are threatened by significant deterioration (due to tree crowding and excessive fuel build-up) would have increased risk of being lost to any dry-season wildfire that might erupt in them.

Consistency with Clearwater Forest Plan: All planned NLF actions are intended to maintain or restore larger patches of older forest, including old growth forest structure, function and processes. Management actions that recognize, accommodate or promote natural processes and disturbance regimes are expected to eventually provide for the continued occupation of this landscape within the historic range of variation for old forest. Planned management actions exceed the Clearwater Forest Plan standard for coniferous old growth forest in nonwilderness areas.

Threatened Plants

Table 3-22 briefly describes the species and their respective habitats that are listed by the USF&WS for the CNF. The “NLF SEIS – MIS & TES Wildlife and Plants Resources Status Report” dated March 26, 2001 provides more details on these species including habitat needs.

Table 3-22: Threatened Plant Species Considered for North Lochsa Face SEIS

Species	Scientific Name	Habitat Description	Probability of Occurrence & Comment
Water Howelia	*Howellia aquatilis*	Known to occur in wetland/riparian habitats in Latah County. Could potentially occur in Clearwater County.	Low probability this species occurs within the NLF.
Ute Ladies'-tresses	*Spiranthes diluvialis*	Known to occur in wetland/riparian habitats from 1500 to 7000 feet elevation. This species has the potential to also occur in spring habitats, wet meadows and river meanders. It also has the potential to occur in a wider range of habitats and elevations than previously predicted.	Low probability this species occurs within the NLF.
Spalding's Catchfly	*Silene spaldingii*	Habitat is grassland and open ponderosa pine forest.	Low probability this species occurs within the NLF.

Based on information from the Boise office of the USF&WS (Section 7 Guidelines, given to the Clearwater and Nez Perce NF's, dated 2/4/1998), *Spiranthes diluvialis* is thought to be a marginal Great Basin species. Populations are known to occur at the base of the eastern slopes of the Rocky Mountains in southeastern and central Wyoming, north-central Colorado, southwest Montana [in the valley bottom of the Jefferson river], the Colorado River basin (especially the Uinta basin), and the Wasatch front and westward into north-central and western Utah [great basin]. There is one new occurrence (in periodic flooded alkaline flats) documented in the Okanogan River basin, near Wanacutt Lake, Washington.

A review of this species' habitat (per ICDC, Montana Natural Heritage and Washington Natural Heritage records) indicates this species to be found in wetland habitats in a physiographic setting of large, low gradient valley bottoms. Other typical habitats include transition areas where river systems leave high gradient, mountainous settings and enter shrub (sagebrush, greasewood, bitterbrush) or grassland-steppe physiographic settings. Plants are nearly always in low gradient, alluvial valleys, open; grass dominated wet meadows, shrub or deciduous tree (i.e. cottonwood) riparian areas. Soils are often alkaline or periodically flooded alkaline flats, adjacent to lowland lakes. Most of the CNF would not be considered suitable habitat for *Spiranthes*.

A review of the habitat needs for water howelia, Ute ladies tresses and Spalding's catchfly were completed for the NLF study area. The review indicated a low probability of these threatened species, or their associated habitats, occurring within the project area. No further evaluation, therefore, will be conducted in the NLF analysis on these species.

Sensitive Plant Species Existing Conditions

Much of the NLF has been evaluated for known populations of sensitive plants. Bank monkeyflower, California sedge and Oregon bluebells (described in the FEIS, pp 83-85) were dropped from this report as they are no longer listed sensitive species. The following discussion is based on the Northern Region Sensitive Species list released in March 1999. Table 3-23 identifies sensitive plant species which could occur within the NLF.

Table 3-23: Occurrence of Sensitive Plant Species

Sensitive Plant Species	Occurrence	Comment
Cladonia andereggii **Anderegg's Cladonia**	Unlikely to occur	Very little is known about this rare fruticose lichen, its habitat requirements, or the substrate on which it grows. There are only two occurrences worldwide, both from a moist cedar/hemlock forest along a tributary of the upper Palouse River. These were found in 1989. The area was surveyed recently but the species was not found.
Pestasites sagittatus **Arrowleaf Coltsfoot**	Not known or suspected	Arrowleaf coltsfoot is circumboreal in distribution, extending from Alaska to Labrador, south to northeast Washington, north Idaho, Montana and Colorado. In Idaho County, it occurs on the Clearwater National Forest near Powell. This occurrence extends the Idaho range approximately 160 miles to the south. However, the Powell population would be more closely linked to populations occurring south of Lolo in the Bitterroot Valley of Montana. Arrowleaf coltsfoot occurs in wet meadows that are usually saturated or submerged in early spring. The Powell location is in a wet meadow dominated by sedges and alder. The plants are found throughout the small meadow, but perhaps most dense along the margins of the alder. This species possibly occurs in other wet meadows in the Powell vicinity. Its large leaves are very distinct; the plant it is most noticeable in April and May when the flowering stalks are in full bloom. The tall, thick stems with large, dense flowering clusters are a stark contrast to the brown, dead vegetation of the meadow at such an early season. The extremely early phenology of this species may cause it to go undiscovered, since patches, of late snow may hinder access to many of the meadows.
Calochortus nitidus **Broad-fruit Mariposa**	One known occurrence	A showy endemic of the grasslands and adjacent open dry forest of the Palouse Prairie in eastern Washington and central Idaho. In ponderosa pine and Douglas-fir forest it is found in grassy openings, usually adjacent to canyons; in grasslands, on canyon rims. Associated understory species include snowberry, Idaho fescue, and bluebunch wheatgrass. Elevations range from 1,450 to 5,680 feet. There is one known population in the NLF project area near the mouth of Canyon Creek, last reconfirmed by USFS Botanist K. Gray in 1992. This population may be the easternmost extension of this species' range, and is located just west of the Lochsa RNA boundary. The site is open, rocky and very dry. There is probably little suitable grassland habitat for this species in the NLF project area. Regionally rare and found only in eastern Washington and central Idaho. Often associated with the Palouse Prairie, it inhabits grassy openings in the forest with a sparse over-story

Sensitive Plant Species	Occurrence	Comment
		of ponderosa pine and Douglas-fir usually adjacent to canyons; and grasslands on canyon rims. Associated understory species include snowberry, Idaho fescue, and bluebunch wheatgrass. Elevations range from 1450 to 5680 feet This population, first document in 1989, is near the mouth of Canyon Creek. The site is open, rocky and very dry. There are probably few, if any, other populations of this species in the NLF. Lichthardt (2001) reports that fire is believed an important ecological factor in maintaining habitat for this species. Its deep-seated bulb would survive most fires. It does not, however, appear to readily recolonize disturbed sites. The author noted "Disturbed areas are especially prone for invasion by weedy exotics, replacing the native vegetation, including broad-fruit mariposa lily."
Carex leptalea **Bristle-stalked Sedge**	Probable	Inconspicuous boreal sedge associated with cool wet meadows, spahgnum bogs, fens, swamps, and lakeshores. On the Clearwater Forest it has been found at Musselshell Meadows. Lichthardt (2001) reported this species is adapted to very specific nutrient levels, water levels, and periodicity of flooding. Changes in these habitat conditions that could be attributed to fires, logging and draining suitable habitats are speculated to be detrimental to this species.
Mimulus alsinoides **ChickweedMonkeyflower**	Probable	A small annual monkeyflower of the Cascades. Disjunct populations have recently been found in cedar forests in Idaho (vicinity of North Fork Clearwater & St. Joe Rivers). It prefers shady areas, especially moss mats on cliffs. The immediate habitat may be seepy cliffs, or seasonally wet (dry in summer) rock outcrops.
Cypripedium fasciculatum **Clustered Lady's Slipper**	14 known populations within NLF	Small populations in eight western states represent this rare orchid. In Idaho it is associated with low elevation river canyons (1,500-4,200 feet elevation) and cedar habitats. Recently, however, it has been documented in drier grand fir and Douglas fir habitats. It prefers patchy, filtered light, a thick duff layer, and moderate to low understory cover. It requires an insect pollinator and a mycorrhizal fungus, and is often associated with *Armillaria* sp. root rot pockets. Lichthardt (2001) reported that fire and forest canopy removal is likely to be detrimental to this species. It is speculated that heat and direct sunlight cause plants age and die before seeds mature. In the upper Lochsa River basin, however, plants were found within a burned area two years after a variable intensity fire. Tree cover was gone and the plants were growing under a dense canopy of fireweed. Population vigor was assessed as "good", five years following the burn.
Cardamine constancei **Constance's Bittercress**	Known transplanted population	This perennial is found only in northern Idaho, associated with partially to completely shaded cedar and hemlock forest, and low elevation (1,150-3,500 feet) river canyons and breaklands. It has been extensively surveyed throughout its range, and for the most part the limits of its range determined. Lichthardt (2001), reported this species "…responds favorably to disturbances that open the (forest) canopy…fire appears to stimulate growth of cardamine." Clearcutting, hot broadcast burns, or scarification, however, would be harmful to this species. Low intensity treatments would likely be favorable.
Botrychium crenulatum **Crenulate**	Not known or suspected	A small, hard to spot fern, found principally at low elevation on drier microsites of damp meadows, boggy areas and marshy places. Plants are generally rooted around trees or shrubs, or in depressions at the edge of

Sensitive Plant Species	Occurrence	Comment
Moonwort		marshes that dry out during the summer. May occur either in sun or shade, but appears to prefer partial shade. Known Idaho locations are in climax western redcedar forests and have a strong affinity to old growth western redcedar stands. Also known in meadow habitats in Washington State. Activity impacting the moisture regime of a site is expected to have adverse effects. In Idaho, there are two historical collections: one from Boundary County, and one from Clearwater County, near Washington Creek near the property boundary between Potlatch Corporation and the CNF. Searches of meadow habitats in Idaho have yet to reveal any populations.
Dasynotus daubenmirei **Dasynotus**	Known	This is a showy perennial, whose range worldwide is limited, by unknown factors, to approximately 30 square miles on the divide between the Lochsa River and Lolo Creek, ranging from Walde Mountain north to Mex Mountain and extending out spur ridges above the Lochsa River. It is quite common in this area. There is also a population near Fog Mountain Saddle above the Selway River. *Dasynotus* grows on nearly all aspects, at elevations of 3,000-5,000 feet. It is found in forest openings, in mixed conifer forests (mostly cedar and grand fir habitat types). It occurs along roads, in clearcuts, and in openings created by fire. Lichthardt (2001), reported this species "…requires some disturbance factor to open the (forest) canopy and provide seedbeds… *Daynotus* is fire-tolerant, even of high intensity fires…one of the first plants to resprout and flower the following spring."
Blechnum spicant **Deer Fern**	Known	A coastal, evergreen fern. Small, disjunct populations occur in northern Idaho where it is found at mid-elevations (3,000-4,500 feet) in moist soils of shaded mature western redcedar and western hemlock forests. Although it is associated with draws and riparian areas, it is also found on drier slopes. Lichthardt and Moseley (1994) stated that "Populations as low as 3400' were believed to be affected by cold air drainage, possibly allowing this species to persist at lower-than-normal elevations." The further stated that habitat might also be related to duration and depth of snowpack. Lichthardt (2001) reported "Seven years after (forest) canopy removal, the total number of plants had increased in all plots…The number of plants more than doubled in 4 plots, including 2 of the disturbed plots. There tends to be greater sporophyll production in the open (disturbed) sites>."
Synthyris platycarpa **Evergreen Kittentail**	Known	An endemic, found only in Clearwater and Idaho counties. Within this area, it is fairly abundant on highlands and ridges separated by deep river canyons. Occurs in mid-elevation (4,000-6,000 feet) cool and moist habitats, meadows, forested slopes and seeps within the grand fir and subalpine fir-mountain hemlock zones, and rarely in the cooler western redcedar types. Its range is strongly associated with occurrence of the grand fir mosaic—a zone of mid-elevation forest, mostly grand fir and western redcedar, interspersed with alder and bracken-fern glades. Within its limited range it can be locally common in the forest understory, meadows, clearcuts, and on moist roadcuts.
Pentagramma triangularis **ssp.** *Triangularis* **Gold-Back Fern**	Not known or suspected	A medium-sized, west coast fern of dry habitats. Three known disjunct populations in Idaho: Snake River canyon south of Lewiston; vicinity of Peck; and Elk Creek on the CNF. There are many other coastal disjuncts in Idaho, but they are from moist habitats. Idaho populations generally occur with rocks in grassland habitats: on open, rocky slopes and in rock

Sensitive Plant Species	Occurrence	Comment
		crevices where seeps occur, on northwest, north and east aspects, from 1,500 to 2,700 feet elevation. These dry habitats are on the fringe of moister forests. Road construction and weed spraying could negatively impact populations.
Buxbaumia virids **Green Bug-On-A-Stick**	Known	This is an unusual, inconspicuous moss, of circumboreal distribution. It grows on soil, humus or very rotten logs in shady, moist forests, from low to subalpine elevations. On the CNF, it has been found in five drainages: Pete King Creek, Old Man Creek, Yakus Creek, Eldorado Creek, and Lolo Creek. Suspected threats to this species are the decrease of decayed wood, and diminished shade.
Carex hendersonii **Henderson's Sedge**	Known	A large sedge of the Pacific Coast, with disjunct populations in Idaho's Lochsa, Selway and Clearwater River drainages. Idaho populations occur on low elevation river terraces (occasionally upslope to 3,600 feet), in shady cedar forests with maidenhair fern, on flat to slightly sloped moist ground. In the NLF project area, it occurs in a variety of habitats (riparian to old barrow pit) and between 1,400 and 3,800 feet elevation. "The most well-developed populations…occur on low-elevation river terraces and lower slopes in moist, fern dominated understories --- often in old growth stands" (Lichthardt and Mosely, 1994). There is a strong association with elk trails and, in several occurences, Douglas fir root rot sites. Ungulates or rodents may be important for seed dispersal. Source populations usually occur in near-climax forests of river and stream bottoms, and less well-developed populations and scattered individuals occur upslope in drier cedar habitat types. Threats to source populations include logging, roadbuilding and the development of campground and recreation sites. Although plants persist for some time following canopy removal, reduced vigor will likely decrease their contribution to metapopulation viability (Lichthardt, 2001).
Cetraria subalpine **Icelandmoss**	Probable	A folious lichen of coastal subalpine forests with rare occurrences inland to north Idaho. It grows on the bases of ericaceous shrubs and other woody plants (fool's huckleberry or *Menziesia* is probably the most common host), and occasionally on the base of conifers. It has been found on the CNF near Savage Pass, on *menziesia* at 6,300 feet, on a SW aspect. Any factors impacting the host shrub would likewise affect the lichen. Disturbed habitats may increase shrubs, possibly causing an indirect beneficial effect.
Waldsteinia idahoensis **Idaho Strawberry**	Probable	This small rhizamatous perennial is endemic to three counties in Idaho (Clearwater, Idaho, and Shoshone counties) and adjacent Missoula County in Montana. Within this area, it is most common in the South Fork Clearwater drainage. Occurs in the North Fork Clearwater and Lochsa drainages, with a large population near the coNLFuence of White Sand Creek and the Lochsa River. CNF populations may represent a range expansion, or remnants of a once larger range, and are found in montane forests (cedar, grand fir, and subalpine fir) at mid-elevations (3,400-4,000 feet). It has been found along streams and upwards, to toeslopes and midslopes. Cool, moist microsites are most favorable for its development. Though a shade-tolerant species of climax understory, this species responds favorably to increased light. It responds well to most forms of disturbance, including low to mixed severity fire. Forest openings, even clearcuts, have been found to be beneficial to this species. Its status is sensitive because so few populations have been

Sensitive Plant Species	Occurrence	Comment
		found within its globally restricted range. Lichthardt (2001), reports from field observations that "…broadcast burns in clearcuts did not appear to inhibit the growth… The deveopment of large, dense mats of *Waldsteinia* was greater on burned cuts than in unburned or scarified cuts. Fire appears to reduce competition on open sites for invasion by rhizomes."
Botrychium lanceolatum var. *lanceolatum* **Lance-Leaved Moonwort**	Not known or suspected	A delicate, inconspicuous fern-like plant with spores on a separate branch. It occurs infrequently over a wide range: from Alaska to Oregon, and through the rockies to the southwest. In Idaho, plants have been documented from a variety of habitats, ranging from old growth cedar groves to disturbed roadsides, and at various elevations. There are many occurrences on the Idaho Panhandle NF; only three on the CNF (not all are confirmed). Its response to disturbance is largely unknown, but it is suspected that habitat altering activities such as extensive logging would be detrimental. Studies of the impacts of grazing on moonworts in meadows show the plant can withstand, perhaps increase with, light grazing (although heavy grazing extirpated the plants).
Buxbaumia aphylla **Leafless Bug-On-A-Stick**	Not known or suspected	An inconspicuous moss of temperate, or boreal, forests. The only known population from Idaho is from the Nez Perce National Forest. It also occurs in northwest Montana. It is often a pioneer of acidic, mineral (disturbed) soils, and has been found on road banks and woodland trails, sometimes on old logs or stumps, in open sunlight or partial shade in both moist and dry (open) forests. Idaho's single example is from a high elevation (5,000 feet) lodgepole pine and subalpine fir open parkland, where it was found on moist mineral soil, on a cool north face, in a sheltered micro-site and under shade of forbs and shrubs. Since this species is generally found on mineral soil and has been located on disturbed surfaces, it is expected to be tolerant of disturbances.
Botrychium simplex **Least Moomwort**	Not known or suspected	Least moonwort is regarded as rare and local. There are a handful of populations scattered throughout Idaho. The single known population on the Clearwater National Forest occurs at the Morris Creek Cedar Grove of the Palouse Ranger District, where the habitat is a climax western redcedar/oakfern habitat type. Habitats for this species vary, typically being a moist meadow which may go dry by late summer. This species can also be found in barrens and woods in usually subacid soil. Disturbance seems to be a common attribute of occupied sites. t is difficult to identify limiting factors of least moonwort, because it is found in such a diverse range of habitats. Recently, the existence of this species at the Morris Creek Cedar Grove has been called into question. A search of this site revealed an abundance of *B. minganense*, but no *B. simplex*. The original collection of *B. simplex* from this site was filed at the University of Idaho Herbarium. An inspection of this mount revealed what appears to be *B. minganense* . Because of the difficulty of distinguishing differences between some specimens of these species the collection's true identification should be confirmed by an expert.
Polypodium glycyrrhiza **Licorice Fern**	Not known or suspected	The main range of this species is along the west slopes of the Cascade/Coast Ranges. Only two inland locations are known-both on the Clearwater National Forest. One site consists of two separate rock faces overhanging Isabella Creek near its confluence with the North Fork Clearwater River. The other site is more than 30 miles west, along Elk Creek, another tributary of the North Fork. Idaho populations occur at low elevations (1,800 ft) in moss-covered rock crevices along streams,

Sensitive Plant Species	Occurrence	Comment
		within moist western redcedar forest. Sites are shaded, mossy, and wet year-round from seepage. The Elk Creek population is in a western redcedar habitat type, but the cover type is mid-seral Douglas fir and grand fir. However, the plants are on the mossy north face of a boulder that is near the stream edge. All inland locations are associated with the riparian areas of large streams that have coastal environments. These populations and the suitable habitat would be protected from disturbance by standard riparian buffers.
Hookeria lucens **Light Hookeria**	Probable	A coastal moss with disjunct populations in north Idaho. On the CNF it is known from the Lolo Creek, Weitas Creek and Lochsa River drainages. It occurs in moist to wet shady areas in humid coniferous forest, and can grow on rock, damp soil, humus, bark, or decaying wood. It is occasionally found submerged in pools in depressions, and sometimes along water courses. Populations on forest floors are susceptable to slow-moving fires that burn duff layers. Also, it is thought to be very sensitive to microclimate changes.
Asplenium trichomanes **Maidenhair Spleenwort**	Not known or suspected	Two locations are documented for Idaho. One of these locations is in a small tributary of the North Fork Clearwater River of the CNF. This population was found in 1971, but efforts to relocated have failed. Maidenhair spleenwort occurs in moist, rocky, cliff crevices and talus slopes. Although the exact location of the Clearwater population is not known, the community surrounding the vicinity is relatively uniform. The likely habitat is along the boulder bed of a perennial creek in a western redcedar/devil's club habitat type. Canopy coverage is 60%. The key seems to be subsurface water that seeps out of rocks. The landscape is heavily glaciated and granitic. The plants are greatly reduced during the mid summer but perk up well with fall rains. Throughout its range elevations range from mid to high mountain. Depsite intensive searches of the population area, the Clearwater population has never been relocated. Substantial logging activity occurred between these surveys and the time of the original discovery and the population may have been extirpated as a result. With so few populations occurring in very different habitats, it is difficult to accurately assess the impacts of management activities on this species. Habitat altering activities are the main threat to this species, which could include harvest related activities, road or trail construction and rock quarrying.
Botrychium minganense **Mingan Moonwart**	Not known or suspected	A small fern-like plant, with spores on a separate branch, that occurs widely in North America. It grows in a wide variety of habitats, including meadows, prairies, riverbanks and moist forests. Most Idaho occurrences have been found at mid-elevations on northern mountains on the Panhandle NF; CNF populations are from old cedar forests, on all aspects, and between 3,400 and 4,500 feet elevation. Locations include upper North Fork Clearwater, East Fork Moose Creek, Lolo Creek, and Powell.
Botrychium montanum **Mountain Moonwort**	Not known or suspected	To date, only a single location is known on the Clearwater National Forest. The population is found in the headwaters of the North Fork of the Palouse River on the Palouse Ranger District, in old growth western redcedar. It is quite possible this species occurs in similar habitats elsewhere on the Clearwater National Forest. The Palouse location inhabits a moist, western redcedar/lady-fern habitat type on “seepy” ground within a general western redcedar/wild ginger habitat. The primary threat to its survival are those related to timber harvest. Physical

Sensitive Plant Species	Occurrence	Comment
		destruction of habitat by road construction could also locally extirpate the species. Shade reduction, which would result with canopy removal, could have an adverse effect, as almost all moonworts found in Idaho seem to require shade. Preliminary observations of an informal study, suggests that populations found in meadows may show a slight increase in vigor via low levels of trampling and grazing. High levels of such activities, however, seem to extirpate the plants. It is not clear whether the low levels of grazing actually increase population vigor or merely make the moonwort easier to see, thus appearing more numerous. At present, mountain moonwort appears to be one of the rarest of the moonworts. However, with diligent surveys more populations will likely be found.
Rhizomnium nudum **Naked Mnium**	Probable	A spectacular flowering tree of the Cascade and Coastal Ranges with small, disjunct populations along Idaho's Lochsa and Selway Rivers. Here, it occurs in mature cedar and moist grand fir forest types in canyon bottoms below 2,000 feet elevation, and occasionally up to 3,600 feet. In the last 15 years most of the bigger trees have succumbed to a fungal disease, dogwood anthracnose. Populations may have decreased 75-90% (Lichthardt and Mosely, 1994, pg 31) between 1976 and 1991.The survivors, which are found in shrubfields, often with bracken fern, are reproducing by sprouting. Seed production is very low. Pacific dogwood grows in a variety of habitats ranging from openings created by fire to understories beneath large old trees. In Idaho, plants growing in openings seem to be surviving anthracnose better than those in the moister conditions in the forest understory. Open, lightly shaded habitats, often resulting from fires, support the greatest concentration of plants. Lichthardt (2001), reported this species is capable of vegetative layering or sprouting after fires or cutting. Reproduction from seed, however, occurs primarily in seral stages after conifers or paper birch begin to dominate, and in the climax forest, as an understory shrub. A September 1991, prescribed burn in the lower Selway River killed seven of twelve tagged shrubs affected by the fire. Of the five that resprouted, leaves were generally abnormal, with mealy discolored surfaces.
Cornus nuttallii **Pacific Dogwood**	Known	This is a regional endemic of canyon bottoms of the Snake and Clearwater River canyons in Idaho and Washington, where it occurs on basalt substrates. Most Idaho occurrences are on private land, including a large cluster of populations along the Middle and South Forks of the Clearwater River. CNF populations occur on two isolated parcels of national forest land along the Middle Fork of the Clearwater River, four miles above Kooskia. This plant is found growing on steep basalt cliff faces, ledges and stabilized talus, on all aspects, and in open situations with low cover of vascular plants. It is known to colonize road cuts. Elevations range from 1,200 to 2,400 feet. Potentially adverse management activities in established populations include roadside disturbances, gravel pits and quarries. In these instances, plants would be lost during the disturbance, but are expected to readily recolonize.
Lomatium salmoniflorum **Salmon-Flower Desert-Parsley**	Not known or suspected	This is a regional endemic of canyon bottoms of the Snake and Clearwater River canyons in Idaho and Washington, where it occurs on basalt substrates. Most Idaho occurrences are on private land, including a large cluster of populations along the Middle and South Forks of the Clearwater River. CNF populations occur on two isolated parcels of

Sensitive Plant Species	Occurrence	Comment
		national forest land along the Middle Fork of the Clearwater River, four miles above Kooskia. This plant is found growing on steep basalt cliff faces, ledges and stabilized talus, on all aspects, and in open situations with low cover of vascular plants. It is known to colonize road cuts. Elevations range from 1,200 to 2,400 feet. Potentially adverse management activities in established populations include roadside disturbances, gravel pits and quarries. In these instances, plants would be lost during the disturbance, but are expected to readily recolonize.
*Triantha occidentalis brevis*tyla **Short-Styled Triantha**	Probable	A plant of northern, boreal wetlands and river banks. It is rare in Idaho (seven small populations are documented), where it has been found on rock bars along large streams and in wetlands or bogs associated with subalpine lakes. On the Clearwater Forest three populations are documented from low elevations on the North and Middle Fork Clearwater River. These plants grow in rock and cobble below the seasonal high-water line. There is suspected ample habitat for this species along the many waterways on the CNF.
Thelypteris Nevadensis **Sierra Woodfern**	Probable	Ranges from the Selkirk Mountains south into the mountains to southern Oregon. Rare in Idaho; only seven recorded occurrences of 1 to 10 plants each. There are three known occurrences on the CNF. Two in the North Fork Clearwater basin at the mouths of Isabella and Grasshopper Creeks; one is along the Lochsa River near Wilderness Gateway. In all three cases, it occurs along the waterways and below the high water mark. Plants are found growing in rock and cobble; often-flowing water runs around the base of the plants or substrates upon which they root. This species is probably safe from most significant forms of disturbance because it has a strong affinity for the riparian areas of large streams. Standard PACFISH and INFS buffers would be adequate to protect this species. There is ample habitat for this species along the many waterways on the CNF, which have never been formerly surveyed for this species. If a search of the larger riparian areas were to take place, many more populations of this species would probably be found.
Mimulus ampliatus **Spacious Monkeyflower**	Probable	This small yellow annual is endemic to Idaho, where it is known from six widely scattered locations in Lewis, Nez Perce, Idaho and Clearwater Counties. It occurs in grasslands and open forest sites, at elevations of 2,600 to 6,900 feet, and has been documented from habitats ranging from a moist meadow to a seepy rock outcrop. Known locations occur on both volcanic and granitic soils, generally on mineral soil openings; sometimes on road cuts. Plants grow in microsites with enhanced spring moisture or shade.
Haplopappus hirtus var. *sonchifolius* **Sticky Goldenweed**	Not known or suspected	This perennial of the suNLFower family is endemic to NE Oregon, central Washington, and adjacent areas in Idaho, where it is known from the Craig Mountain area south of Lewiston, as well as a single occurrence on the CNF near Helmer. It occurs in moist (not wet) meadows and open or sparsely wooded slopes in the foothills, at elevations of 2,700 to 4,700 feet. Idaho occurrences have been documented from headwater meadows and from shallow, rocky portions of a lower elevation meadow (primarily in cobbles of a dry creekbed). Response to disturbance is not certain. Most impacts probably come from livestock grazing and competition with weeds, especially dense meadow grasses. The Helmer location is the easternmost known occurrence and is considered a peripheral. A potential concern is off highway vehicle use.

Sensitive Plant Species	Occurrence	Comment
Petasites frigidus var. *Palmatus* **Sweet Coltsfoot**	Not known or suspected	This is a leafy wet-site perennial of the sunflower family that blooms very early in the spring. It is a boreal species whose only appearance in the Northwest was the Cascades, until 1996, when a sizeable population was found along Long Meadow Creek, a tributary of Elk Creek on the Palouse Ranger District, CNF. This Idaho population was found mostly below the seasonal high-water line, with plants extending onto adjoining benches and terraces. Its habitat is cedar, and associated species include several coastal disjunct species. Although there is suitable habitat throughout the Clearwater River drainage, it has not been found elsewhere on the forest. The response of this species to disturbance is not known.

Sensitive Plants Environmental Consequences

Analysis Process: A review of all known locations of sensitive plant species within the North Lochsa Face was conducted. These known locations were overlaid with the actions to determine whether or not the actions would affect a species. In addition, sensitive plant species habitat was evaluated. Each activity was reviewed to see if it incorporated a species habitat. The effects analysis is based on evaluating effects to known populations and effects to suspected populations where potential habitat may occur within an activity area. (See project file NLF SEIS – MIS & TES Wildlife and Plant Resources Status Report, March 26, 2001 for additional information and references).

Direct and Indirect Effects

Alternative 1: would not directly affect any sensitive plant population. Natural disturbance factors (insects, disease, wind and fire) would continue to influence and shape the distribution and abundance of sensitive plant habitats. Forested lands, including forested riparian habitats, would increase in forest fire fuel loading as forest succession advances, trees die and wildfires are suppressed. The risk of sensitive plant habitats populations being impacted, perhaps locally extirpated, due to severe wildfire, would increase with Alternative 1. Uncontrolled, expanding noxious weed invasion could also threaten habitat suitability for some sensitive plant populations.

Alternatives 2 through 6: All action alternatives employ practices that emulate fire disturbance intervals, intensity and scale. Default PACFISH buffers would be applied to protect forested riparian habitats, including associated sensitive plant species. All action alternatives strive to maintain or develop old forests patches consistent with historical availability and distribution. These practices are expected to minimize or eliminate risk that could lead to listing sensitive plant populations as an endangered or threatened. In these areas, the intensity and scale of the planned practices (timber harvest or prescribed fire) would approximate conditions under which native forest plant communities, including those

recognized as 'sensitive plants', developed.

The action alternatives could impact known or suspected populations of clustered lady's slipper, Henderson's sedge and Pacific dogwood. These species occur in habitats where relatively frequent, sometimes severe, fire occurs. Planned activities (regeneration harvest and low to mixed severity prescribed fire) are expected to impact several of these populations. Clustered lady's slipper, Henderson's sedge and Pacific dogwood populations are relatively common throughout the NLF. There would be numerous populations of each of these species which would be unaffected by planned NLF activities.

Three populations of evergreen kittentail have currently been confirmed in the NLF. The largest evergreen kittentail population in North Lochsa Face occurs in or near a planned low intensity under burn (Unit 214) and a regeneration harvest (Unit 186). One other population occurs in or near Unit 59 (planned for regeneration timber harvest). The effect of the burning and timber harvest, though emulating a natural occurring fire, is unknown at this time. It is believed, however, that disturbance creating openings in the forest canopy is beneficial to evergreen kittentail (as evidenced by known occurrences in timber harvest units and road cutslopes, elsewhere on the Clearwater National Forest). One other population confirmed in the North Lochsa Face area would be unaffected by planned activities.

Three sensitive plant species could be directly impacted by the planned actions (deer fern, Henderson's sedge and light hookeria). Because these species are typically associated with moist habitats protected by default PACFISH buffers, the effects of the planned actions are not expected to result in a trend toward federal listing or reduce viability for the population or species. Six sensitive plant species are expected to directly benefit from the planned actions include: Broad-fruit mariposa; clustered lady's slipper; Dasynotus; Idaho strawberry; Pacific dogwood; and spacious monkey flower. Seven sensitive plant species would not be affected by any of the planned actions.

Sites potentially selected for spring burns are likely to be those exposed to direct sunlight (generally on southern aspects) with open forest conditions. Response of broad-fruit mariposa, clustered lady's slipper, dasynotus, deer fern, evergreen kittentail, Henderson's sedge, Idaho strawberry, Pacific dogwood and spacious monkey flower to spring burning is unknown. Spring burning would be used to create breaks in fuel continuity and to treat fuels dry sites (south aspects and ridges). Because these species are associated with, and adapted to, forests that have historically burned, dry season (summer or fall) prescribed fire is expected to benefit the above sensitive plant species.

Table 3-24 describes the expected direct and indirect affects of planned NLF activities on sensitive plants. References to specific alternatives are cited only where the effect is specific to one or more action alternative.

Table 3-24: Direct/Indirect Effects to Specific Sensitive Plant Species

Species	Effects
Broad-fruit Mariposa	Alternatives 2, 3, 3a, 5 and 6 would underburn adjacent to the only known population in the analysis area. The burn would promote the retention grassy openings, with a sparse overstory of ponderosa pine and Douglas-fir and associated Idaho fescue and bluebunch wheatgrass, that are favored habitat for this species. The underburn would have a beneficial effect to the species.
Bristle-stalked Sedge	Possible wet sedge meadow habitats that this species inhabits are avoided in all alternatives; therefore there is no effect to this species.
Chickweed Monkeyflower	All alternatives avoid cliffs and outcrops where this species resides. There would be no effect to the species.
Clustered Lady's Slipper	Six of the 14 known populations in North Lochsa Face occur in or near prescribed burn units or regeneration harvest areas. Two populations occurring in Unit 227 and near Unit 241 occur in riparian areas. Two populations (in or near Units 246 and 33 occur on ridges. A fifth population occurs in riparian habitat that includes a spotted knapweed infestation. The sixth population occurs in Unit 43. Units 33 and 43 are regeneration harvest units. Planned disturbances (regeneration harvest and low/mixed severity fire) would maintain habitat conditions for this species by maintaining large, live trees within the patch. Surface disturbance that retains some live trees that are associated with the perennial rhizomatous root system is expected to maintain individuals within populations. Though some *Armellaria* root rot infested Douglas-fir stands would be treated by either logging or prescribed fire, other infected stands outside the planned treatments would be unaffected. The actual effect of management (i.e., canopy opening, reduced competition from shrubs/trees, and soil disturbance) is unknown. In the event that fire is sufficiently intense to consume the duff layer where a population occurs, it is likely that affected plants would not survive. The planned treatments are likely more beneficial than detrimental to this species due to reduced shading of understory trees over-topping this species. Greenlee (1997) stated that in the short term, individuals may be impacted by timber harvest activities, but in the long term populations may benefit from the reduced threat of stand replacing fire.
Dasynotus	All action alternatives include timber harvest and prescribed fire within the historical range of Dasynotus. Units 29, 38, 207, 212 and 213 include or are on the margins of known populations. This species is expected to benefit from both canopy and soil disturbances, including planned timber salvage operations.
Deer Fern	Known and suspected populations would be avoided through the application of PACFISH buffers. The possibility exists that some unknown populations may occur outside of riparian habitats within planned treatments. Regeneration harvest or prescribed fire occurring on upland sites containing deer fern would likely kill individual plants.
Evergreen Kittentail	The Van Camp population is located near unit 214 (underburn) and unit 186 (regeneration). The Brush Hill population is at the edge of unit 59 (regeneration). All alternatives include unit 59. Alternatives 2, 3, 3a, 5 and 6 include underburning unit 214. Only alternative 2 includes timber harvest planned in unit 186. The actual effect of the activities is unknown. However, creating openings in the forest canopy is expected to benefit this species (as evidenced by known occurrences in timber harvest and road cuts). The Glade Creek population would not be affected.
Green Bug-On-A-Stick	The one known occurrence of this species within North Lochsa Face is in an upland location on the margin of unit 48 (all alternatives). This population would be avoided (see Design Criteria, Chapter 2) by buffering from disturbance. Therefore

Species	Effects
	there would be no effect to the species.
Henderson's Sedge	Known populations occur near prescribed fire units 23/229 boundary (LRNA), and between units 212 and 213. Planned prescribed fire in the Lochsa RNA and Deadman Creek, may impact two known populations. Both populations are located in riparian areas that are unlikely to carry fire. Prescribed fire is expected to retain riparian habitat conditions. Lichthardt and Moseley (1994, p 54) stated, "…threat to sensitive species in this unit (Lochsa Conservation Unit) can be considered minor."
Icelandmoss	Planned disturbances (low/mixed severity fire) in upper Fish and Hungery Creeks may improve habitat conditions for this species by opening the forest canopy and increasing understory shrub density. However, this species is associated with moist habitat shrubs that are unlikely to burn except in extreme burning conditions.
Idaho Strawberry	Planned disturbances (regeneration harvest and low/mixed severity fire) are expected to improve habitat conditions for this species by opening the forest canopy, reducing vegetative competition and improving germination success.
Light Hookeria	The only known population in the North Lochsa Face is on the margins of precommercial thinning unit 270. This area would be avoided through the application of PACFISH buffers; therefore there would be no effect.
Naked Mnium	This species would be avoided through the application of PACFISH buffers. Prescribed fires are neither planned nor would be applied when burning conditions are sufficiently dry enough to threaten riparian habitats; therefore there would be no effect.
Pacific Dogwood	Alternatives 2, 3, 3a, 5, and 6 propose road reconstruction to access a helicopter log landing near the mouth of Bimerick Creek. Approximately 12 Pacific dogwood plants occur along this access road. The site has been reviewed and it is feasible to reconstruct the road without removing the plants. Design Criteria, Chapter 2 includes engineering design and inspection to assure the plants are protected. Benefits similar to burning may be derived from the road reconstruction as a number of the dogwood in this area are growing on soils disturbed by the original road construction to the site. Lichthardt and Mosely (1994, p 54) states, "…Management practices such as fire or conifer thinning might be applied to…but injury to individual trees should be avoided when planning timber sales and road and trail maintenance". Planned disturbances (regeneration harvest and low/mixed severity fire) are expected to improve habitat conditions for this species by opening the forest canopy, reducing vegetation competition and improving germination success. Alternatives 2,3, 3a, 5 and 6 also propose prescribed fire within the Lochsa Research Natural Area (LRNA) The purpose of this practice is to rehabilitate Pacific dogwood within the LRNA. This action is consistent with the "*Conservation Plan for Cornus Nuttallii (Pacific Dogwood), in Idaho, 1991*". The prescribed fire plan would be jointly developed (see Design Criteria, Chapter 2).
Short-Styled Triantha	Grows below seasonal high-water line along large streams and rivers. No activities are planned to occur in potential habitat.
Sierra Woodfern	Grows below seasonal high-water line. No activities are planned in potential habitat; therefore there would be no effect.
Spacious Monkeyflower	Alternatives 2, 3, 3a, 5 and 6, propose preseribed fire for Unit 21. It is possible this species occurs here. Promoting the open forest and grassland characteristics of this site using prescribed could improve or maintain habitat for this species.

Cumulative Effects: The measure of cumulative effects for sensitive plants is how well the planned actions would protect structure, function and processes in the habitats in which these species reside. For example, species favored by disturbance (such as fire) would benefit from practices that promote the disturbance. Likewise, species favored by lack of disturbance (often associated with deep shade and abundant moisture) would benefit from practices that protect from disturbance. The time frame for the cumulative effects assessment is 2012.

The geographic boundary for assessing cumulative effects of each alternative for sensitive plant species is the NLF study area. Most of the species that are known or suspected to occur in the NLF are restricted to breakland habitats. Present and foreseeable future management actions and natural events within the NLF study area include: 1) Salvage harvest implemented through the Ranger District small timber sale program; 2) Large or severe wildfires; and 3) Changes in noxious weed distribution.

Species benefiting from planned management actions are largely located on drier and steeper habitats. Without disturbance, broad-fruit mariposa, clustered lady's-slipper, Dasynotus, pacific dogwood, Idaho strawberry and spacious monkeyflower populations known or suspected in the NLF, are likely to decline with advancing forest succession. Retention of default PACFISH buffers is expected to protect all known or suspected populations of those plant species favored by protection from disturbance. Species for which the effects of disturbance are unclear (i.e., evergreen kittentail) would be monitored to assure that future management actions effectively provide for the needs of this species.

The District timber salvage program is not expected to degrade habitat for any riparian habitat associated species. Species naturally occurring outside of riparian habitats may benefit from commercial thinning and timber salvage. Assessments regarding possible adverse or beneficial effects from timber salvage would be determined through specific project proposals and environmental assessments. Intense, unplanned wildfires at lower elevations of riparian habitat conservation areas, however, could impact some populations. A successful noxious weed program is expected to maintain or promote restoration of sensitive plant habitats.

Under all alternatives, natural disturbance factors (insects, disease, wind and fire) would continue to influence and shape the distribution and abundance of sensitive plant habitats. Riparian stands would increase fuel loading as forest succession advances, trees die and wildfires are suppressed. The risk of sensitive plant habitats in riparian areas being impacted due to severe wildfire would increase with time.

At least six of the sensitive plants are favored by habitat disturbance (i.e., within the range of natural variation) to maintain populations and population distribution. If disturbance is precluded in their respective habitats, they are expected to decline and perhaps locally extirpate. Maintenance of these species in the landscape requires disturbance be allowed to occur (typically frequent, low to mixed severity fire). Altering disturbance (i.e., fire) intervals and intensity (i.e., severe fire occurring where low to mixed severity fire typically occurs), does not favor the long-term productivity of those plants

Regulatory Findings: Table 3-25 displays the findings relative to the effects by alternative on sensitive plants. These findings are based on: 1) the described habitats for these species; 2) applicable species-specific literature; and 3) the ecosystem management principles of emulating natural disturbances (i.e., frequency, scale and intensity of fire) intended to maintain or improve habitat features suited to the continued existence and health of these populations.

Table 3-25: Sensitive Plant Species Potentially Impact by Alternative ---NLF SEIS

Species	Alt 1	Alt 2	Alt 3	Alt 3a	Alt 4	Alt 5	Alt 6
Anderegg's Cladonia	**n/a**						
Arrowleaf Coltsfoot	**n/a**						
Broad-fruit Mariposa	**NI**[1/]	**MIIH**[2/]**BI**[3/]	**MIIH/BI**	**MIIH/BI**	**MIIH/BI**	NI	NI
Bristle-stalked Sedge	**NI**	NI	NI	NI	NI	NI	NI
Chickweed Monkeyflower	NI	NI	NI	NI	NI	NI	NI
Clustered Lady's Slipper	NI	**MIIH/BI**	**MIIH/BI**	**MIIH/BI**	**MIIH/BI**	**MIIH/BI**	**MIIH/BI**
Constance's Bittercress	NI	NI	NI	NI	NI	NI	NI
Crenulate Moonwort	**n/a**						
Dasynotus	NI	**MIIH/BI**	**MIIH/BI**	**MIIH/BI**	**MIIH/BI**	**MIIH/BI**	**MIIH/BI**
Deer Fern	NI	**MIIH**	**MIIH**	**MIIH**	**MIIH**	**MIIH**	**MIIH**
Evergreen Kittentail	NI	**MIIH/BI**	**MIIH/BI**	**MIIH/BI**	**MIIH/BI**	**MIIH/BI**	**MIIH/BI**
Gold-Back Fern	**n/a**						
Green Bug-On-A-Stick	NI	NI	NI	NI	NI	NI	NI
Henderson's Sedge	NI	**MIIH**	**MIIH**	**MIIH**	**MIIH**	**MIIH**	**MIIH**
Icelandmoss	NI	NI	NI	NI	NI	NI	NI
Idaho Strawberry	NI	**MIIH/BI**	**MIIH/BI**	**MIIH/BI**	**MIIH/BI**	**MIIH/BI**	**MIIH/BI**
Lance-Leaved Moonwort	**n/a**						
Leafless Bug-On-A-Stick	**n/a**						
Least Moomwort	**n/a**						
Licorice Fern	**n/a**						
Light Hookeria	**NI**	**MIIH**	**MIIH**	**MIIH**	**MIIH**	**MIIH**	**MIIH**
Maidenhair Spleenwort	**n/a**						
Mingan Moonwort	**n/a**						
Mountain Moonwort	**n/a**						
Naked Mnium	NI	NI	NI	NI	NI	NI	NI
Pacific Dogwood	NI	**MIIH/BI**	**MIIH/BI**	**MIIH/BI**	**MIIH/BI**	**MIIH/BI**	**MIIH/BI**
Salmon-Flower Desert-Parsley	**n/a**						
Short-Styled Triantha	NI	NI	NI	NI	NI	NI	NI
Sierra Woodfern	NI	NI	NI	NI	NI	NI	NI
Spacious Monkeyflower	NI	**MIIH/BI**	**MIIH/BI**	**MIIH/BI**	**MIIH/BI**	**MIIH/BI**	**MIIH/BI**
Sticky Goldenweed	**n/a**						
Sweet Coltsfoot	**n/a**						

1/ NI = *No impact*
2/ MIIH =*May impact individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species.*
3/ BI = *Beneficial Impact*

Noxious Weeds Existing Conditions

Noxious weeds are those plants that have been designated by federal, state or county officials as such. In *Weeds of the West* by Whitson et al. (1992) a weed is defined as, " A plant that interferes with management objectives for a given area of land at a given point in time." The Idaho Noxious Weed Law defines a "noxious weed' as any exotic plant species that is established or that may be introduced in the State which may render land unsuitable for agriculture, forestry, livestock, wildlife or other beneficial uses and is further designated as either a State-wide or County-wide noxious weed (Idaho Code 24 chapter 22). Primary concerns are generally expressed as losses in commodity yield or interferences of land use. However, impacts of these invasive non-native plants to ecosystem function and health are becoming increasingly important.

Regulatory Framework: Federal legislation, regulations, policy and direction that require development and coordination of programs for the control of noxious weeds, and evaluation of noxious weeds in the planning process include: The National Forest Management Act (1976); Forest Service Manual (Chapter 2080, as amended, (1995); Executive Order #13112 (February 1999); The Forest Service Handbook (FSH 3409), on Forest Pest Management defines a strategy for managing pests, including noxious weeds, as "A decision-making and action process incorporating biological, economic, and environmental evaluation of pest-host systems to manage pest populations". (FSH 3409.11, 6/86) This strategy is termed Integrated Pest Management (IPM).

Forest Plan Requirements: The Clearwater Forest Plan is fairly silent on noxious weeds. It lists research needs identified during development of the Forest Plan, including, " Determine the autecology of the noxious weeds: spotted knapweed, diffuse knapweed, leafy spurge, goatweed, dalmation toadflax, common toadflax, hounds tongue, common tansy, caprina (sic), musk thistle, star thistle, canada thistle, and dyerswoad. Develop and evaluate probable biological control methods for these weeds (Forest Plan II-16)".

There is a "Noxious Weed Appendix"(N), which is a situation report from 1985 in the Forest Plan. It describes the various weed species, methods of spread, and the consequences of the problem. Loss of forage habitat for both wildlife species and domestic livestock, degradation of riparian vegetation conditions, fuels and fire hazard increase, decreased visual quality, and negative effects on adjacent landowners are all listed as consequences of the problem. Control methods listed include prevention, biological control, chemical control, mechanical control, and cultural control.

The proposed treatment sites occur in a variety of land management allocations. Land management allocations affected include: Forest Plan Management Areas E1, A4, M2, A5, with the majority being in E1. The standards for all of these Management Areas include the use of integrated pest management for protection against pests.

Clearwater Basin Weed Coordinating Committee: In March of 1995, the Clearwater Basin Weed Coordinating Committee was formed. This Committee is a multi-agency

working group including: Clearwater and Nez Perce National Forests; Bureau of Land Management; Nez Perce Tribe; Idaho Departments of Fish & Game, Lands and Transportation; Clearwater Resource Conservation and Development Council, Inc.; Natural Resources Conservation Service; Clearwater, Latah, Lewis, Idaho and Nez Perce Counties and Potlatch Corporation. The purpose of the Committee is to develop consistent management objectives for weed species known to occur within the Clearwater River Basin and develop preventative measures for reducing the threat of invasion by new non-native plant species. The Clearwater Forests role, as an active participant, is to follow through with weed management as agreed upon by the Committee within constraints set by federal policies.

Weed Occurrence: Existing weed infestation inventory within the project area is based on reporting efforts of Forest field going personnel, input from Committee members and concerned publics. These locations are denoted in Appendix D.

Noxious weed surveys have taken place throughout the Clearwater Forest since 1988. Within the project area weed species present include: spotted knapweed (*Centaurea maculosa*), Canada thistle (*Cirsium arvense*), Dalmatian toadflax (*Linaria genistifolia*), Scotch broom (*Cytisus scoparius*), Scotch thistle (*Onopordum acanthium*) and orange hawkweed (*Hieracium aurantiacum*). In addition to the thirty-five designated noxious weeds in Idaho, the Clearwater Weed Coordinating Committee has designated Japanese knotweed (*Polygonum cuspidatum*) and perennial peavine (*Lathyrus latifolius*) as new invaders to the basin that warrant control. Both of these species occur within the project area and are considered for treatment.

Table 3-26: Summary of Weed Occurrence Within the NLF Project Area

Weed Species	Description	Location
Canada thistle (*Cirsium arvense*)	Native of Eurasia, introduced as a contaminant in crop seed in the late 18th century. It is a colony-forming perennial from deep and horizontal roots. It is an asexual plant that can maintain high population densities without producing fruits. Cultivation actually increases the number of plants.	Canada thistle is found scattered throughout the project area, particularly where major canopy openings are created.
Dalmatian toadflax (*Linaria genistifolia*)	Introduced from southeastern Europe, probably as an ornamental. It is an aggressive perennial with an extensive deep root system and a thick waxy cuticle on the leaf that makes chemical control difficult.	Dalmatian toadflax is found along the fill slope of FS Road 514 (T33N, R06E, Sec 2).
Japanese knotweed (*Polygonum cuspidatum*)	Introduced from Asia as an ornamental. It is a perennial that forms long creeping rhizomes. This weed is an invader to roadsides, ditchbanks and riparian areas	Japanese knotweed has become established along Bimerick and Pete King Creeks (T33N, R08E, Sec 3 and T33N, R07E, Sec 28 respectively).
Orange hawkweed (*Hieracium*	Introduced from Europe, probably as an ornamental. It is a fibrous rooted perennial that spreads by stolon and seed production. To date, the	Orange hawkweed has become established at several locations; throughout the

Weed Species	Description	Location
aurantiacum)	infestations are limited to north of the Lochsa River. This plant is a fierce competitor for nitrogen and generally out competes native flora where it becomes established.	Pete King Creek drainage (T33N, R07E, Sec 19, 20, 21, 28, 29, 30), Short Block (T34N, R07E, Sec 19), Camp Moosehorn (T34N, R07E, Sec 8), Smith Saddle (T33N, R06E, Sec 21, 22, 27), Trail 142 (T34N, R07E, Sec 22 and McLendon Butte (T34N, R08E, Sec 2,11).
Perennial peavine (*Lathyrus latifolius*)	Native of Europe that is often used as stabilization cover on landslide areas. It is perennial with climbing tendencies that could choke out native flora.	One small infestation is known along FS Road 101 (T32N, R06E, Sec 5, 6).
Scotch broom (*Cytisus scoparius*)	Introduced from Europe as an ornamental. It is widespread in the Pacific Northwest with selected varieties still sold as ornamentals. Seeds remain viable in the soil for many years and it invades forest and wildland habitats.	Scotch broom is established in the Dry Point area (T33N, R07E, Sec 3).
Scotch thistle (*Onopordum acanthium)*	Introduced from Europe. It invades roadsides and wildlands. It is a biennial that can grow to twelve feet tall and can form dense stands that deter use by wildlife and recreationists.	Scotch thistle has been located within an old harvest unit. Lowell Creek #14 (T33N, R07E, Sec 32).
Spotted knapweed (*Centaurea maculosa*)	Native of Eurasia, probably introduced as a contaminant in crop seed. It is a biennial or short lived perennial and is widely distributed throughout North America. To date, infestations are primarily along roadsides, abandoned roads and semiarid wildlands. It has moderate shade tolerance and could potentially displace native flora throughout much of the project area	Spotted knapweed has become established at several locations throughout the project area (see Appendix E).

Management Objectives: Table 3-27 represents those weed species known to occur within the project area, the assigned management objective for each species by the Clearwater Basin Weed Coordinating Committee and recommended treatment method(s).

Table 3-27: Clearwater Basin Weed Coordinating Committee, Management Recommendations

Weed species	Management objective	Treatment method
Canada thistle	Confine/Contain	Biological, Herbicide
Dalmatian toadflax	Eradicate	Herbicide OR Manual
Japanese knotweed	Eradicate	Herbicide
Orange hawkweed	Eradicate	Herbicide
Perennial peavine	Eradicate	Herbicide, Manual
Scotch broom	Eradicate	Herbicide, Manual
Scotch thistle	Eradicate	Herbicide, Manual
Spotted knapweed	Confine/Contain	Biological, Herbicide, Manual

Ongoing Efforts: Biological control agents have been released at low levels for the containment of spotted knapweed within the project area and the agent *Urophora quadrifasciata* has naturally distributed itself throughout northern Idaho. The agent *Metzneria paucipunctella*, a seedhead-feeding moth, was released within the Pete King Creek drainage during 1997 and 1998. To date, monitoring of the *Metzneria p.* release has shown establishment was successful but it is too early post release to measure any reductions in seed production due to this agent. Monitoring of this *Metzneria p* release site will continue as part of an overall Forest program. An experimental pathogenetic fungus, *Sclerotinia* was released within the Pete King Creek drainage during 1997. Monitoring results suggest that the Sclerotinia reduces the vigor of a small percentage of spotted knapweed plants but does not provide effective control to warrant further distribution.

Additional biological control agents are available for the containment of spotted knapweed. Those include: *Larinus minutus*, a seedhead feeder and the root feeders *Cyphocleonus achates* and *Agapeta zoegana*. The Forest has greatly increased its utilization of biological control agents and will continue to release agents as they become available.

Biological control agents for Canada thistle have been released on the Forest but establishment has not been successful. Biological control agents for Dalmatian toadflax and Scotch broom are available but the low levels of infestation of these weeds within the project area would not warrant such efforts. There are no known biological control agents available for Japanese knotweed, orange hawkweed, perennial peavine or Scotch thistle.

Description of Proposed Action: All action alternatives propose an integrated weed management strategy. This includes the following (see Appendix E):

- ✍✍**Physical/mechanical treatment***:* handpulling ½ acre of dalmation toadflax; ½ acre of scotch broom; grubbing 1 acre of scotch thistle
- ✍✍**Biological Control***:* Use biological control for Canada thistle and spotted knapweed.
- ✍✍**Chemical Control***:* Use chemical control agents on approximately 500 acres of dalmation toadflax, Japanese knotweed, orange hawkweed, scotch broom, and spotted knapweed.

In addition to these measures several additional measures would be applied to minimize the spread of noxious weeds caused by road construction and timber harvest (these are also found in Chapter 2, Design Criteria table (Note there are other design criteria for weeds for to ensure safety and minimize effects on other resources). Additional criteria to minimize weed spread include:

- Clean off-road equipment of loose debris (CT 6.26) prior to moving on sale area. This reduces the chance that weed seeds that have been picked up by equipment are transported from site to site.
- Revegetate raw soils (seeding) that are exposed through project activities as soon as practicable. Use weed free seed. Revegetating raw soils reduces the likelihood that weeds can get established.
- Use certified weed-free forage and straw. This helps reduce introduction of new invaders.
- Reseed all areas with native mix or mix which would prevent invasion of weeds and is certified weed free.
- Pre-treat spotted knapweed adjacent to units 32, 33, 47, 48, and 227, as well as the orange and meadow hawkweed.

Noxious Weeds Environmental Consequences

Effects Analysis Process: The effects analysis evaluated the level of risk, or likelihood that the proposed action would increase weed spread within the North Lochsa Face project area. Road construction, reconstruction, reconditioning, obliteration, fireline construction would cause soil disturbance. Since several roads within North Lochsa Face are already weed-infested, there is a risk of indirectly introducing noxious weeds into newly disturbed sites. The amounts of road construction, (permanent and temporary) as well as reconstruction and obliteration are used as indicators for evaluating the potential distribution of weeds.

Many weed species generally invade areas of disturbed soil. Timber harvest that removes more than 30 percent of the tree canopy allows for increased understory vegetation growth, including noxious weeds. In addition, where harvest would be ground-based (skyline or tractor), the risk of weed spread is higher than helicopter. Helicopter harvest is a lower risk since no machinery that may include weed seeds is placed on the landscape. Indicators for timber harvest include harvest activities that remove more than 30 percent of the canopy (all harvest, except for salvage meets this criteria) by landtype; and the acres treated by ground-based systems. In addition, activities on dryer landtypes are more likely to increase weed spread because other native vegetation takes a longer time to get established and therefore weeds can get established quicker.

The most important indicator is the location of existing weed patches when compared to proposed activities; timber harvest, road construction, and prescribed fire. Therefore another

indicator is the acres of timber harvest units and number of prescribed burn units that either overlap or are within 200 feet of an existing infestation.

The effects analysis is primarily a qualitative analysis that evaluates quantitative information (indicators) and establishes a level of risk. Risk is defined as:

- **High risk:** those areas where weed development is likely to occur because of disturbed sites. These include new permanent road construction where continual use is likely to establish weeds. Also at high risk are those areas that overlap or are within 200 feet of an existing infestation.
- **Moderate risk:** those areas where weed development may occur but due to logging systems and temporary nature of the roads the likelihood of establishment is less than a road that is continually used. This includes activities that remove 30 percent of the canopy on breaklands, or colluvial midslopes but with use of helicopter or skyline system there is less likelihood of weeds being established because less ground is disturbed.
- **Low risk:** those areas where weed development is unlikely to occur because the sites are not conducive to weed establishment. This includes activities on frost churned uplands and old surfaces.

Table 3-28: Indicators for Effects of Action Alternatives

Indicator	Alt 2	Alt 3	Alt 3a	Alt 4	Alt 5	Alt 6
Roads (miles)						
Permanent	1.1	0	0	0	0	0
Temporary	3.7 (10 roads)	0	3.5 (9 roads)	3.5 (9 roads)	3.5 (9 roads)	3.2 (8 roads)
Obliteration	66	66	66	66	66	66
Long term storage	54	54	54	54	54	54
Reconstruction	13	13	13	1.5	1.5	13
Breaklands						
Ac Regeneration	1100	920	990	400	400	1070
Ac Off-site Harvest	20	20	20	0	0	20
Ac Commercial Thin	480	370	480	305	305	445
Ac Mixed Severity Burn	1355	1355	920	0	1355	1490
Ac Underburn	4450	4450	4880	520	4450	4585
-TOTAL ACRES	**7405**	**7115**	**7290**	**1225**	**6510**	**7610**
Colluvial Midslopes						
Ac Regeneration	705	620	705	695	695	680
Ac Off-site Harvest	0	0	0	0	0	0
Ac Commercial Thin	480	480	480	475	475	435
Ac Mixed Severity Burn	695	695	5	0	695	710
Ac Underburn	1160	1160	965	15	1160	1160
TOTAL ACRES	**3040**	**2955**	**2155**	**1185**	**3025**	**2985**
Frost Churned Uplands						
Ac Regeneration	0	0	0	0	0	0
Ac Off-site Harvest	200	200	200	0	0	200
Ac Commercial Thin	0	0	0	0	0	0
Ac Mixed Severity Burn	2160	2160	0	0	2160	2155
Ac Underburn	260	260	350	0	260	260
TOTAL ACRES	**2620**	**2620**	**550**	**0**	**2420**	**2615**
Old Surfaces						
Ac Regeneration	1055	915	1005	1010	1010	970
Ac Off-site Harvest	2000	2000	2000	0	0	2000
Ac Commercial Thin	1560	1420	1560	1525	1525	1155

Indicator	Alt 2	Alt 3	Alt 3a	Alt 4	Alt 5	Alt 6
Ac Mixed Severity Burn	1260	1260	0	0	1260	1260
Ac Underburn	1035	1035	330	170	1035	1035
TOTAL ACRES	**6910**	**6630**	**4895**	**2705**	**4830**	**6420**
Logging Systems						
Skyline	2390	1950	2230	2160	2160	1810
Tractor/Forwarder	3780	3565	3780	2030	2030	3445
Helicopter	1895	1895	1895	685	685	2035
Proposed Activity Acres Adjacent to or Overlapping Existing Weed Infestations						
Acres Harvest Units	111	106	111	15	15	111
Acres Prescribed Burn Units	207	207	197	2	207	204
Miles of existing weed infested roads adjacent to or overlapping proposed activities						
Miles through burns	6.1	6.1	6.69	.01	6.1	6.87
Miles through harvest	1.39	1.39	1.39	.23	.23	1.39

Alternative 1 - No Action

The No Action Alternative would not treat existing infestations with biological, mechanical or chemical methods. On rangelands and open forests spotted knapweed infestations can increase soil erosion in creeks and rivers. Studies done by Montana State University indicate that total water runoff from a 30 minute rain averaged 23 percent on a grass site, and 36 percent on a knapweed site. On average water runoff was 56 percent higher and sediment losses were 192 percent higher on the knapweed dominated plots (Lacey 1989). Sediment runoff yield tripled on the knapweed plots. Why does this happen? The plant physiology and ecology of knapweeds and other invaders permit them to rapidly invade new areas and out compete native plants for light, water, and nutrients. Some of these characteristics are:

- Early maturation
- Profuse reproduction by seeds
- Long life in the soil
- Seed dormancy
- Extremely long roots
- Prickles, vines and thorns that repel animals
- Survival and seed production under adverse environmental conditions.

Knapweed matures early and also has very long root systems. The density of plant roots is much lower per square yard of soil, than the native plant densities, so much less soil is protected. This is the key difference in plant ecology resulting in much higher sedimentation levels. Because there is so much more soil exposed, and fewer roots on the surface (they go down rather than spread out like a grass or some forbs), more erosion results.

With no action proposed specific weed infestations would continue to expand; reducing biodiversity, increasing sediment delivery to stream systems, reducing forage availability to big game throughout the project area, impairing the scenic quality and potentially reducing recreational opportunities.

The No Action Alternative also would not propose timber harvest, road construction or prescribed burning within the analysis area, therefore it would not increase the risk of weed spread through these management activities. Road obliteration would also not occur. Obliteration of roads would decrease the future possibility of weed spread by removing vehicular access into these areas.

This alternative would also weaken the collaborative position of the Clearwater Forest within the Clearwater Basin Weed Coordinating Committee. As a Committee participant, the Forest has an obligation to carry out those weed management objectives developed by the Committee during project planning and implementation.

Ongoing, low level, biological control agent distribution would continue as agents become available as part of an overall Forest program. Biological control agents attained by Forest personnel have been cleared for release by Animal & Plant Health Inspection Service, Agriculture Research Service, US Department of Agriculture, US Department of the Interior, Environmental Protection Agency, National Plant Board and Weed Society of America. A process to develop a list of plant species which may be susceptible to agent attack includes: testing agents against species in same genus, related genera, related by family, unrelated but economically important, plants attacked by related insects, plants with similar morphology or biochemistry, crop plants not previously exposed to the candidate agents and, as of 1995, plants within communities of listed threatened and endangered plants.

No Action

?? Would not directly increase risk through road construction, reconstruction, timber harvest or prescribed burning.
?? Existing infestation would continue to expand
?? Biodiversity would be reduced
?? Forage would be reduced
?? Sediment delivery to streams could increase
?? Would not obliterate roads therefore would not reduce potential weed occurrence on these roads

Solely battling the spread of noxious weeds within the project area by biological control agents (bioca) and mechanical means would be a long and slow process. Currently, not all weeds known to occur within the project area have bioca's cleared for release. Under this alternative those weeds without available bioca's would continue to spread. Mechanical controls including hand grubbing, mowing and cultivation are labor intensive and somewhat ineffective at the scale of entire watersheds. Treatments would be necessary for many consecutive years; current rates of spread and the long seed viability displayed by these non-native invaders would likely prove mechanical controls futile throughout the project area.

Continued spread of these non-native invaders would reduce forage availability to wildlife, increases in sediment production from landscapes of spotted knapweed would reduce water quality, infestations of hawkweed could destroy rare and sensitive plant habitats and, the

overall reduction in biodiversity would reduce ecosystem health and scenic quality currently enjoyed by many recreationists.

No Action Cumulative Effects: Other actions, which could have cumulative effects within the project area, include the spraying of administrative sites (approximately 14 acres) and the spraying of State Highway 12 (approximately 28 acres) by the Idaho Department of Transportation. Administrative sites include places like Apgar Campground, Glade Creek Campground, Major Fenn, the Van Camp Trailhead, and others. The specific chemicals and application amounts for all of the existing spray activities have been taken into account in the worst-case scenario cumulative effects analysis. This would apply to both the no action and action alternatives. These chemical applications stay within the no observable effect level for risk to aquatic organisms (see aquatic resources section). Details regarding chemical types and application amounts can be found in the project file for Highway 12 and administrative site applications.

Increasing recreation use in general, and specifically increasing recreation visitor use as a result of the Lewis and Clark bicentennial celebration could cause an increase in weed spread and the possibility of introduction of new weed species. Lewis and Clark themselves may have introduced new weed species on their journey to the west.

There is always the risk of a wildfire occurrence, even with no actions proposed. If a wildfire were to take place, existing weed infestations would spread. Without the ability to control the weeds with an integrated approach, the weeds would spread further.

Effects Common to All Action Alternatives

Alternatives 2-6: All action alternatives propose the use of an Integrated Pest Management (IPM) system; utilizing manual, chemical and biological control methods to implement weed management objectives as agreed upon by the Clearwater Basin Weed Coordinating Committee. The method(s) of choice for particular infestations is dependent upon weed species, infestation size, land use patterns and location. All areas of herbicide application would be administered by a pesticide applicator licensed by the State of Idaho and all label restrictions would be adhered to, and followed by an aggressive revegetation effort. Seed mixes selected would consider filling soil horizon niches that would reduce the risk of subsequent reinvasion. These mixes would consider early, shallow rooted species; mid-season species with moderately deep roots; late-season species with deeply rooted species. Considerations of disturbance regimes, species availability and species performance (site habitat characteristics, germination requirements, growth rates and competition between species interactions) would also be included in revegetation plans.

Treatment proposals are described in Appendix E. Herbicides considered under chemical control scenarios include clopyralid, picloram, metsulfuron, triclopyr, 2,4-D, and dicamba. Herbicide treatments are proposed for those species addressed by the Clearwater Basin Weed Coordinating Committee as having an eradication objective and where infestation levels warrant an eradication objective. Within the entire project area, herbicides are proposed on approximately 500 acres (16 sites) which represents 0.035 percent of the 128,000 acre

project area. Some of these sites, denoted in the treatment table (Appendix E) would include the distribution of bioca's or mechanical control measures outside of roadsides and areas where proximity to water sources (streams and/or high water tables) where herbicide applications are inappropriate. Where herbicides are used, revegetation efforts would follow and follow-up treatments would occur based upon monitoring of application effectiveness. It is anticipated that two consecutive years of herbicide application would be a worst-case scenario, as revegetation with desired species would reduce the likelihood of reinfestation within these sites. The chemical applications stay within the no observable effect level for risk to aquatic organisms (see aquatic resources section) for all action alternatives.

Where biological control can be used in conjunction with herbicide use, the effectiveness is predicted to be approximately 75 percent. Timing of herbicide treatment and biological control can greatly increase the chance of control. For mechanical control 30 percent effectiveness is predicted. This method is tedious and often misses parts of plants that can reproduce. Chemical control is predicted to be about 50 to 70 percent effective. It is important to understand that each weed has different management objectives and treatment priorities. Management objectives ranges from eradicate, control, contain, and reduce, to custodial. They are all different degrees of decreasing weed populations. Eradicates means the elimination of the weed, and custodial meaning treatment is deferred at this time.

Predicted Effectiveness

?? Biological control in conjunction with chemicals = 75 percent effective
?? Chemical control only = 50-70 percent effective
?? Mechanical control = 30 percent effective

Alternative 2 Direct And Indirect Effects: Alternative 2 would construct one mile of new permanent road. This road would increase the risk of weed spread and invasion of new species because it provides access to motor vehicles. Weeds, transported via vehicles, account for much of the weed spread in the project area. Revegetation of disturbed sites would reduce the risk of weed spread, but it would not eliminate the risk. Alternative 2 would construct 10, short temporary roads. These roads would be constructed and rehabilitated in the same year, with followup revegetation as necessary. This short-term use would minimize weed invasion by quickly revegetating the sites. However, there is some risk that weeds could become established as these roads are used during the year. These proposed roads are not located near existing infestations.

Alternative 2 would harvest approximately 1100 acres in the breaklands. The breaklands are the driest landtype that would be treated in the analysis area, and are the highest risk to weed infestations, especially spotted knapweed. The regeneration harvest and commercial thinning in the breaklands would retain over 50 percent of the canopy thereby reducing the potential for noxious weed spread. Approximately 20 acres would be clearcut. This area has the highest risk of weed spread.

Helicopter logging is the primary logging system used in the breaklands. Because helicopter logging has less ground disturbance and does not place equipment on the ground there is less

risk of weed introduction, therefore although there is some increased risk on the breaklands due to the amount of canopy removed, there is less of a risk due to the type of logging system employed. Overall, the risk of increased weeds is low in timber harvest units that are helicopter logged on the breaklands.

Some skyline logging would occur on the breaklands. Skyline logging would have an increased risk of introducing weeds although less than tractor systems. The requirement to have off-road vehicles, and logging equipment cleaned before they enter the project area would reduce the risk of weed introduction. The risk of increased weeds is low to moderate in timber harvest units that are skyline logged on the breaklands. No tractor/forwarder based systems are prescribed on the breaklands.

On the breaklands 4450 acres would be underburned. Underburning generally retains 70 percent or more of the canopy therefore the risk of weed introduction is low to moderate. Approximately 1355 acres on the breaklands would have mixed severity burns applied. These burns result in more open canopies and the risk of weed introduction would be moderate in these situations.

Alternative 2

Approximately 705 acres would be regenerated on the colluvial midslopes. Regeneration in these areas would retain approximately 45 percent canopy cover. Since these sights are moister than the breaklands, significant increases in noxious weeds are not expected. However, there is a low risk that noxious weeds could inhabit these areas. In the commercial thin units, on the colluvial midslopes there is a low risk of weed occurrence because of the amount of cover retained and moisture regime. It is likely that Canadian thistle could become established. Most of the colluvial midslopes would be skyline logged which can provide the opportunity for weed dispersal through mechanical equipment. However, with the requirement to wash equipment, the wetter sites, and amount of cover retain, there would be a low risk of substantial noxious weed increase.

Mixed severity burning responses on the colluvial midslopes would be similar to the breaklands. Tractor/forward logging systems would be used to clearcut the off-site ponderosa pine in Bimerick Creek. Because of the amount of disturbance there would be a moderate potential to increase weed infestations in this area.

Summary: By treating existing infestations new invaders should be eradicated, and Canada thistle and spotted knapweed should be confined/contained. The road construction, timber harvest, and prescribed burning would have a moderate risk of increasing weed infestations, with the highest risk associated with new, permanent road construction. Seeding disturbed sights, requiring cleaning of off road vehicles would reduce this risk.

Alternative 2 Cumulative Effects:
Other actions, which could have cumulative effects within the project area, include the spraying of administrative sites (approximately 14 acres) and the spraying of State Highway 12 (approximately 28 acres) by the Idaho Department of Transportation. Administrative sites include places like Apgar Campground, Glade Creek Campground, Major Fenn, the Van Camp Trailhead, and others. The specific chemicals and application amounts for all of the existing spray activities have been taken into account in the worst-case scenario cumulative effects analysis. This would apply to both the no action and action alternatives. These chemical applications stay within the no observable effect level for risk to aquatic organisms (see aquatic resources section). Details regarding chemical types and application amounts can be found in the project file for Highway 12 and administrative site applications.

Increasing recreation use in general, and specifically increasing recreation visitor use as a result of the Lewis and Clark bicentennial celebration could cause an increase in weed spread and the possibility of introduction of new weed species.

Alternative 2

High risk of weed expansion include:

?? Permanent road construction (1.1 miles)
?? 318 acres that overlap existing weed infestations
?? 7.5 miles of existing infested road adjacent to or overlapping proposed activities.

Moderate risk of weed expansion include:

?? 10 new temporary roads (3.7 miles)
?? 1100 acres regeneration harvest on the breaklands
?? 1355 acres of mixed severity burning on the breaklands
?? 705 acres regeneration harvest on colluvial midslopes
?? 695 acres of mixed severity burning on colluvial midslopes

Low risk of weed expansion

?? Any activity on frost churned uplands, old surfaces

Risks noted above would be reduced but not eliminated by

?? Pre-spraying 5 areas of existing infestations adjacent to units would reduce this risk to moderate
?? Washing equipment
?? Reseeding with weed-free seed

Alternative 2 would eradicate new invaders and confine/contain Canada thistle and spotted knapweed.

Cumulatively, with the proposed vegetative actions, herbicide treatment of existing infestations and with work completed at administrative sites and on State Highway 12, the project should not result in an increase in noxious weeds.

The effects of the timber sale on the existing weed populations would not be an instant, or direct effect, however, the seeds that might be transported, and sprout throughout the years would cause a cumulative effect. There are approximately 7.5 miles of existing weed infested roads in alternative 2 which go through proposed mixed burns, underburns, and harvest units. This is the third highest amount for the action alternatives with alternative 6 and 3a being higher. For alternative 2 there are approximately 318 acres (207 acres of burning, and 111 acres of harvest) of existing weeds that either overlap or are within 200 feet of proposed burning and harvest. This is the highest amount of overlap for all the action alternatives.

Pretreatment of noxious weeds on these roads and in units would help reduce the likelihood of weed spread to the adjacent burns, and proposed harvest areas. However, there would still be weeds that are missed, and some viable seeds would remain, even after burning to spread to the adjacent areas. Weed monitoring and continued treatment would help prevent or reduce long-term introduction of weeds.

Cumulatively, with the design criteria applied to the vegetative management actions and road construction, and application of herbicides (both with this project and on administrative sites and Highway 12), noxious weeds within the North Lochsa Face project area should decrease.

Alternative 3 Direct and Indirect Effects: Alternative 3 does not construct roads, permanent or temporary therefore there would be no effect on weed distribution from roads. Alternative 3 prescribes slightly fewer vegetative treatments as Alternative 2; therefore the risk of weed introduction would be slightly lower, or about the same. Since there is no road construction associated with Alternative 3, there would be less risk for increased weed spread than described in Alternative 2.

Alternative 3

High risk of weed expansion include:

?? 313 acres that overlap existing weed infestations
?? 7.5 miles of existing infested road adjacent to or overlapping proposed activities.

Moderate risk of weed expansion include:

?? 920 acres regeneration harvest on the breaklands
?? 1355 acres of mixed severity burning on the breaklands
?? 620 acres regeneration harvest on colluvial midslopes
?? 695 acres of mixed severity burning on colluvial midslopes

Risks noted above would be reduced but not eliminated by

?? Pre-spraying 5 areas of existing infestations adjacent to units would reduce this risk to moderate
?? Washing equipment
?? Reseeding with weed-free seed
?? No road construction

Cumulatively, noxious weed occurrence would decrease.

Alternative 3 Cumulative Effects: Alternative 3 has the same amount of existing weed-infested roads (6.1 miles) that go through proposed prescribed burns as alternative 2 (see the indicator table earlier). Existing weed infested roads which go through proposed harvest units is the same as for alternative 2 also, 1.4 miles. In addition there are similar acres of overlap of existing weed infestations and proposed harvest activities, 313 acres, the third highest amount of all the action alternatives. The chemical applications stay within the no observable effect level for risk to aquatic organisms (see aquatic resources section). Cumulatively noxious weed occurrence would decrease due to eradication of new invaders, contain/confine of Canada thistle and spotted knapweed, and design criteria applied to vegetative management actions.

Alternative 3A Direct and Indirect Effects: Alternative 3a does not construct any permanent roads therefore it would not provide a permanent conduit for weed introduction. Vegetative treatment under Alternative 3a is very similar to Alternative 2, with the major difference in the number of acres of mixed severity burning on the colluvial midslopes

Alternative 3a Cumulative Effects: The amounts of existing weed infested roads that go through proposed burns as well as harvest units is similar to alternatives 2 and 3, 6.7 miles and 1.4 miles respectively. The acres of overlap of existing weed infestations and proposed harvest units are 308 acres.

Cumulatively noxious weed occurrence would decrease due to eradication of new invaders, contain/confine of Canada thistle and spotted knapweed, and design criteria applied to vegetative management actions and temporary road construction.

Alternative 3a:

High risk of weed expansion include:

?? 308 acres that overlap existing weed infestations
?? 7.5 miles of existing infested road adjacent to or overlapping proposed activities.

Moderate risk of weed expansion include:

?? 9 temporary roads (3.5 miles)
?? 920 acres regeneration harvest on the breaklands
?? 920 acres of mixed severity burning on the breaklands
?? 705 acres regeneration harvest on colluvial midslopes
?? 5 acres of mixed severity burning on colluvial midslopes

Risks noted above would be reduced but not eliminated by

?? Pre-spraying 5 areas of existing infestations adjacent to units would reduce this risk to moderate
?? Washing equipment
?? Reseeding with weed-free seed

Cumulatively, noxious weed occurrence would decrease

Alternatives 4/4a

Alternative 4/4a Direct and Indirect Effects: Alternative 4/4a would regeneration harvest approximately 400 acres in the breaklands, the lowest amount of the action alternatives. The breaklands are the driest landtype that would be treated in the analysis area, and are the highest risk to weed infestations, especially spotted knapweed. There would be no acres clearcut, eliminating that risk of weed spread. On the breaklands only 15 acres would be underburned, also the lowest of the action alternatives. Mixed severity burns are not proposed in the breaklands with this alternative.

Alternatives 4/4a

High risk of weed expansion include:

?? 17 acres that overlap existing weed infestations
?? .24 miles of existing infested road adjacent to or overlapping proposed activities.

Moderate risk of weed expansion include:

?? 9 temporary roads (3.5 miles)
?? 400 acres regeneration harvest on the breaklands
?? 695 acres regeneration harvest on colluvial midslopes

Risks noted above would be reduced but not eliminated by

?? Pre-spraying 5 areas of existing infestations adjacent to units would reduce this risk to moderate
?? Washing equipment
?? Reseeding with weed-free seed

Cumulatively, noxious weed occurrence would decrease. Alternative 4 has the lowest risk of creating new weed infestations.

Approximately 695 acres would be regenerated on the colluvial midslopes. Regeneration in these areas would retain approximately 45 percent canopy cover. Since these sights are moister than the breaklands, significant increases in noxious weeds are not expected. However, there is a low risk that noxious weeds could inhabit these areas. In the commercial thin units, on the colluvial midslopes there is a low risk of weed occurrence because of the amount of cover retained and moisture regime. It is likely that Canadian thistle could become established. Most of the colluvial midslopes would be skyline logged which can provide the opportunity for weed dispersal through mechanical equipment. However, with the requirement to wash equipment, the wetter sites, and amount of cover retain, there would be a low risk of substantial noxious weed increase. Alternative 4/4a would construct nine temporary roads (one less than alternative 2) therefore the effects would be similar to alternative 2.

Alternative 4/4a – Cumulative Effects: The total acres of overlap between existing weed infestations and proposed harvest or burn activities for alternative 4 is 17 acres, the lowest of all the action alternatives. There are .24 miles of existing weed infested roads which go through proposed harvest units or prescribed burns. This is also the lowest of all action alternatives. The risk of introduction of noxious weeds into the roadless area would be lowest with this alternative, since there is no ground disturbing activity proposed in that area for this alternative.

The cumulative effects of activities discussed previously such as the spraying of State Highway 12, and administrative sites would be the same for all alternatives.

Alternative 5

Alternative 5 Direct and Indirect Effects: Alternative 5 would harvest approximately 910 acres in the breaklands, the lowest amount of the action alternatives, the same as alternative 4. There would also be no acres clearcut, eliminating that risk of weed spread.

On the breaklands 1355 acres would have a mixed severity burn prescribed, the same as alternatives 2 and 3, with a low to moderate risk of weed introduction.

Approximately 695 acres would be regenerated on the colluvial midslopes. Effects of the harvest on weed populations are expected similar in all action alternatives since these acres do not differ greatly between alternatives.

Alternative 5 would construct nine temporary roads (one less than alternative 2) therefore the effects would be similar to alternative 2.

Alternative 5

High risk of weed expansion include:

?? 222 acres that overlap existing weed infestations
?? 6.3 miles of existing infested road adjacent to or overlapping proposed activities.

Moderate risk of weed expansion include:

?? 9 temporary roads (3.5 miles)
?? 400 acres regeneration harvest on the breaklands
?? 1355 acres of mixed severity burning on breaklands
?? 695 acres regeneration harvest on colluvial midslopes
?? 695 acres of mixed severity burning on colluvial midslopes

Risks noted above would be reduced but not eliminated by

?? Pre-spraying 5 areas of existing infestations adjacent to units would reduce this risk to moderate
?? Washing equipment
?? Reseeding with weed-free seed

Cumulatively, noxious weed occurrence would decrease.

Alternative 5 Cumulative Effects: The total acres of overlap between existing weed infestations and proposed harvest or burn activities for alternative 5 is 222 acres, the second lowest of all the action alternatives. There are 6.33 miles of existing weed-infested roads that go through proposed harvest units or prescribed burns. This is also the second lowest of all action alternatives. The risk of introduction of noxious weeds into the roadless area would be second lowest with this alternative, since the only ground disturbing activity proposed in that area for this alternative is prescribed burning.

The cumulative effects of activities discussed previously such as the spraying of State Highway 12, and administrative sites would be the same for all alternatives.

Alternative 6

Alternative 6 Direct and Indirect Effects: Alternative 6 would regeneration harvest approximately 1070 acres in the breaklands. Approximately 20 acres would be clearcut. This area has the highest risk of weed spread.

On the breaklands approximately 1490 acres would have a mixed severity burn prescribed, the highest of the action alternatives. These prescribed burning activities pose a low to moderate risk of weed introduction.

Approximately 680 acres would be regenerated on the colluvial midslopes. Effects of the harvest on weed populations are expected to be similar in all action alternatives since these acres do not differ greatly between alternatives.

Alternative 6 would construct eight temporary roads (two less than alternative 2) therefore the effects would be similar to alternative 2.

Alternative 6

High risk of weed expansion include:

?? 315 acres that overlap existing weed infestations
?? 8.3 miles of existing infested road adjacent to or overlapping proposed activities.

Moderate risk of weed expansion include:

?? 8 temporary roads (3.2 miles)
?? 1070 acres regeneration harvest on the breaklands
?? 1490 acres of mixed severity burning on breaklands
?? 680 acres regeneration harvest on colluvial midslopes
?? 710 acres of mixed severity burning on colluvial midslopes

Risks noted above are reduced but not eliminated by

?? Pre-spraying 5 areas of existing infestations adjacent to units would reduce this risk to moderate
?? Washing equipment
?? Reseeding with weed-free seed

Cumulatively, noxious weed occurrence would decrease.

Alternative 6 Cumulative Effects: The total acres of overlap between existing weed infestations and proposed harvest or burn activities for alternative 6 is 315 acres, the second highest of all the action alternatives. There are 8.3 miles of existing weed-infested roads that go through proposed harvest units or prescribed burns. This is the highest of all action alternatives.

Cumulatively noxious weed occurrence would decrease due to eradication of new invaders, contain/confine of Canada thistle and spotted knapweed, and design criteria applied to vegetative management actions and temporary road construction.

Forest Plan Consistency

All alternatives are consistent with the Forest Plan since the plan does not provide specific direction for noxious weeds.

Consistency with Clearwater River Basin Coordinating Committee

All action alternatives are consistent with the agreements of the Clearwater River Basin Coordinating Committee agreements. The alternatives initiate preventive measures for reducing the threat of invasion by new non-native plant species.

Human Health and Resources

There are many differences of opinion within the general population in regards to the safety of pesticide use. Within the agricultural communities herbicides and pesticides are often viewed as necessary tools of the trade. Safety protocols have been developed and herbicide labels denote many precautionary measures that are legally required to be taken by applicators. However, many groups are questioning the safety of these compounds within the environment.

The Northern Region of the Forest Service has analyzed the risk of using chemicals to control noxious weeds. Two documents address health and safety issues: *Risk Assessment for Herbicide use in Forest Service Regions 1, 2, 3, 4 and 10 and on Bonneville Power Administration Sites (USFS, 1992) and Human Health Risk Assessment for Herbicide Application to Control Noxious Weeds and Poisonous Plants in the Northern Region (Monnig, 1988).*

Toxicology data for chemical compounds are generally developed from animal testing. Extrapolation from results on animals to humans is an uncertain process but, toxicologists compensate by using safety factors. The Environmental Protection Agency reduces the NOEL from animal testing by one hundred (NOEL divided by 100) when deciding allowable amounts of pesticides on foods. This adjusted amount (dose) is referred to as the Acceptable Daily Intake (ADI) or Reference Dose (RfD). This ADI is the amount assumed to be safe to consume daily for a lifetime.

Table 3-29: Allowable Daily Intake (ADI)

Herbicide	ADI (mg/kg/day)
Clopyralid	0.5
Dicamba	0.03
Picloram	0.07
2,4-D	0.01
Glyphosate	0.1
Triclopyr	0.025
Metsulfuron Methyl	0.25

The ADI may be met or exceeded if a person ate more than one-half pound of wild food immediately following herbicide application. This situation will be avoided; areas of herbicide applications will be posted three days prior to, during and one week following application procedures in order to avoid this scenario.

There is a possibility of hypersensitivity within a small percentage of the population. These persons are generally aware of their sensitivities and therefore avoid possible exposure situations. Areas of herbicide applications will be posted in order to alert those that may be hypersensitive. Such persons will not be permitted to work on spray crews.

Risks to human health are assumed to be reasonably small given that all precautionary measures to ensure human safety will be taken.