

## IV Environmental Consequences

### Introduction

This chapter discloses the potential effects of implementing each alternative described in Chapter II. It will be organized based on Forest Plan resource values described in Chapter I. Key issues will be primarily tracked under the single resource that generated it. The existing condition is summarized under the heading of Findings. More detail can be found in reviewing Chapter III.

Effects can be direct (occurring at the same time and place as the action), indirect (separate in time from the action that caused them), or cumulative (the incremental effect of the project when added to the effects from other past, present, and reasonably foreseeable actions). These effects are described in terms of increases, intensity, duration, and timing. In many cases cumulative and direct effects merge together when multiple projects are analyzed or when multiple resource objectives are being met. This chapter provides the analytical background for the comparison of alternatives described in Chapter II.

**Ecosystems and Diversity:** Goal: To provide for diversity of plant and animal communities and tree species consistent with overall multiple-use objectives of the Forest Plan. Maintain or enhance ecosystem functions to provide for long-term integrity (stability) and productivity of biological communities.

Summary of findings:

- The shorter the fire return interval, the less dramatic would be the result of the wildfire on total plant composition, maintaining the stand with a dominance of seral tree species. Approximately 55 percent of the planning area is within the frequent fire regime and 37 percent in the mixed fire regime.
- Ponderosa pine is maintained by the frequent fire regime. Historically 72 to 90 percent of the regime would be dominated by ponderosa pine. Currently 22 percent is ponderosa pine.
- Western larch is maintained by longer fire return intervals approaching 100 years.
- The stands in the planning area have departed from historic vegetation conditions and have become overstocked with shade tolerant climax species. The canopy structure has changed from mostly single strata to multi-stratum. Approximately 45 percent of the forested stands in the Willow/Phillips and Gordon Creek watersheds are in overstocked conditions.
- When disturbances are absent for an extended period, particularly in the frequent fire regime, instability is heightened; increasing the risk for catastrophic events associated with insect epidemics and fire stand replacement events. Risk of mortality to large diameter trees is increased.
- Old Forest Single Strata made up a larger percent of the landscape in the past. Large diameter ponderosa pine is currently found in the ridgetop and midslope stands.
- The dry grasslands are being encroached by conifers.
- Diversity of forest type, structure, and composition provide habitat for a diverse array of wildlife species, many with unique habitat requirements.
- The action alternatives would not change the structural stages in the Dry Forest. Actions are proposed in SEOC, UR, and YFMS.

Effects are summarized from input provided by the silviculturist found in the *Pedro/Colt Analysis Silvicultural Report*, and supplemented in the EA.

Changes in Moist Forest Structural Stages in the HRV Analysis Area

Alternative	Acres Changed Percent HRV	SI %	SECC %	SEOC %	UR %	YFMS %	OFMS %	OFSS %
HRV	Percent	1 to 15	1 to 25	0 to 5	5 to 25	20 to 60	10 to 60	0 to 5
Alt A	Acres Percent	None 11.8	None 1.6	None 15	None 11	None 30.3	None 19.6	None 10.7
Alt B	Acres Percent	+120 12.3	-29 1.5	None 15	+38 11.2	-58 30.0	-262 18.4	+191 11.5
Alt C	Acres Percent	+110 12.3	-29 1.5	0 15	+71 11.2	-81 29.9	-219 18.6	+148 11.3
Alt D	Acres Percent	+161 12.5	-29 1.5	0 15	+38 11.2	-99 29.9	-262 18.4	+191 11.5
Alt E	Acres Percent	+161 12.5	-29 1.5	0 15	+38 11.2	-99 29.9	-262 18.4	+191 11.5

Changes in Moist Forest Structural Stages in the Planning Area

Alternative	Acres Changed Percent Planning Area	SI %	SECC %	SEOC %	UR %	YFMS %	OFMS %	OFSS %
HRV	Percent	1 to 15	1 to 25	0 to 5	5 to 25	20 to 60	10 to 60	0 to 5
Alt A	Acres Percent	None 14.8	None 1.2	None 17.9	None 7.1	None 35.7	None 15.4	None 7.9
Alt B	Acres Percent	+120 15.7	-29 1.0	None 17.9	+38 7.4	-58 35.3	-258 13.5	+187 9.3
Alt C	Acres Percent	+110 15.6	-29 1.0	0 17.9	+71 7.4	-81 35.1	-215 13.8	+144 9.0
Alt D	Acres Percent	+161 15	-29 1.0	0 17.9	+38 7.4	-99 35.0	-258 13.5	+187 9.3
Alt E	Acres Percent	+161 16	-29 1.0	0 17.9	+38 7.4	-99 35.0	-258 13.5	+187 9.3

There would be no changes to the Dry Forest structural stages. Harvest would occur in stem exclusion open canopy, understory reinitiation, and young forest multistratum without changing them to another structural stage.

Acres treated by structural stage in Dry Forest

Alternative	Acres Treated Percent HRV	SI %	SECC %	SEOC %	UR %	YFMS %	OFMS %	OFSS %
HRV	Percent	5 to 15	0 to 10	5 to 20	0 to 10	5 to 25	5 to 20	15 to 70
Alt A	Acres Percent	None 17	None 10.7	None 46	None 4.9	None 7.8	None 13.6	None 0
Alt B	Acres Percent	None 17	None 10.7	None 46	88 4.9	141 7.8	None 13.6	None 0
Alt C	Acres Percent	None 17	None 10.7	497 46	88 4.9	141 7.8	None 13.6	None 0
Alt D	Acres Percent	None 17	None 10.7	497 46	88 4.9	141 7.8	None 13.6	None 0
Alt E	Acres Percent	None 17	None 10.7	497 46	88 4.9	141 7.8	None 13.6	None 0

**Alternative A - No Action**

**Direct and Indirect Effects** - The landscape would continue its present trend. Vertical diversity would remain at high levels because of the shade tolerant species in the understory. Horizontal diversity would be good for early successional stages but lost as plantations age. Multistructured stands would continue to dominate the landscape and single stratum old forest would be lacking. Western larch and ponderosa pine would not regenerate because of closed canopies and the lack of stand disturbance events. There would be a continued loss of early seral tree species. Stands would tend to become uniform as insects and disease kill the larger diameter trees and the younger grand fir and Douglas-fir take their place. Landscape diversity would continue to become more uniform in forest structure and the amount of forest edge would be reduced as plantations age.

**Cumulative Effects** - Fuel conditions would transition to high risk because of insect mortality and the continued development of ladder fuels. In the Frequent fire regime stand replacement wildfire could occur, becoming the norm. Mortality levels would be high, killing large diameter trees. The historical resilience of the frequent fire regime would change with fewer trees surviving a wildfire event. The distribution of live trees would be in patches rather than individual trees spread across the landscape. Severe changes in vegetation composition would occur in the frequent fire regime and in portions of the mixed fire regime.

With time, early successional trees become young forest and begin to blend with the mature forest. In fifteen years there would be a 62 percent reduction in early successional stages as plantations age. Wildfires could develop extensive areas of early successional stages, at a cost to larger trees and old growth ponderosa pine. A wildfire would likely create stand initiation above HRV for the frequent fire regime. Horizontal diversity would be lost or reduced either from aging of the stands or from wildfire creating homogeneous, stand replacement, conditions on the landscape.

## All Action Alternatives

**Direct and Indirect Effects** – Actions are being proposed in low elevation stands where fire frequency played a major role in maintaining forest landscape diversity, structure, and resiliency. The planning area is 55 percent frequent fire regime and 37 percent mixed fire regime. Due to the mosaic nature of the regimes on the landscape, most of the mixed fire regime is at the short end of the fire return interval and the disturbance regime favored early seral (ponderosa pine and western larch) tree species. Treatments would be focused on stands having higher proportions of early seral species and restore single stratum with large trees. Current stand conditions indicate single stratum with large trees is lacking in the Dry Forest while it is above HRV in the Moist Forest. Overall the landscape lacks historical levels of single stratum with large trees and is becoming uniform in appearance by the increase in stocking levels of shade tolerant tree species.

The vast majority of proposed treatments would not change structural stages but would maintain or restore open stand conditions characteristic of historic short fire return intervals. Alternative B maintains or restores 5,250 acres of open forest; Alternative C, 2,020 acres; Alternative D, 2,090 acres, and Alternative E 6,640 acres. Approximately 148 (Alt C) to 191 (Alts B, D, and E) acres of Old Forest Multistratum would become Old Forest Single Strata representing about a half percent increase over the 36,400 acre HRV analysis area. The reduction in stocking levels would allow faster growth, increase resilience, and the reduced fuel structure would protect the large trees from wildfires. Vigor of the remaining trees would increase, reducing the risk of mortality from insect epidemics.

Changes to Structural Stages by Alternative

Alternative	Total Acres Treated	No Change Acres	OFMS to SI Acres	OFMS to UR Acres	OFMS to OFSS Acres	UR, YF, or SECC to SI Acres
B	5,560	5,182	0	71	191	120
C	2,277	1,952	0	71	148	110
D	2,672	2,253	0	71	191	161
E	6,640	6,392	0	71	191	161

Within the planning area there would be no structural stage changes expected in the Dry Forest. The Moist Forest in the Planning Area would have a 1.6 to 1.9 percent reduction of Old Forest Multistratum with an increase of 1.1 to 1.4 percent in Old Forest Single Strata and a 0.8 to 1.2 percent increase in Stand Initiation. All alternatives would convert approximately 71 acres of Old Forest to Understory Reinitiation. The Understory Reinitiation stands retain enough large trees to be old forest, however the created opening and the mosaic of regeneration within the stands fit the understory reinitiation phase. Stand initiation would increase above 15 percent in the planning area, however it is below 13 percent for the HRV analysis area. The temporary increase above historic levels in the planning area would be remedied by natural growth and aging of the plantations. Within the next 15 years approximately 62 percent of the plantations would become young forest.

The 110 to 161 acre increase in Stand Initiation comes from the seed tree prescription in stands that are currently Stem Exclusion Closed Canopy, Understory Reinitiation, and Young Forest. These stands have high levels of mortality from past insect activity (spruce budworm) and root rots. Stands having root rots would have the tree species shifted from true firs to other species that would be resistant to that particular strain of root rot, likely western larch or ponderosa pine.

All Alternatives meet the requirements of Forest Plan Amendment 11, the ECOSCREENS and increases the diversity of forest habitat by restoring the open canopy character associated with short fire return intervals. Moist Forest is within or above HRV for Old Forest Multistratum and Single Stratum and fits within Scenario B. In the Dry Forest, the Old Forest Single strata is below HRV, fitting within scenario A and no large trees would be cut in Dry Forest stands. Large trees can be removed from Moist Forest stands, however ponderosa pine larger than 21 inches would not be cut. This would restore stands to open ponderosa pine with large trees. Units 20 and 23 are the only units that have large grand fir designated for removal. It was decided after marking these units that large trees would not be cut. The large trees in these units are grand fir and are not likely to survive an understory burn. The units would retain late old structure but would become single structure in appearance. Approximately 340 acres of old forest multistratum would be treated using seedtree or intermediate cut prescriptions. The seedtree prescription would convert 191 acres of old forest multistratum to old forest single strata. The seedtree prescription is being used to describe conditions after harvest. The removal of grand fir from these stands would create an open stand condition that would look much like a seedtree harvest when completed. The open condition would be maintained in the future so the stand would not become a plantation nor would the overstory be removed. The treatments could be called improvement cut but are being called seedtree to acknowledge the extent the stand would be opened. Unit size would be limited to 40 acres. Since the prescription is not to regenerate but to restore open forest with large trees and the old forest will remain old forest, the Scenario B constraint to not use regeneration harvest systems in LOS areas over 100 acres is met. The leave trees are predominately large trees leaving the stand with 10 or more trees greater than 21 inches per acre, *Interim Old Growth Definitions for Ponderosa Pine for Region 6*.

Vertical diversity is related to the structural layers within a stand. Vertical diversity is created by small-scale disturbance events such as root rot pockets, endemic insect attacks, or lightning. Overall, the action alternatives would reduce vertical diversity because of the focus to restore frequent fire stand characteristics to the landscape. The current stand conditions have all age classes present. The restored stand would have distinct cohort age groups with breaks in the vertical structure. Unevenaged management using patch clearcuts less than 5 acres in size would emulate small-scale disturbance. Alternative B proposes 23 acres of patch clearcuts; Alternative C, 10 acres; and Alternative D and E, 33 acres. Most of the patch clearcuts are for treatment of root rot pockets and would be regenerated to non-host species.

The natural fuels treatment on 4,450 acres proposed in Alternative B and 4,520 acres in Alternative E is not expected to change structural stages. The burning would reduce the amount of shade tolerant tree species in the seedling to pole size classes. Vertical diversity would be reduced by the prescribed fire killing small understory trees; beginning the process to restore the open stand characteristics of frequent and mixed fire regimes dominated by early seral tree species. Understory is the major component of vertical diversity and would be lost to restore horizontal diversity.

All prescriptions would give the stand an open appearance. Understory and mid level trees would be removed. The increased spacing between trees would allow for more vigorous tree growth; reducing the risk to insect mortality and inter-tree competition. Large diameter trees and associated old forest character would be achieved sooner. The thinning of small size classes reduces ladder fuels. A large portion of the landscape would achieve resilience to wildfires due to reduced fuels and would more closely resemble stand structure and character associated shot fire return intervals. These changes would increase horizontal diversity by restoring open stands dominated by early seral species.

#### Increases in Horizontal Diversity by Fire Regime

Fire Regime	Total Acres of Fire Regime in Planning Area	Acres of Fire Regime Treated Alt B	Acres of Fire Regime Treated Alt C	Acres of Fire Regime Treated Alt D	Acres of Fire Regime Treated Alt E
Frequent	12,066	4,130	1,835	1,971	4,848
Mixed	8,054	1,410	442	682	1,774
Infrequent	1,876	19		19	19

Alternative B proposes treatment of 34 percent of frequent fire regime and 17 percent of the mixed. Alternative C would treat 15 percent of the frequent fire regime and 5 percent of mixed. Alternative D would treat 16 percent of the frequent fire regime and 8 percent of the mixed. Alternative E would treat 40 percent of the frequent fire regime and 22 percent of the mixed. Alternative B and E treat the highest amount of acres in restoring or maintaining horizontal diversity while Alternatives C and D are nearly the same.

The majority of treatments are being proposed in stands that have deviated from historic conditions because of missed fire return intervals. Approximately 72 percent of the acres proposed for harvest in Alternative B, 95 percent in Alternative C and 86 percent in Alternative D and E are condition class 2 and 3 stands. Approximately 69 percent of the acres proposed for prescribed fire in Alternative B and E are condition class 2. The high percentage of condition class 2 and 3 indicates the focus on restoring frequent fire stand characteristics.

#### Harvest Treatments by Condition Class

Alt	Harvest Acres	CC 1 %	CC 2 %	CC 3 %
B	1,108	28.4	57.3	14.3
C	1,586	4.9	74.3	20.8
D	1,981	15.8	67.5	16.7
E	1,981	15.8	67.5	16.7

Though tree species diversity is found across the landscape, current stand conditions are not favorable for the regeneration of early seral tree species. The proposed removal of shade tolerant tree species from the understory and follow-up prescribed fire creates conditions for maintaining these species on the landscape. Maintaining conditions favorable to early seral tree species returns habitat that was lost due to missed fire return intervals. The silvicultural objectives would provide conditions favorable to regenerate ponderosa pine and western larch. Approximately 55 percent of the acres harvested in Alternative B are for ponderosa pine management, 73 percent of Alternative C, and 60 percent of Alternative D and E. The emphasis on early seral tree species is indicated by the amount of acres of ponderosa pine and western larch proposed for treatment: Alternative B proposes 754 acres or 68 percent; Alternative C proposes 1,414 acres or 89 percent; and Alternative D and E proposes 1,586 acres or 80 percent.

## Harvest and Prescribed Fire Acres by Silvicultural Objectives

Alternative	Ponderosa pine Management	Stocking Control for Vigor	Western Larch	Root Rot	Fuels, Stand Structure	Regen for Decadence
B	623	129	131	131	4,452	94
C	1,159	0	255	172	691	0
D	1,209	135	371	172	691	94
E	1,209	135	371	172	4,660	94

**Cumulative Effects** - The focus of silvicultural treatments would increase early seral tree species and restore landscape characteristics of the frequent fire regime. The objectives would be accomplished by: focusing treatment in stands that have deviated the most from historic fire return intervals, removing shade tolerant tree species from the understory, and locating treatments to control the size and severity of a wildfire. Returning large portions of the landscape back to frequent low intensity fires would retain ecosystem functions. The increased resilience to a wildfire event provides stability to the landscape. The risk of catastrophic loss would be reduced. Large diameter trees would survive and the mosaic of vegetation would help to keep fires on the ground. The dry, southern exposures dominated by ponderosa pine would function within historic disturbance processes.

Fires on the landscape would have a low resistance to control so other resource values could be protected. The resilience of forest cover would be increased because more standing trees would remain after a wildfire. The landscape would be in a condition of greater stability. The risk to insect epidemics would be reduced. Through the restoration of resilience and forest character associated with the frequent fire regime, productive biological communities would be maintained. Fire behavior would be altered along the grassland-forest interface. Wildfires would spread quickly through the grasses, carrying fire to large portions of the landscape. The fire would also move quickly through forested stands with reduced risk of fire reaching into the overstory crowns from the torching of individual trees. Grazing would have little effect on the rates of spread since the route and timing of grazing changes each year and pastures have non-use year every fifth year. Currently the allotment has not been used for two years. Natural fire behaviors would be expected because of regrowth of the pastures each year.

Stand conditions on private lands below the forest boundary are generally in an overstocked conditions. Landowners use overstocked conditions to screen their houses from the Dry Creek road and to trap dust. The Oregon State department of Forestry has been working with private landowners to reduce the high stocking levels and the associated risk from wildfires damaging their homes. The landowner south of the Forest boundary is considering a commercial harvest entry to reduce his stocking levels as well. The treatments on the National Forest Lands and private lands work together to restore open forest diversity on a landscape dominated by short fire return intervals in the watershed. Activities on private lands are generally accomplished rapidly. The phased treatments on the National Forest would allow the landscape to slowly adjust to the restored conditions since all available lands are treated at one time.

**Wildlife Habitat:** Goal: To maintain or develop effective levels of well distributed wildlife habitat throughout the forest to maintain viable populations of all existing native and desired nonnative vertebrate species.

Key issue 1: The Forest Plan provides inconsistent standards and guidelines between wildlife and achieving forest health, sustainability and biodiversity. The development and maintenance of desired forest structure and composition in the Frequent Fire Regime can be at odds with wildlife standards developed for closed canopy species and big game habitat.

### **Alternative A - No Action**

#### Old Forest Habitat – Direct and Indirect Effects

In the short term, late and old structure (LOS) would remain at current levels. In the warm dry plant association, single layer old forest (OFSS) would remain below the historical range of variability. With continued fire suppression, more LOS stands in the project area would continue to grow into a multistory structure. Mortality from insect and disease would continue to reduce overstory canopy. The loss of large diameter ponderosa pine and Douglas-fir would move the forest to young forest conditions of shade tolerant tree species. The high canopy closure would inhibit regeneration of western larch and ponderosa pine. This multi layer condition would increase the stand density making the stands increasingly susceptible to insects, disease, and high intensity wildfires. A major disturbance on the landscape would change the composition and structure to an open shrubland/grassland with little or no tree cover. This could result in a loss of old forest habitat on a large scale.

### Dead and down wood habitat

In the coming decade, dead standing trees (snags) would continue to occupy the project area at current densities and size classes. Snag levels would eventually increase because the overstocked conditions increases stress induced mortality from insects and disease. Given the current tree density, composition, and structure, the area would remain susceptible to wildfire. Depending on the size and severity of the next major disturbance, snag density would increase temporarily (for more than 10 years) in the watershed, and then fall to “normal” levels, maintained by the “natural” mortality of green trees.

### Management Indicator Species Direct/Indirect Effects:

Habitat conditions would not change for American marten, pileated woodpecker, and other primary cavity excavators. Abundant snags and down logs would be available in most areas. The potential for use by species such as white-headed woodpecker and others that prefer open ponderosa pine habitat will continue to decrease. Rocky Mountain elk habitat would remain unchanged. The open road density would remain at 0.5 miles per square mile. Over time, stands would continue to grow and develop into a multistory structure, increasing the amount of total cover. More stands would shift from forage to cover and from marginal cover to satisfactory cover. Overall, elk habitat effectiveness index (HEI) would remain high near .85. However, the increase in fuels could result in future high intensity wildfires or other tree mortality, which would severely reduce cover.

### Neotropical Migratory Birds

Nesting habitat for species preferring ponderosa pine and open stand conditions would continue to decline, but late successional mixed conifer stands would remain abundant. Subalpine habitat would remain unchanged. A major disturbance on the landscape could change the composition and structure of the area to an open shrubland/grassland with little or no tree cover as discussed in the Old Forest section. Riparian shrub habitat will not be directly affected by current management direction because habitat components will essentially remain unaltered. Over time, riparian shrub stands in the project area would continue to grow and develop into more dense community, eventually occupying more of the site.

### Threatened, Endangered, and Sensitive Wildlife Species, and northern goshawk

There would be no immediate changes in conditions for the gray wolf or Canada lynx. Current management would have no effect to these species since populations are not known to occupy the area. Wolverine, bald eagle, and goshawks may use the area on an occasional basis, but probably not for reproduction. Future reductions in habitat could result if fuels continue to build up and a large wildfire occurs.

## **All Action Alternatives**

### Old Forest Habitat Direct and Indirect Effects of all Action Alternatives

Dedicated Old Growth (C1) unit #2552 contains only 8.4% old forest. Boundary changes proposed for the Dry Creek Dedicated Old Growth will increase the protection of old forest that is currently designated as E2, Timber and big game. An equal exchange of 127 acres would occur, however the actual acres having old forest characteristics within C1 would increase. Appropriate old forest habitat would be added to C1 designation (portions of inventoried old growth #s 4419, 4409, and 4399); while roadside and more open grassy areas would be removed from C1 designation.

The proposed treatments would move approximately 148 acres (Alt C) to 191 acres (Alts B, D, and E) of Old Forest Multistratum to Old Forest Single Strata, representing about a half percent increase in OFSS in the Phillips and Gordon watersheds. No large trees would be cut in Dry Forest stands. Within the planning area there would be no structural stage changes expected in the Dry Forest. All alternatives would convert approximately 71 acres of Old Forest to Understory Reinitiation. These stands would retain enough large trees to be considered old forest, however the opening of holes and the mosaic of regeneration within the stands fit the understory reinitiation definition. Underburning in harvest units plus additional landscape burning would also be beneficial to late and old structure stands. Prescribe burning should reduce the density of vegetation in late and old structure stands, eventually moving more old forest multi-strata stands toward an old forest single stratum conditions. Prescribed burning would also serve to maintain old forest single stratum stands in a more historic ecological condition.

The vast majority of treatments would not change structural stages but would maintain or restore open stand conditions characteristic of historic short fire return intervals. The following table illustrates the number of acres that would be treated with the intent to maintain or promote the growth of old forest conditions. Alternative B would treat 5,335 acres; Alternative C, 1,965 acres; Alternative D, 2,266 acres, and Alternative E 6,235 acres. The reduction in stocking levels would allow faster growth, increase resilience, and reduce fuel loads, reducing the chance that large areas could be lost to intense wildfire. Ultimately these stands should reach late and old structure sooner than with no action, thereby providing habitat for wildlife species associated with older, larger trees.

Table of Old forest maintained and promoted by alternative (acres)

Alternative	B	C	D	E
<b>Frequent fire regime (dry sites) treated to maintain or promote Old Forest Single Story by timber harvest</b>	544	1249	1246	1246
Additional burning outside of units	3425	313	313	3255
<b>Total</b>	<b>3969</b>	<b>1562</b>	<b>1559</b>	<b>4501</b>
<b>Mixed fire regime areas treated to maintain or promote Old Forest by timber harvest</b>	339	165	469	469
Additional burning outside of units	1027	238	238	1265
<b>Total</b>	<b>1366</b>	<b>403</b>	<b>707</b>	<b>1734</b>
<b>Total treatments to promote old forest</b>	<b>5335</b>	<b>1965</b>	<b>2266</b>	<b>6235</b>

Old Forest Habitat Cumulative effects

Past activities and events in the Phillips and Gordon watersheds that would cumulatively affect late and old structure stands include harvest on national forest and on private land. Past harvest activities have affected the structure and composition of old forest in the watershed through the removal of large diameter trees and fragmentation of interior forest. Past and present wildfire suppression tactics have caused an increase in the density of trees and a change in species composition. As a result, predicted fire behavior has changed from frequent low-intensity to infrequent high-intensity stand replacing burns. Few late and old structure stands have burned in more recent times, but all old forest multi-strata stands in the watershed are susceptible to stand replacement fires.

Dead and down wood habitat Direct and Indirect Effects of all Action Alternatives

The estimated snag density in the affected areas would average 3.2 snags per acre >20" dbh, and 5.9 snags per acre >12" dbh, which is within the Forest Plan standards, as amended. Actual numbers of snags in each unit is highly variable. Snag densities  $\geq 20$ " dbh range from a low of one per acre to as many as 8 per acre. Total snag densities within units range from 2.5 per acre to 20.6 per acre. While the average appears low when compared to DecAid tolerance levels for most species (Table U), some units will exceed levels and others will fall short. At the watershed scale, snag densities would probably fall somewhere between the post harvest estimates and the CVS watershed-wide estimates. For example, watershed-wide the average is estimated at 3.5 large (>20") snags per acre, and within units post harvest, 3.2 snags per acre. The harvest units make up only 3% (Alternative B) to 5% (Alternative E) of the Phillips and Gordon watersheds that CVS snag numbers are based on. Harvest unit data indicates that an adequate number of the most desirable snags will be marked to protect, and there are numerous additional snags that are expected to remain. Future levels of dead and down trees are expected to be higher than the standards because of expected mortality from underburning. Controlled burning on 551 acres (Alternatives C and D) to 4520 acres (Alternative E) would essentially maintain dead standing tree habitat in the area.

DecAid tolerance levels for six species compared to post-harvest snag density from unit layout estimates and forest plan standards.

Species	Diameter Group	Snag Density (#/acre)				
		DecAid Tolerance Levels			Post harvest average	Forest Plan Standard
		30%	50%	80%		
White-headed woodpecker	$\geq 10$ " dbh	0.3	1.9	4.3	<b>5.9</b>	2.25
	$\geq 20$ " dbh	0.0	1.5	3.8	<b>3.2</b>	0.14
Pileated woodpecker	$\geq 10$ " dbh	-	30.4	-	<b>5.9</b>	1.8
	$\geq 20$ " dbh	-	7.3	-	<b>3.2</b>	0.14
American marten	$\geq 10$ " dbh	-	16.2	-	<b>5.9</b>	1.8
	$\geq 20$ " dbh	-	5.0	-	<b>3.2</b>	0.14
Cavity-nesting birds	$\geq 10$ " dbh	-	-	-	<b>5.9</b>	1.8
	$\geq 20$ " dbh	-	2.4	-	<b>3.2</b>	0.14
Silver-haired bat	$\geq 10$ " dbh	-	56.4	-	<b>5.9</b>	1.8
	$\geq 20$ " dbh	-	16.8	-	<b>3.2</b>	0.14
Long-legged myotis	$\geq 10$ " dbh	-	10.2	-	<b>5.9</b>	1.8
	$\geq 20$ " dbh	-	-	-	<b>3.2</b>	0.14

Dead and down wood habitat Cumulative effects

Past harvest activities have directly affected snag density in the analysis area through the removal of dead standing trees, and regeneration harvests that left few live trees standing. These effects are reflected in the affected environment section. Present activities that have a cumulative effect on dead standing trees include wildfire suppression tactics. Particularly in dry sites, fire historically served to reduce heavy fuel build-up and recruit snags on the landscape. Fire exclusion interrupts deadwood dynamics on the landscape, allowing dead standing trees and down wood to remain longer on the site, and building higher densities of dead wood on the landscape. Past and present activities, when considered with the proposed activities, do not change the conclusion that snag and down wood levels are expected to remain at adequate levels in the Phillips and Gordon watersheds.

Management Indicator Species Direct and Indirect Effects of all Action Alternatives

Pileated woodpeckers

Cool moist forest types are within the range of amounts of old forest estimated to occur historically, however large unfragmented blocks are lacking. Primary pileated woodpecker reproductive habitat is limited to small patches at higher elevations in the watersheds. A slight reduction of Old Forest Multistructure (OFMS) would occur as a result of proposed activities. Alternative C would reduce OFMS by 219 acres and Alternatives B, D, and E 262 acres. At the watershed scale, this would be a 3% reduction in OFMS in moist forest stands. This reduction could slightly alter use of the area by pileated woodpeckers, but not enough to reduce the viability of the population. Dead and down wood would be provided at 100 percent population levels. Most of the area would continue to provide pileated woodpecker foraging habitat. The older plantations are moving toward young forest and would provide additional foraging habitat in the next 20 years.

The forest plan amendment to change the boundary on C1 unit 2552 will increase the amount of protected habitat for pileated woodpeckers to a small degree. The new boundary will encompass more old forest further up the drainage away from the road.

Primary cavity excavators are the management indicator species for dead and down wood in the general forest. There are eleven species of primary excavators that utilize the planning area. The Partner in Flight database has summarized trend information for this portion of the National Forest. It was determined that 4 species are increasing, 2 are stable, 2 have not enough data to make a determination, 2 are in decline, and 1 shows an uncertain trend. Species showing an increasing trend are coniferous forest generalist or prefer dense forest. Species showing a decline are the Williamson’s sapsucker and Lewis’ woodpecker. Williamson’s sapsucker prefers ponderosa pine and western larch, stands characterized by the mixed fire regime. Lewis’ woodpecker is a low elevation open coniferous forest species severely affected by competition with starlings. They will utilize burned trees of any species. White-headed woodpeckers are the species with an uncertain trend; they prefer open mature ponderosa pine forest. Actions that increase open stand conditions with large trees would improve habitat for those primary excavator species showing a declining and uncertain trend. Alternative B treats and maintains the most acres of ponderosa pine and all alternatives provide treatments favoring western larch. Guidelines for down logs and snags provide for 100 percent viable populations. Initial levels of dead and down trees would be higher than the standards after prescribed burning due to current fuel loads.

Rocky Mountain elk:

Comparison of Impacts to Big Game Habitat Forest Plan Standards by Alternative

Alternative	Percent Satisfactory Cover		Percent Total Big Game Cover		HEI		Open Road Density		
	C4	E2	C4	E2	C4	E2	C4	E2	Planning area
A (Current)	26	38	57	58	.85	.78	0.32	2.25	1.10
B	24	14	57	51	.84	.71	0.32	2.49	1.20
C	24	29	56	54	.84	.74	0.32	2.49	1.20
D	23	28	55	53	.84	.75	0.32	2.49	1.20
E	23	13	55	50	.84	.70	0.32	2.49	1.20
Forest Plan Minimum Standard	15	10	30	30	.60	.45	-	-	-

Forest plan standards for big game in management area E2 would be met. Total cover for each alternative would remain well above the Forest Plan standard of 30 percent. Total reduction of cover would range from 4% (Alt. C) to 8% (Alt. E). Alternatives B and E would cause the largest reduction in cover due to landscape prescribed burning treatments. The mosaic nature of the burning would not kill large patches of satisfactory cover. The burning targets small diameter trees (less than 8

inches dbh) and avoids burning in areas that would kill large diameter trees thereby reducing the impacts to crown cover. Because the percent crown cover is reduced, the whole stand is considered to no longer be satisfactory cover even though 2 to 10 acre patches or larger would remain. HEI for all alternatives is well above the minimum standard of .45. Alternative E is again the lowest because of the landscape prescribed fire. All alternatives would enhance the quality of forage because of the prescribed fire and opening of the stands increases brush and grass species. Alternatives B and E would allow for higher increases of forage because they would treat more acres. Enhanced palatability would last 5 to 8 years. The open character of the area, following both harvest and prescribed fire, would result in earlier loss of snow on southerly aspects and permit earlier green-up of herbaceous forage. This would tend to draw wintering animals up into the area earlier and reduce animal damage in the farms below the Forest Boundary. E2 would provide enhanced spring-fall range for elk and deer and slightly less quality mid summer range due to loss of cover from restoring open stand character.

Forest Plan standards for big game in C4 would be met. Total cover for each alternative would range between 55 and 57 percent of the C4 and C3 within the Planning Area, well above the Forest Plan standard of 30 percent. There would be little change in total cover; Alternative B has no change, Alternative C reduces total cover by 1 percent, and Alternatives D and E reduce total cover by 2 percent. All action alternatives would reduce satisfactory cover by 2-3%. Current satisfactory cover is 26 percent. Alternatives B and C would reduce satisfactory cover 2 percent, and Alternatives D and E, 3 percent. Satisfactory cover would remain well above the Forest Plan standard of 15 percent of the C4 area. All action alternatives would result in an HEI value of .84, well above the Forest Plan standard of .45.

The opening of the tree overstory would allow for re-establishment of native shrubs and herbaceous species that have been shaded out over the past 50 to 80 years. The extensive use of prescribed fire would enhance forage palatability and production due to the input of phosphorus, nitrogen, etc. resulting from the burning. Alternatives B and E would provide greater benefits to forage because more acres are burned. Burning in Alternative C and D is confined to activity units. The opening of the area's coniferous cover, coupled with improved forage conditions, would tend to attract elk to the area earlier in the spring and reduce their presence on adjacent private lands where they presently cause depredation problems for the Oregon Department of Fish and Wildlife.

Open road densities would be within the desired conditions of 2 miles per square mile forest wide for all alternatives. Elk tend to be displaced more easily from open forest conditions than from existing closed forest conditions, even with road closures. The general loss of hiding cover from the reduction of tree boles by harvest or prescribed fire and loss of regeneration from continued use of prescribed fire would cause elk to leave the area when hunting, woodcutting, mushroom harvesting and other human contact activities occur. The continued burning to maintain and develop open forest conditions would increase mushroom quality and quantity causing increased human contact in the spring. This increased human interaction would impact calving or cause the elk to move to higher elevations sooner. There is about a two-week overlap with calving and mushroom collecting. Elk using the Middle Ridge area would be less likely to have contact with humans because of limited road access. Elk using the Finley Creek area could have some contact with humans driving roads and collecting mushrooms in late May or early June because of the open road system. Mushroom collecting would be short duration, mainly a weekend activity. Access from Forest Road 3100 would be limited because of snowdrifts that keep the road closed until mid June.

#### Management Indicators Species - Cumulative Effects

The current cover and habitat effectiveness index values reflect the sum of impacts of all past human actions and natural disturbances. The direct and indirect effects to cover and HEI values for the proposed action alternatives were added to residual past, present, and reasonable foreseeable future effects relative to the evaluation criteria for elk (total cover, satisfactory cover, and habitat effectiveness index). Past harvest and road building actions throughout the area impacted the structure and composition of cover in the winter range through the removal of trees and understory vegetation. Fire exclusion may have contributed to the amount and distribution of total cover. While beneficial to elk, these increases may not be sustainable over time partly because fire and insect disturbances are inevitable. The proposed actions in addition to past, present, and foreseeable actions would increase habitat for some cavity excavators, and reduce habitat for others. The species showing a declining trend would benefit from the proposed activities (thinning ponderosa pine, promoting larch, prescribed burning) because they are associated with open stand conditions (i.e. white-headed woodpecker, Williamson's sapsucker).

#### Neotropical Migratory Birds Direct and Indirect Effects of all Action Alternatives

Fire exclusion over the past 70 plus years has caused an increase in shade tolerant, fire sensitive, tree species resulting in increased canopy closure for most forest stands. There has been a shift from single structure open canopy stands to dense multilayered stands. The increased shading has brought about a decline in the density of shrub understory. The edge has become well defined with an increase of shade tolerant tree species. Plantations from thirty to 40 years ago are ageing, providing young forest habitat of dense overstory. There are 16 species of neotropical birds of conservation concern that utilize habitat in the planning area. These species show a decreasing trend. Eight of the species prefer open stands of ponderosa pine or mixed conifers. Five species utilize forest edges and five prefer habitat in close proximity to water. The action alternatives restores open stand conditions that are favorable to half the species of concern. The actions would also help to maintain forest edge and reduce encroachment of meadows. Species that prefer proximity to water would have low to no impacts because no harvest or burning is proposed in riparian areas and harvest activity would begin in early to late June when the streams are beginning to dry. Hammond's flycatcher which prefers high elevation conifers and aspen and olive-

sided flycatcher which prefers open mature spruce and true fir forests would not be impacted because no management actions are proposed within these stands. Most of the sixteen species of concern are habitat generalists or prefer ponderosa/mixed conifer habitat and would receive benefits because more niche habitat would be created than lost, particularly with the restoration of open forest conditions. Eastern kingbird, veery, Swainson's thrush, and Yellow warbler can be affected by spring burning. The management requirement limiting acres burned after the second week of May would reduce impacts to these species and retain viable populations.

#### Neotropical Migratory Birds

Species	Habitat Characteristics	Nesting Season	Habitat Restored and Maintained			
			Alternative B	Alternative C	Alternative D	Alternative E
Cooper's hawk	Large second growth conifer/deciduous forest and edge	April to June	9.9 miles of edge	14 miles of edge	15.4 miles of edge	15.4 miles of edge
American kestrel	Mixed forest with significant edge	April to May	9.9 miles of edge	14 miles of edge	15.4 miles of edge	15.4 miles of edge
Mourning dove	Low elevation open mixed forest	May to September	5,250 acres of open forest	2,020 acres of open forest	2,090 acres of open forest	6,540 of open forest
Red-naped sapsucker	Conifer forest edge and aspen groves	April to May	No changes	No changes	No changes	No changes
Lewis' woodpecker	Ponderosa pine and open mixed conifer forest	April to June	5,540 acres of open forest	2,110 acres of open forest	2,270 acres of open forest	6,540 of open forest
Olive-sided flycatcher	Open mature spruce/true fir forest	May to July	No changes	No changes	No changes	No changes
Western wood pewee	Semi-open mixed species forest with edge	May to July	5,540 acres of open forest	2,110 acres of open forest	2,270 acres of open forest	6,540 of open forest
Hammond's flycatcher	High elevation conifer forest and aspen groves	June to July	No changes	No changes	No changes	No changes
Eastern kingbird	Mixed forest shrublands in association with water	May to July	No changes	No changes	No changes	No changes
Mountain bluebird	Higher elevation grasslands and shrub	April to May	900 acres grassland and shrub	1,490 acres grassland and shrub	1,570 acres grassland and shrub	1,570 acres grassland and shrub
veery	Moist deciduous forest associated with water	April to June	No changes	No changes	No changes	No changes
Swainson's thrush	Mixed conifer in association with edge and riparian areas	May to July	5,540 acres of open forest	2,110 acres of open forest	2,270 acres of open forest	6,540 of open forest
Cassin's vireo	Mature open-crowned conifer forest at all elevations	April to June	5,540 acres of open forest	2,110 acres of open forest	2,270 acres of open forest	6,540 of open forest
Yellow warbler	Open conifer and deciduous forest in association with water	May to June	5,540 acres of open forest	2,110 acres of open forest	2,270 acres of open forest	6,540 of open forest
Chipping sparrow	Open ponderosa pine and mixed conifer forest of mixed ages	May to June	5,540 acres of open forest	2,110 acres of open forest	2,270 acres of open forest	6,540 of open forest
Bullock's oriole	Dense conifer deciduous trees in association with water	May to June	No changes	No changes	No changes	No changes

Management requirements would protect viable populations of both ground-nesting birds and tree nesting birds during spring burning. Natural fuel reductions would occur before the second week of May, before neotropical birds arrive or set up territory. The Swainson's thrush does not arrive until mid May, the chipping sparrow arrives late in April but does not establish territory until May. Nesting for most birds begins the second week of May when insect activity increases. Spring burns for treatment of natural fuels would not occur after the first week of May. Burning of harvest-generated slash could occur into June because the additional burn window is needed to reduce fuel concentrations and reduce the severity of fall burning. Spring burning of activity fuels would help to reduce flame lengths in fall burning. Though the harvested stands would not become preferred habitat until woody understory is established, some birds may take the opportunity to nest in the concentrations of fuels. There is the risk of killing birds in their nest. Mortality is not expected to impact viable populations because late spring burning would take place on a very small portion of the landscape, less than 500 acres in any year.

Understory burning is expected to blacken 60 percent of the area, consuming concentrations of fuels. Birds would most likely escape the ignition and could nest another brood later in the spring or early summer. These birds would replace lost broods up to August.

Harvest activities could impact avian species that nest in the intermediate crown layers and prefer the closed canopy of the current stand. High-risk times would be mid May to late June. Harvest very seldom starts before June because of late melting snow drifts on roads and moist soil conditions. Dry haul conditions in the Phillips Creek area would shift startup into July on approximately two-thirds of the acres proposed for harvest. Typical production rates would harvest approximately 150 acres per month with a forwarder and 250 acres with a helicopter. The effect would be random and affect those individuals that are nesting in trees removed. Adult birds would escape however young birds in the middle of nesting season could be killed. Disturbance early in nesting would be replaced with another brood. There is the potential to have harvest activity on approximately 1,000 acres during a two and a half month nesting period. This is a low level of disturbance in a 22,000-acre planning area. The harvest is not expected to affect viable population levels.

#### Neotropical Migratory Birds Cumulative Effects

Prescribed fire and the restoration of open forest structure would bring about changes in species use over time. The burning would kill trees outright to become snags within the first year. Over the next five years other trees would die from stress caused by the prescribed fire. These trees become important food sources because of increased insect activity. During the first fifteen years following burning, woodpecker foraging and nesting habitat would increase. As the snags age and fall to the ground primary cavity nesters would begin to lose habitat until another fire moves through the area. The fire return cycle, insect activity, and prescribed fire burning are important to maintaining viable populations. Avian species diversity would have cyclic changes responsive to the fire return interval.

Domestic sheep would be routed through areas of transitory range. Sheep could disturb nesting birds but would be short duration. Several days of grazing may occur but not enough to cause abandoning of the nest. Recreational users may have random encounters with individual birds but the impact to bird behavior would be short lived. The random nature of encounters with nesting or foraging birds along with short duration, low level of disturbance would not combine with burning and harvest to affect viable population levels.

Discussion of Key Issue 1. The emphasis in the Forest Plan wildlife standards and guides is on big game, dead and down tree habitat, and amended to include old forest conditions. The management indicator species are elk, pileated woodpecker, American marten, and three-toed woodpeckers. These indicator species have been associated with closed forest multi-structural stands. The Forest Plan's focus on multi-structural, closed canopy stands, plus the perception that old forest is closed canopy, conflicts with the stocking level control objective to reduce the risk of epidemic insect population levels (for forest health and sustainability) and returning stands within the frequent fire regime to open structural conditions comprised of early seral species (biodiversity). Habitat for marten, pileated woodpecker, and northern three-toed woodpecker was not likely abundant historically in the planning area. Cover requirements for elk are not backed by scientific studies and are now considered debatable. Regardless, big game habitat according to forest plan minimum standards will be met with all alternatives, so the conflict for big game is somewhat negligible.

Approximately 92 percent of the planning has a short to moderate fire return interval. These areas generally do not provide closed canopy (>70%) habitat historically. Returning open structural stages (increasing habitat diversity) to the landscape would benefit those species dependent of open forest structure, such as white-headed woodpeckers and about half the Neotropical species of concern. Each of the action alternatives reduces the amount of multi-structural forests and increases the diversity of habitat across the landscape. The action alternatives would provide greater diversity of habitat across the landscape by reducing the multi-structural conditions in the frequent fire regime. The landscape itself would become more resilient by creating areas of low intensity fire between areas of longer return intervals. Should a wildfire occur in the future, it would create a broader mosaic of vegetation conditions and maintain an open forest on the landscape, rather than producing a large scale stand replacement event that is likely with the current fuel and stand condition.

**Soils:** Goal; Manage National Forest lands to maintain or enhance soil and land productivity.

Forest Plan Standards and Guidelines to maintain soil productivity potential include:

- Minimize soil productivity reductions caused by detrimental compaction, displacement, puddling, and severe burning.
- Maintain a minimum of 80 percent of an activity area in a condition of acceptable productivity potential.
- Plan and conduct land management activities so that soil loss from surface erosion and mass wasting will not result in an unacceptable reduction in soil productivity or in water quality.
- Management activities shall be designed and implemented to retain sufficient ground vegetation and organic matter to maintain long-term soil and site productivity.

Summary of Findings:

- Dynamic reductions to stand productivity come from high stocking levels, low tree vigor, stand age, and degree of competition. Major disturbance events as severe wildfire and epidemic insect or disease would also reduce productivity.
- Down wood would be left at the levels needed for wildlife based on historic disturbance processes. There would be a range of decomposition levels. Recruitment of new down wood comes from the mortality created during landscape prescribed fire.
- None of the proposed units have been harvested more than three times. Approximately 1,240 acres proposed for harvest have had past harvest; ninety percent of the acres had only one harvest entry. Ninety-six percent of the harvest was 30 to 40 years ago. Field review of the units indicates that less than 5 percent of an activity area has detrimental soil conditions. The detrimental conditions are confined to landings, old roads, and intersections of major skid trails near the landings. Recovery of detrimental conditions is evident by the leader growth on the regeneration and vegetative or biomass cover on the trails.
- Soils rated for Severe erosion potential occurs on 49 percent of the planning area. There are 676 acres within proposed harvest units; 491 acres are forwarder units and 185 are helicopter. Volcanic ash and loess have moved to the lower slopes and valley bottoms. Past management activity has caused several gullies and rills to form on the lower slopes.
- Soils rated as Unstable occurs on 5 percent of the planning area, no actions are proposed in these areas. Twenty-five percent of the planning area has soils with a greatly increased risk of mass wasting as a result of management actions. Past harvest on these soils does not indicate a problem with stability. Four helicopter units totaling 85 acres are proposed on soils with a greatly increased risk of mass wasting.
- Concern for puddling occurs on 644 acres of the proposed harvest units, 43 acres are helicopter, 65 are machine mastication for noncommercial thinning, and 536 are forwarder.

Comparison of Alternatives on High Risk Soils

Alternative	Total Acres	High Sediment Yield Potential	High Risk to Puddling	Severe Risk to Surface Erosion	Greatly Increased Risk to Mass Movement
<b>B</b>					
Prescribed Fire without harvest	4,450	508	972	1,825	809
Forwarder	608	221	380	142	238
Helicopter	500	56	56	176	83
<b>C</b>					
Prescribed Fire without harvest	551	26	58	391	36
Forwarder	1,012	155	298	513	181
Helicopter	574	111	49	132	125
Mechanical	140	7	116	15	8
<b>D</b>					
Prescribed Fire without harvest	551	26	58	391	36
Forwarder	1,378	285	531	599	337
Helicopter	603	128	67	176	170
Mechanical	140	7	116	15	8
<b>E</b>					
Prescribed Fire without harvest	4,520	508	972	1,825	809
Forwarder	1,378	285	531	599	337
Helicopter	603	128	67	176	170
Mechanical	140	7	116	15	8

## **Alternative A - No Action**

**Direct and Indirect Effects** – Within stands maintained by short fire return intervals productivity would continue to be impacted by overstocked conditions. The complex fuel conditions would persist and continue to increase. Currently 93 percent of the frequent fire regime and 44 percent of the mixed fire regime are at risk for uncharacteristic severe wildfires or approximately 60 percent of the planning area. A severe wildfire would likely consume up to 80 percent of the duff layer, increase the likelihood of soil hydrophobicity, and expose up to 60 percent mineral soil. Wildfire on southern exposures would likely consume stringers of trees lining drainages. Ash based soils on the lower slopes and flat midslope areas would be exposed leading to rilling or gully formation. Displacement and hydrophobic conditions could lead to detrimental soil conditions over much of the burned area; likely above the 20 percent standard of the Forest Plan. There would be a loss in productivity from the changed soil conditions. The increased stocking levels would lead to an increase in dead, down wood. High levels of decomposing wood, (above historic levels in the Dry Forest) increases the risk for severe soil burning in stands that historically did not have severe wildfires. A wildfire may burn leaving a mosaic of dead and live trees. In thirty to forty years after the event a higher intensity wildfire often occurs as a result of the additional buildup of fuels and standing dead wood.

**Cumulative Effects** – Impacts to productivity and increased risk to detrimental soil conditions would continue as stands adapt to higher dead biomass conditions than what occurred historically. Tree encroachment on soils that were naturally maintained as grasslands or open pine stands would continue to develop higher stocking levels. Seral tree species and associated habitat would be lost, both ponderosa pine and western larch need fire to maintain the stand. Resilience to catastrophic wildfire would be lost leaving larger gaps between trees and taking longer to reestablish a forest. Should a wildfire occur, the high fuel loads would burn hot and change the soil structure and character. Nutrient cycling would change from frequent quick release of the burning biomass to become a longer-term release from decomposition. The drier forest conditions found in the frequent fire regime would take much longer to decompose dead wood, perhaps several hundred years. In soil organisms and soil functions would further change from that maintained by historical low intensity fires.

The continued build up of biomass would interfere with regeneration of the stands, particularly ponderosa pine and west larch. Stand species composition would change. The higher stocking levels would favor shade tolerant tree species and change the fire regime of the Dry Forest associations to long return interval, stand replacement events. Size and quality of trees would shift to small diameter trees. Overstocked conditions produce higher cubic volume yields of small diameter trees taking 20 to 40 years longer to reach large tree size than stands managed for spacing. Thinned stands, whether by natural disturbances or mechanical thinning, produce larger trees.

## **All Harvest Alternatives**

The impacts to soils will be over estimated because the total gross acres of the harvest units are being used. Small natural openings and category 4 RHCAs have been included in gross acres. Category 4 RHCAs would not receive harvest or have fire ignitions. The same is true for landscape prescribed fire proposed in Alternative B and E. The total acres treated include RHCAs even though ignitions would not occur within them. When prescribed fires occur, 60 percent of the area is considered blackened. Impacts would be associated with the blackened acres. The forest plan evaluates and provides guidelines for soil impacts based on activity area. Activities can occur on hundreds or even thousand of acres within a watershed and concern is reached by the distribution and amount of detrimental conditions. The Forest Plan restricts detrimental soil conditions to no more than 20 percent of an activity unit, the level when direct impacts to soil productivity are likely to occur. Averaging detrimental conditions over a watershed has little meaning. What is important to consider is the arrangement of the impacts in the watershed and whether they can cause an additive impact.

**Direct and Indirect Effects** – The potential for soil compaction would be similar between the action alternatives. Forwarders, helicopter landing construction, and mechanical treatment of fuels are the primary sources of compaction. Forwarders would deck logs along a road without construction of a landing and the crushed brush sprouts once logs are removed. The Finely Ridge/Finely Creek area would have 3 helicopter landings one of which is a service landing. The Phillips Creek side would have 4 landings; one would be a service landing. The 5 log landings would be a combination of constructed or reused older landings or decking in wide spots along the road system. Constructed helicopter landings could be up to an acre in size. All helicopter landings suitable for treatment would be subsoiled after use, seeded with native seed, and drained to prevent sediment from reaching streams. Subsoiling reduces compaction and increases surface roughness such that water infiltration rates would reduce overland flow from storm events. The increased surface roughness would reduce the loss of soil from rill or sheet erosion. The use of Best Management Practices (BMPs) would further reduce this risk of detrimental soil impacts.

Research at Limber Jim in La Grande showed that approximately 1.7 percent of a forwarder unit has compacted soils. The Walla Walla District has been using forwarders since 1995 and the research compares well with the Forest's monitoring

results of approximately 2 percent compaction in similar conditions. Helicopter units would not experience measurable compaction. Landscape prescribed fire would not have an effect on soil compaction. Survey of past harvest units indicated they were within Forest Plan Standards. A portion of the forwarder units had been harvested using conventional tractor skidding, all of it thirty to forty years ago. The past harvest was for salvage and individual trees that did not require a comprehensive skid pattern, less than 10 percent of a unit was impacted. Stumps of trees removed can be seen but it is hard to find the skid trails used to remove the trees. There are isolated areas where trails converged as collector trails to the landings. Leader growth on the regeneration in the skid trails shows one-foot growth; this rate of growth indicates compaction is not a problem. Currently detrimental compaction covers less than 5 percent of an activity area. When adding 2 percent for the compaction from the forwarder harvest, the activity areas would remain under 10 percent. Most of the new harvest entry would be over the trails from the past harvest so the expected detrimental compaction would be much less than ten percent and confined to the area under the wheels rather than the whole width of the trail. The low ground pressure of the equipment and operating over slash helps to mitigate the effect of closer forwarder routes when compared with conventional skidding. Forwarder routes have approximately 50 feet between trails and conventional skidding 100 feet. Recovery from compaction would not take as long as conventional tractor logging because roots would lift the narrow strips of compaction in the wheel tracks. Additional compaction from the harvest system would not contribute much, less than 2 percent of the activity area, toward detrimental soil conditions. See discussion later about combining displacement, compaction, and current conditions to determine the amount of detrimental conditions in an activity unit.

Units proposed for grapple piling would have an additional pass of machinery over the forwarder routes. Grapple piling is proposed on 215 acres in Alternative B, 117 acres in Alternative C, and 215 acres in Alternative D and E. The machine would concentrate slash in areas away from trees susceptible to fire mortality. The machine would operate over the slash left in the forwarder routes and move it to the pile location. Machinery would begin at the end of the trail and work to the beginning so there is a slash mat to work on. The piling is not expected to occur on every route. Soils would be dry and less likely to be impacted by compaction. Impacts are expected to overlap with past harvest and the forwarders; no more than an additional 4 percent detrimental compaction is expected. Unit 41, 40 acres, has had two previous harvests, one in 1961 and the other in 1974. Unit 55, 18 acres, had a harvest in 1974. Both Units 41 and 55 could have up to 7 percent detrimental compaction after grapple piling. Lower impacts would be expected if the units were helicopter yarded and the jackpots of slash burned.

Alternative D has the greater potential to increase detrimental compaction to Forest Plan Standards. This alternative has units proposed for masticating fuels before timber harvest. There is the potential for 537 acres to have both mastication and timber harvest with a forwarder. The mastication machinery has a low ground pressure and would operate over the natural fuel buildup. It would be similar to forwarders in impacts to compaction. The added slash from mastication would also help insulate the soils from further impacts because there would be more slash to disperse the weight of the forwarder and the areas of impact would overlap. Assuming a worst case that each entry of machinery adds 4 percent compaction and a best case of 2 percent, new compaction would increase 4 to 8 percent above current levels. Adding this to the current 5 percent indicates a range between 9 and 13 percent. There is an additional 140 acres of noncommercial thinning that was harvested in the past that would be thinned by machine during dry conditions. The low ground pressure is not expected to increase compaction above Forest Plan Standards and guidelines.

The following table summarizes past harvest by alternatives and estimates the acres of new detrimental soil compaction. Proposed units with 40 percent or more of the area covered by past harvest are counted. Past Skyline logging occurred in some units proposed for helicopter logging and would not experience additional detrimental compaction. Acres of new detrimental compaction are from forwarder, grapple piling, and mastication. Detrimental compaction would not be continuous, confined mainly to landing locations or where multiple forwarder routes converge.

Alternative	Total Harvest Units and Acres	Past Harvest Units and Acres	Helicopter Units with Past Harvest	Forwarder Units with Past Harvest	Mastication Units with Past Harvest	Prescribed Fire Units with Past Harvest	Acres of New Detrimental Compaction
<b>B</b>							
# of Units	47	24	6	18		Areas	
Acres	1,108	588	135	452		2,600	21
<b>C</b>							
# of Units	48	26	4	18	2	2	
Acres	2,277	1,481	120	930	140	293	29
<b>D</b>							
# of Units	64	38	6	28	11	2	
Acres	2,672	1,725	135	1,157	677	293	50

Alternative	Total Harvest Units and Acres	Past Harvest Units and Acres	Helicopter Units with Past Harvest	Forwarder Units with Past Harvest	Mastication Units with Past Harvest	Prescribed Fire Units with Past Harvest	Acres of New Detrimental Compaction
E							
# of Units	64	38	6	28	11	Areas	
Acres	2,672	1,725	135	1,157	677	2,600	50

There are 21 units that the Soil Resource Inventory indicates have a high risk for pudding. The soils have a higher component of clay and holds moisture longer into the year. These are Units 5, 6, 7, 8, 15, 16, 27, 32, 33, 43, 47, 50, 52, 61, 65, 77, 78, 80, 84, 90, and 93; totaling 644 acres. Two units, Units 15 and 16 (totaling 43 acres), are helicopter units and not expected to receive detrimental compaction. Units 5, 6, 7, 8, 61, 65, 78, 80, 90, and 93, totaling 324 acres, are forwarder units with a dry season haul because of potential impacts to steelhead in Phillips Creek. These units are not expected to receive detrimental compaction because they would be harvested during dry soil conditions with enough slash generated to protect the soil. Unit 84, 65 acres, is proposed for mastication of noncommercial thinning slash. This unit would be thinned during dry soil conditions and not expected to have detrimental compaction.

The remaining units, Units 27, 32, 33, 43, 47, 50, 52, and 77, totaling 215 acres, are located in the Finley Ridge area where logging could occur early in the season. These units are adjacent to clearcut units harvested in 1957 that most likely were tractor piled for slash disposal. Current growth rates in these plantations indicate that compaction has not limited production. Units 32 and 77 have shelterwood prescriptions and should generate enough slash to protect the soils if harvested during a June harvest period. Units 43 and 52 would also generate enough slash in the patch clearcuts to protect the soils, taking the wood to a landing would cause compaction because of low levels of slash on the trail leaving the patch clearcut. The distance to the landings are short, less than 300 feet with single trails accessing the opening: any detrimental compaction during moist soil conditions would be less than 4 percent of the activity area. The other units are improvement cuts that would have light slash cover and located near the ridgetop. Trail distances would be less than 200 feet. The soil near the ridgetop has more rock and less clay development and is not expected to exceed 3 percent detrimental soil compaction. The current harvest entry is not as severe as the 1957 clearcut with tractor piling. There would be little to no risk of detrimentally compromising soil productivity by compaction.

Impacts to soils by displacement differ by alternative. Units located on soils with a severe and very severe potential for surface erosion pose the greatest risk but the amount of exposed soil would not differ between forwarder units or between helicopter units. Forwarder, prescribed fire, and mastication can expose soil when equipment turn or make multiple passes over a trail or when burning conditions removes duff exposing mineral soil. The Limber Jim study indicated soil displacement to be 4.3 percent in forwarder units. Monitoring of forwarder units on the Umatilla National Forest indicates approximately 2 percent displacement of soils. Helicopter yarding does not expose soil other than at landings and the sweep of logs as they are lifted. Areas of exposed soil from forwarder routes would be in small, isolated areas with a low risk of carrying erosion off site. The loss of soil cover would have a mosaic appearance. Mats of slash and undisturbed areas would hold the soil on site, reducing the risk of sediment reaching the streams. Soil loss or movement would have no measurable effect on soil productivity. Mastication would also occur over slash and would not expose large areas of soil. Mastication provides mulch over the soils. Insolated areas of displacement may occur where roots might get ripped out of the ground or where equipment turned. It is not likely that mastication or forwarders would create areas larger than 100 square feet and 5 feet wide; detrimental displacement is not expected within units, other than near landings and on main forwarder routes.

Exposed soil after landscape prescribed fire or slash reduction would also have a mosaic appearance. The varied fire intensity would leave duff, unburned areas, and areas of varied fuel consumption. Approximately 88 percent of the burned area would retain material that would help reduce or eliminate erosion problems from the areas of exposed soil. Soil hydrophobicity effects and resulting overland flow would be low because of "cooler" burns, and the risk of erosion and sediment delivery to streams would be low because of surface roughness and retention of duff. Units with grapple piling would have small areas of exposed soil. The exposed areas would be isolated because fire is not likely to creep between piles. The piles would have a higher severity burn than an understory burn, however their size would be small, less than 10 feet in width. Duff would be burned under the piles but the intensity should be low enough to not create hydrophobic conditions. Less than eight percent of grapple pile units would have detrimental soil displacement when combined with harvest.

Soil impacts from surface exposure are short term often gone within the first year. Vegetative cover removed by burning or equipment sprouts quickly. Monitoring after timber harvest has shown sprouts within a week after the use of trails. Burning also shows quick recovery whether burning in the fall or spring. Needle cast from scorched trees adjacent to and over the burned areas provide soil cover the first year. Lower consumption of large fuels provides places to trap soil.

Alternative C, D and E have greater amounts of soils with severe surface erosion potential because of ridgetop ponderosa pine units with shallow soils and grasses. Timber removal would be in clumps with fewer forwarder routes than found in uniform stands. Forwarder routes would be within the timbered areas and have few crossings of the grasslands. Since

there would be fewer routes and passes per route, detrimental displacement would be less than 2 percent of the activity area; confined mainly to the areas of landings.

Predicted Acres of Soil Displacement by Alternative  
Not all would be detrimental

Alternative	Forwarder Acres with Only Underburn	Forwarder with Grapple Or Mast Acres	Helicopter Acres	Prescribed Fire in areas with short fire return intervals without harvest Acres	Mastication Acres	Total Activity Acres	Acres Predicted Exposed Soil
B	332	276	500	4,450	0	5,558	360
C	722	290	574	551	140	2,277	120
D	468	910	603	551	140	2,672	150
E	962	416	603	4,520	140	6,641	370

Approximately 285 acres of forwarder units and 87 acres of helicopter units occur on soils with a greatly increased risk to mass movement. There are two groups of concern; Finley Creek units 27, 32, 33, and 77 (127 acres) and Highway 204 units 6, 7, 8, and 9 (87 acres). The topography of the Finley units was developed from past mass movement. Adjacent clearcut units from the 1950s to 1970s do not show evidence of mass movement from the past action. The Highway 204 units are on a clay soil that has the potential for shallow rotational slumps. Units above the highway that were clearcut in the past do not have mass movement occurring. When the units are implemented they will be smaller due to RHCAs. Several units may even be dropped because of the reduction for RHCAs. Harvest would likely be reduced to 60 acres. This should not increase water retention or risk of mass movement.

The proposed logging systems are designed to reduce impacts to soils when compared to conventional tractor skidding. Impacts to soil productivity caused by displacement would be immeasurable because forwarder and helicopter logging do not expose extensive areas of soils or mix the soil horizons. The risk to compaction is greatly reduced because forwarders have low ground pressure, would operate over a slash mat, and tend not to mix soil horizons. The majority of units would be harvested under dry soil conditions, lowering the risk for compaction. Prescribed fire would not cause extensive soil damage because prescriptions would require fuel moisture conditions that limit severity and intensity. Slumps and slides are not expected. Impacts to individual units (Activity Areas) would range from less than one percent for helicopter units to 6 percent of Forwarder units with their first entry. Units grappled piled would have an additional 2 to 4 percent compaction. Current conditions of units harvested 30 to 40 years ago indicate less than 5 percent detrimental soil conditions; these units were visited and evaluated for current condition in the summer of 2003 and the results while the original EA was being appealed. The results are shown in the following table. The range of potential detrimental soil impacts from the use of ground-based machinery is 6 to 17 percent of the activity area, well below the Forest Plan standard of 20 percent. Unit 27 is estimated to be as high as 17 percent. By helicopter logging units 41 and 55 detrimental conditions could be lowered to 9 percent. Activity Area includes the acres proposed for treatment from both the harvest and fuels treatment.

Detrimental impacts are the combined affects of compaction, displacement, and severe burning. The analysis will over estimate detrimental impacts because compaction, displacement, and severe burning are overlapping impacts. Compaction often overlaps with displacement from logging. Areas compacted by past harvest also overlap with the new entry. The following table lists units of concern based on past harvest. The Total Detrimental Conditions column is a straight total of potential compaction, displacement and severe burning without any adjustments for overlap. The following observations help to understand the magnitude of the detrimental impacts to soils:

- There is little evidence of detrimental compaction and displacement from harvest completed 30 to 40 years ago. Skid trails are hard to find. They are covered in liter with little to no evidence of berms. The skid trails are regenerating with the young trees showing good leader growth. The main skid trails are still evident making it hard to say that no compaction from past activities exists today. Growth rates of trees on the skid trails indicate that compaction is not a problem, however the center portions of the trails show affects. Roots would eventually break up these areas. Past harvest contributes to less than 5 percent detrimental compaction over the activity area. A new entry would overlap with these impacts. The past harvest percent detrimental column is based on field evaluations.
- Units designated for underburning would have additional areas of exposed soil outside of the forwarder routes caused by prescribed fire. Surface exposure from both burning and equipment are displayed together; only a portion contributes to detrimental displacement. Areas of displacement greater than 100 square feet are counted. Displacement occurs when machinery passes on a portion of trail more than 20 times, normally found near landings and when the duff layer is removed by burning.
- Units with grapple piling would have compaction and displacement overlaps. Grapple piling would have higher levels of displaced soils because the equipment moves slash into piles and soil is exposed by burning. Monitoring

of grapple piling in the summer of 2002 indicated much less than 4 percent of the activity unit having exposed soil and the equipment did not contribute any to detrimental displacement. Piles are small and would not contribute to detrimental displacement except when fire creped around the piles removing the duff layer.

- Net acres are those impacted by the activity and do not include RHCAs and small openings that make up gross acres. For patch clearcuts, net acres represent the harvest acres; approximately 20 percent of the gross unit acres. Alternative B has 814 net acres harvested from 1,108 gross acres; Alternative C has 1,409 net acres from 1,586 gross acres, and Alternative D and E have 1,644 net acres from 1,981 gross acres. Alternatives C, D and E have an additional 140 acres of fuels mastication in non-commercial thinning units.
- Percentages are for an activity area. The Total percent Detrimental Condition is not discounted for the overlapping affects of compaction, displacement, and past actions. It is hard to determine how much overlap would occur; impacts can be overestimated by as much as 40 percent.

#### Comparison of Forwarder Units with Past Harvest

Unit #	Net Acres	# Past Harvest Entries	Year of Harvest	Grapple % Compaction	Forwarder % Compaction	Surface Exposure from Burning and Equipment	Detrimental Displacement	Past Harvest % Detrimental	% Total Detrimental Condition
7	32	1	74		2	6	2	1	5
26	8	1	63		2	6	2	1	5
27	18	1	72	4	2	6	6	5	17
31	17	1	63		2	6	2	5	9
32	28	1	72		2	6	2	1	5
33	24	1	72	4	2	10	6	2	14
41	40	2	61,74	4	2	10	6	1	13
43	5	1	72		2	6	2	1	5
44	2	1	63		2	6	2	5	9
45	7	1	63		2	6	2	2	6
47	17	1	72	4	2	10	6	1	11
50	26	1	72	4	2	10	6	1	11
52	4	1	72		2	6	2	1	5
55	11	1	74	4	2	10	6	1	13
69	40	1	63		2	6	2	2	6
77	28	1	72		2	6	2	2	6
78	24	1	63		2	6	2	3	7
79	16	1	63		2	6	2	3	7
80	5	1	63		2	6	2	3	7
82	106	1	74		2	6	2	7	11
83	169	1	74		2	6	2	5	9
86	31	1	63		2	6	2	1	5
87	77	1	63		2	6	2	4	8
90	65	1	83		2	6	2	6	10
93	49	1	63		2	6	2	3	7
94	90	2	63,73		2	6	2	8	12
95	10	1	63		2	6	2	2	6
99	37	1	83		2	6	2	6	10
	986								

**Cumulative Effects** - Cumulative effects on soils is related to past and future actions in the same activity unit. When the impacts from the harvest alternatives are combined with other on-going and proposed actions, the additive impacts are not expected to exceed Forest Plan Standards and Guidelines for detrimental soil impacts or loss of productivity. Grazing patterns would not change; sheep would be kept away from streamside areas and routed over midslope and ridgetop locations during dry times of the year. Sheep are confined in bedding areas that are spread along the travel route that are rotated each year. Bedding areas are located under trees and not likely to overlap with harvest or burning units in the same year. Since ground disturbance from harvest is low and the vegetation spouts quickly the up to two acres of displacement from bedding areas for a thousand sheep would not cumulatively exceed forest plan standards. Displacement is a short-term impact that would be remedied by vegetative recovery within weeks to two months. Harvest would improve transitory range without developing plantations. The AUMs allocated to this pasture are expected to stay the same.

In addition to the 140 acres of noncommercial thinning listed in Alternatives C, D and E there are 580 acres proposed for stand improvement. Most of the 580 acres would be thinned by hand and have no impact to soils. Machine mastication may be used on a portion of it to quickly reduce fuels in areas needed for protection along the Forest Boundary. Thinning slash outside of 150 feet from roads would be left in place and allowed to decompose. Where tree size and species shows resilience to burning, fire may creep through the slash when harvest units are treated. Roadside slash may be hand piled or masticated. These additional impacts would overlap with past activities and are not expected to increase detrimental soil conditions above Forest Plan standards.

The 7 miles of road obliteration would disturb road surfaces that have not been used for many years while returning the soils to a less compacted state and increase productivity. There would be a short-term increase in erosion potential, but the combined effects with prescribed fire or harvest is not expected to be measurable. Surface water flows are not expected because of increased surface roughness and permeability. BMPs, revegetation, waterbars, and restoring unrestricted flows would be effective in controlling erosion and dispersal of water.

A high severity underburn can cause extensive loss of nutrients and erosion. Though burning does not contribute to soil compaction, severe burns can have detrimental effect on soil aggregation and mycorrhizal development. Current practices rarely result in high severity burns. Experience has shown that prescribed burning generally retains 50 to 80 percent of the duff and 75 percent or more of the large woody debris. Small woody debris remains in unburned patches. Low severity burns of this nature have little to no effect on organic and inorganic soil particles. Recovery of mycorrhizal fungi that is affected by fire is typically dependent on the recovery of host plant species.

Generally, prescribed burning increases soil PH, redistributes some organic matter in the soil profile, decreases total nitrogen, Phosphorus, potassium, calcium, and magnesium. It would also increase available nitrogen and phosphorus and slightly increase cation exchange capacity. These effects rarely last more than one growing season. Fire lines can experience rill erosion if waterbars are not properly built or placed. Hand lines are generally narrow and revegetate the first growing season. Prescribed burning rarely creates a hydrophobic soil layer in forest soils.

**Water:** Goal; Manage National Forest resources to protect all existing beneficial uses of water and to meet or exceed all applicable State and Federal water quality standards.

Summary of findings for the Willow/Phillips watersheds:

- The Willow/Phillips watersheds are within the Upper Grande Ronde River Subbasin; National Forest system lands makes up 40 percent of the watershed. Willow Creek and Phillips Creek are not hydrologically connected and enter the Grande Ronde about halfway between the Wallowa River and Five Points Creek, a stream west of La Grande. Their mouths are about 7 miles apart.
- No water quality listed streams occur within the planning area. A reach of the Grande Ronde is on the 1998 list of water quality limited streams compiled by the State of Oregon for Sedimentation (excess cobble embeddedness and fine sediment), Habitat modification (Lack of large woody debris, pools, and habitat complexity), and stream temperature (the 7 day moving average of daily maximum exceeded 64 degrees F). The Grande Ronde River is downstream 7 (Phillips Creek) to 16 (Dry Creek) miles from the Forest boundary.
- The Upper Grande Ronde has an approved TMDL and Water Quality Management Plan. The Willow/Phillips watersheds are listed as a high priority for treatments that would improve stream temperature, decrease the amount of sediment delivered and increase stream flows into the Grande Ronde River.
- Beneficial uses of the Grande Ronde that could be impacted by the project include livestock watering, anadromous fish passage, salmonid fish spawning and rearing, resident fish and aquatic life, wildlife and hunting, and water contact recreation.
- Spawning and rearing habitat occurs for Snake River steelhead trout in both the Willow Creek and Phillips Creek watersheds.
- Stream flows are dominated by snowmelt with peaks in the spring that subside quickly to intermittent flow. East Phillips and Pedro Creeks are the only perennial streams in the planning area.
- Cobble embeddedness is low with sediment transport occurring during high flows.
- Current ECAs by subwatersheds range from 0.8 to 6.1 percent. National Marine Fisheries Service uses 15 percent as a level of concern.
- Road densities are higher than 2.0 miles per square mile, the level of concern for the National Marine Fisheries Service. Current road density ranges from 2.5 to 4.9 by subwatershed. Thirty to forty-six (30 to 46) percent of the roads within subwatersheds are ridgetop roads. Impacts to hydrologic function may not be as severe as the numbers indicate. The planning area has a total road density of 3.8 miles per square mile with an open road density of 1.1 miles per square mile.
- Phillips Creek, Dry Creek, Finley Creek, and East Phillips Creek are Rosgen B3 type channels. B streams are considered relatively stable and resilient to disturbance.

Effects are summarized from input provided by the Hydrologist found in the *Pedro/Colt Timber Sale and Fire Reintroduction Project Hydrologic Report, Addendum to the Hydrologic Effect Analysis* and *Cumulative Effects Addendum*, and supplemented in the EA.

## **Alternative A - No Action**

**Direct and Indirect Effects** – Conditions and hydrologic function would continue as they are. Road densities and road condition would remain the same since road obliteration, maintenance, and reconstruction opportunities are postponed. Culverts needing replacement, either for size or because of wear, would pose a risk to increase sedimentation in the future when a failure occurs. Hydrologic function would continue to be degraded because gullies and roads no longer needed would continue to intercept water, delivering sediment and channeling overland flows into streams.

Improvements in hydrologic function from gully repair, culvert replacement and removal, and large wood placement in Phillips and East Phillips Creek would not take place. The gully in the land-exchanged area is channeling water onto the top of a cutslope on Forest Road 3738, within the Phillips Creek RHCA. Sediment is currently being deposited on a flat above the cutslope but the flat is beginning to rill over the edge of the cutslope. A major rain-on-snow event could cause the road to wash out.

Effect of previous harvest on shade and woody material in the aquatic system would continue to recover at natural rates. This would be true for any action alternative as well. No plantings are needed in the riparian areas. It will take time for the trees to grow and provide shade and future large wood.

Uncharacteristic fuel accumulations would continue; currently 93 percent of the frequent fire and 44 percent of the mixed fire regime are in condition class 2 and 3. Current fuel conditions place large portions of the planning area at risk to catastrophic fire, loss of ground cover, and hydrophobic soil conditions. Sediment transport would increase should a wildfire ignite under fuel and weather conditions conducive to a large-scale fire event. Water quality and channel functions could change as a result. The loss of tree cover, large woody debris, and riparian vegetation, while exposing large areas of soil, increases sedimentation, shifting peak flows and impacting stream channels and aquatic habitat.

**Cumulative Effects** – Natural recovery in RHCAs from past management and uses would continue. In the areas of past harvest, riparian vegetation would continue to recover and trees would provide shading as they increase in height and the canopy closes over the streams. The willows and young alder along Phillips Creek provide stability to the channel. The regenerating cottonwoods grow faster than the conifers and would provide stream shade in the next 30 to 50 years.

Upland vegetation would recover as plantations age and hydrologic functions return. Over the next twenty years the affects from harvest would become negligible as ECAs approach zero. Large down wood would remain lacking within riparian areas harvested in the past. The effect on water yields and peak flows would be well below detectable levels. Recovery rates would be lengthened when a stand replacement wildfire occurs

## **All Action Alternatives**

**Direct and Indirect Effects** - The *Upper Grande Ronde Water Quality Management Plan* lists the Willow/Phillips watershed as a high priority for treatments that would improve stream temperature, decrease the amount of sediment, and increase stream flow of the Grande Ronde River. These types of improvements build on the concept of connecting habitat of high quality. The reach from the Wallowa River to Five Points Creek is on the 1998 list of 303 (d) streams for the State of Oregon for a number of parameters. Temperature, sediment, and stream flows are the only parameters potentially impacted by the actions. Dry Creek and Phillips Creek, even though they are anadromous fish streams, do not contribute to summer temperatures because they go dry by mid July.

Water temperature: The TMDL for the Upper Grand Ronde Basins uses effective shade, reducing the channel width to depth ratio and maintaining stream flows as measures for improving stream temperatures. Water temperature can be adversely affected (increased) by reducing the density of shade on the water surface. Non-commercial thinning is the only vegetation action proposed within RHCAs. The thinning would remove small trees less than 8 inches in diameter and would not occur near perennial streams. No commercial harvest would occur nor would prescribed fire be ignited within PACFISH stream buffers. The portions of the analysis area proposed for timber harvest and noncommercial thinning are drained primarily by intermittent and ephemeral channels which, due to their short and early season periods of flow, do not generally contribute to critical summer water temperatures.

Underburning of harvest and natural fuels would occur in stands with fire resistant tree species. There would be no ignition within RHCAs, however fire would be allowed to back into these areas. The increased humidity would reduce fire intensity and the amount of ground burned in those areas. This low intensity, short flamelength fire, would rarely kill shade-producing vegetation and would not significantly reduce shade. Mortality rates would be low comprised of non-commercial size trees and larger trees that have debris accumulations at their base, anyplace where heat is retained for extended time. Other harvest fuel treatments would rely on piling or burning jackpots of fuel, fire spread would be minimized and likely not enter RHCAs.

About 7.5 miles of road would be obliterated or removed from the system; 0.6 miles are within RHCAs of perennial non-fish bearing streams and 0.5 miles in RHCAs of intermittent streams. Work would take place on existing road surfaces, which currently do not support shade-producing vegetation. There would be no short-term negative effect to water temperature and in the long term, revegetation of the RHCA portions of these roads would provide more shade to the channels.

Water temperature would be maintained and conditions that allow recovery of shade would not be retarded. Since there would be no disturbance of vegetation within RHCAs there would be no change in riparian conditions. Summer water temperatures would not be impacted because neither harvest nor ignitions would occur within RHCAs, and the majority of streams go subsurface by the middle of July.

Sediment Delivery: There is potential to deliver sediment into streams from actions associated with vegetation management activities; from treatment of activity and natural fuels using prescribed fire that back into RHCAs, removal of culverts, and from valley bottom log haul. This sediment would not get mobilized until fall high water because the impacted streams go dry for the summer.

The harvest activity is not expected to deliver sediment into streams. Helicopter logging exposes very little soil. There can be isolated sweeps as a log is lifted but undisturbed cover would trap erosion. Forwarder logging would expose soil near landings and where routes converge. Forwarders operate over slash with minor amounts of mineral soil exposed in scattered areas on an otherwise undisturbed ground surface. Past monitoring indicates that less than 4 percent of a forwarder unit would have exposed soil. The surrounding surface cover would hold erosion on site. The undisturbed PACFISH RHCA buffers would provide additional filtering. Sediment delivery is not expected from the removal of logs. Forwarders do not require landing construction. Logs are decked along the edge of the road with minor disturbance of vegetation. Landing sites recover quickly. Helicopter landings would require construction or leveling. Most would be located near ridgetops. Two helicopter landings would occur along FR 3738 outside the Phillips Creek RHCA. They would be designed not carry sediment into the ditch system or the stream when water returns in the fall.

Some sediment yield, an increase over natural undisturbed amounts, is expected to occur from existing roads. Surface blading, reconstruction, and haul loosen the road surface. Within the first year the surface hardens and would lead to lower levels of sediment being eroded from these sites. Road obliteration within RHCAs would cause a one-season flush of sediment followed by vegetation recovery and reduced sediment yields. Increased surface roughness, restored infiltration rates (though not to natural conditions), and reduced surface runoff along with mulching and native seed erosion control measures would reduce sediment yields below current levels. Reconstructed roads and maintained roads have improved road drainage, which routes water off the road surface, reducing concentrated flows and the likelihood of erosion entering streams. Any culverts or dips added for cross drains or ditch relief would shorten the length of water intercepted by the road and allow it to spread cross slope. Road sediment would be filtered by surface debris. Surface replacement restores a hardened surface that produces lowers levels of sediment than native surface or a road with exposed subgrade. Four inches of gravel produces 80 percent less sediment than a native surfaced road.

Log haul would occur over three road systems. The Finley Creek area would use approximately 17 miles of road to reach Highway 204, including 7 miles of paved surface. Approximately a third of the proposed harvest volume would haul over this system. There would be approximately 5 miles of reconstruction that includes removing 5 culverts and replacing them with a rolling dip. Most reconstruction would occur in ridgetop and mid-slope areas. Disturbance would be minor and sediment from the culvert removal would flush with the first fall flows. The ridgetop location and distance to stream channels would allow sediment to be filtered and trapped by surface vegetation or instream debris downstream from the work and haul, preventing any sediment derived from the surface reconstruction from entering surface water.

The other two haul routes would use valley bottom roads; one crossing Little Phillips Creek to Highway 204 and the other would follow Phillips Creek to the highway. One segment, about 2,500 feet long, of Forest Road 3734 near Highway 204 would have drainage dips constructed and the surface hardened. This could lead to a small amount of sediment entering Little Phillips Creek during the first year until the road restabilizes. The increase in cross drains would reduce the distance water travels along the road surface, reduce rilling, and allow sediment to be filtered before reaching stream channels. Sediment eroded from road surfaces and forced up through gravel by traffic are available for transport into channels by road surface drainage. Dry season use or restricting haul during surface runoff periods plus the use of BMPs would significantly reduce the amount of sediment reaching surface water.

Road obliteration outside of RHCAs is not expected to cause measurable increases in sediment delivery. The old road surface would be recontoured to allow water to drain cross slope over debris and duff. The compacted road surface would be broken up to allow infiltration and reduce surface flows and chance of rilling. There would be 7.5 miles of road obliteration, 0.6 miles in perennial RHCAs and 0.5 miles in intermittent. A culvert would be removed from Pedro Creek to allow fish passage. Instream work would occur during the instream work period. The use of sediment barriers, mulching and seeding would limit the amount of sediment entering the channel. Deposited sediment would move out of the system during the next high flow period. There would be a low risk of a slight increase in sedimentation from the culvert removal for one runoff year, while the site is stabilizing.

The proposed prescribed fire is not expected to provide measurable increases of sediment into the stream systems. The magnitude of potential effects is related to the number of acres treated and the amount of riparian area burned. Project design, protection measures, BMPs, PACFISH buffers, and contract or project administration minimizes the effects of the project on sediment delivery and makes all alternatives almost equal in affects to sediment yield. The expected affects on sediment yields are small, immeasurable. Burning poses the greater risk because the more acres burned, the greater the risk to fire backing into a RHCA. The potential to have more acres of RHCAs impacted by fire is greatest for Alternatives B (5,343 underburn acres) and E (6,245 underburn acres). Alternative C and D are almost equal, underburning 1,979 and 2,276 acres respectively. The following table summarizes the amount of acres proposed for fuel reduction by treatment combinations. Harvest units would be treated using underburning, mastication with underburning, or grapple pile and burn. Natural fuels are treated by understory burning without prior harvest.

Alternative	Acres of Understory Burning with Harvest	Acres of Harvest, Mast and Underburn	Acres of harvest with Machine Mastication	Acres of Mastication noncommercial thinning	Acres Natural Fuels using Prescribed Fire only	Total Acres of Fuels Treatment
B	797	96	215	0	4,450	5,558
C	1,280	148	158	140	551	2,277
D	1,036	195	750	140	551	2,672
E	1,530	195	256	140	4,520	6,641

Machine mastication refers to acres that could be treated by grapple pile and burn or by mulching or chipping the slash. These methods are being used in areas where thin bark tree species are left in the stand and need protection from fire. The equipment would work along forwarder routes, from the back forward so there is a slash mat to work on. When mastication is used the material would be left on site without burning. Burning piles and jackpots of slash would expose soil. The exposed areas would be surrounded by unburned fuels that would filter and trap eroded sediment.

Landscape and understory burning would have similar effects on erosion and sedimentation. Burns would typically be planned with prescriptions designed to maintain 50 percent of the existing duff. In forest sites, a mosaic of burn areas occurs with about 60 percent of the project area blackened. Less than 20 percent of the blackened area would have exposed mineral soil. Remaining duff, vegetation, and surface debris would surround exposed soil. Slope distances on the exposed soil would be short, preventing significant overland flow from developing and the surrounding duff and vegetation would act as a filter. Natural mulching by needles and leaves would provide some ground cover before the first winter. Needle fall and herbaceous vegetation would increase surface roughness, provide armoring, and reduce the movement of soil. Larger fuels, greater than 8 inches would not be consumed and add to the surface roughness. Sediment transported from the uplands is expected to be trapped and not measurably increase sediment levels above current levels.

No ignitions for fuel treatments would occur within RHCAs. Fire would be allowed to back into the RHCA to provide the benefits of fuel reduction to these areas. The fire would be low intensity with short flame lengths. If the fire moves into areas of concentrated fuels or next to the channel, exposed soils could occur. The risk of erosion is limited due to short slope lengths of exposed soil and the surrounding unburned debris and vegetation. Because mineral soil might be exposed next to channels, a small amount of sediment might enter channels during intense storms and spring runoff for the first year. There is a low risk that sedimentation would occur at levels that would measurably affect water quality or deposition in channels. The mosaic of unburned vegetation and the current levels of debris and other channel roughness would slow and reduce the transport of any sediment. This risk would not extend beyond the first growing season after burning due to regrowth of surface vegetation and accumulation of natural mulches.

**Cumulative Effects** – The cumulative effects analysis is based on the evaluation of additive impacts from ongoing, reasonably foreseeable future projects and activities on private and National Forest System lands to sediment, temperature, and flow. Impacts are shared by two, unconnected watersheds; Willow Creek and Phillips Creek. The town of Elgin is approximately 5 stream miles downstream of the Forest boundary on Phillips Creek. Willow Creek has extensive agriculture and rural housing development. The mouth of Willow Creek with the Grande Ronde River is approximately 10 miles below the Forest boundary. National Forest Actions are listed in Chapter III also as Other Area Improvement Projects in Chapter II. Reasonable foreseeable future projects listed in Chapter III are projects likely to occur in 10 or

more year; those listed in Chapter II are likely within five years of implementing one of the action alternatives. Projects on National Forest System lands include soil restoration by subsoiling, placement of large wood in Phillips Creek, rill and gully restoration, culvert replacement for fish passage, and noncommercial thinning for fuel reduction and growth.

Temperature: Placement of large wood could impact streamside vegetation but is not likely to damage or remove large tree that contribute to shade. Most of the large wood is being placed in channels sections of channel that goes dry during the summer. Helicopters and horse logging would be used for the placement of the large wood in sections of streams that have been thinned or clearcut to the edge of the channel. The upper reaches of East Phillips Creek would utilize horses to pull the material to the stream. Pools would intercept ground water but not likely to hold water all summer. Impacts to the streamside area from grazing are not expected because sheep are herded away from perennial streams and are watered at upland springs. The allotment has been inactive the past two years and may remain inactive. Sheep would impact streams for the short time they cross. The analysis for the proposed timber harvest and fuel reduction shows no effect to water temperature. The cumulative effects to water temperatures would be immeasurable.

Sediment: Sediment delivery into streams would come mainly from restoration projects not related to vegetation management. The placement of large wood in Phillips Creek, culvert replacement, rill and gully repair, road obliteration, and the replacement of a culvert with a bottomless arch over Little Phillips Creek are restoration projects with potential for direct sediment input into streams because work would occur within stream channels. The activities would have short term, localized, high intensity effects as fill is removed and replaced or wood is embedded in the stream. Culvert removal and replacement on the perennial section of Phillips Creek would have short-term, localized, high intensity effects when fill is removed and replaced. These effects would last more than an hour and less than a day and would not be measurable beyond a few stream miles. The culvert replacements on Little Phillips Creek and Phillips Creek at the crossing of FR 3740 would occur when the channel is dry and could flush low levels of sediment during fall high water. Other restoration work including the placement of large wood and gully restoration would have negligible erosion and sedimentation effects. Direct impacts would be nonexistent because the channels would be dry when most of the work occurs. Large wood placement in upper East Phillips Creek would generate short-term sediment for less than a day. This would occur in the headwaters 9 miles above the Forest boundary. Early in the run off year, when water returns to the streams, there would be an immeasurable increase above background effect from sedimentation. Culvert removals from the proposed road reconstruction on FR 3217030 and fish passage replacements occur 2 to 9 miles above the forest boundary. The culvert removals from the road reconstruction are not in the same watershed as the fish passage replacement culverts. Large wood replacement begins about 0.75 miles from the Forest boundary in Phillips Creek and would generate low levels of sediment into the system. Impacts from sediment would be immeasurable at the Forest boundary and would not be detected when combined with the agricultural and forest management uses on private lands downstream.

Other ongoing actions (grazing, noxious weed treatment, and recreational use along Phillips Creek) have stable, low level impacts to water quality, erosion, and sedimentation. Sheep grazing would not occur within fish bearing or perennial RHCAs. Watering for sheep occurs in the upper reaches of the watershed away from perennial stream flows. Sheep are constantly watched and moved such that grazing would not expose soil. Noxious weed treatment retains ground cover. Dispersed recreational use within the Phillips Creek RHCA would continue. Fall hunting provides the heaviest use. Sediment can directly reach the stream as flows return. It is quickly diluted and becomes immeasurable. Harvest and burning would create areas of exposed soil surrounded by undisturbed areas or areas with low levels of fuel consumption. The effects from erosion and sedimentation would be immeasurable from these exposed areas because they would occur in a mosaic, surrounded by unburned or duff areas that trap erosion. The RHCA protection measures provide additional filtration that would prevent transport of any erosion derived from logging or burning from reaching the streams. A small amount of sediment may reach streams when a fire backs into the RHCA. The magnitude of combined sedimentation would be small since surface erosion from exposed soil would be limited to short slope lengths and channel roughness features would trap and store sediment in ephemeral and intermittent channels.

Stream Flows: Effects of harvest, burning, and past harvest to changing water yield or timing of flows is modeled using the Umatilla National Forest Equivalent Clearcut Acre (ECA) methodology. Vegetation management actions that change transpiration or snow melt are modeled. It is assumed that 60 percent of the area proposed for prescribed fire would get blackened and 15 percent tree mortality would occur on the blackened acres. The model also assumed that the harvest and burning would occur in the same year. This gives a conservative estimate of effects because the harvest and burning would occur over 5 to ten year period. Increases in ECA occurred in several of the subwatersheds. All subwatersheds but Subwatershed 84C, Middle Phillips Creek, maintained ECA values in the low risk to changes category. For Alternative D subwatershed 84C had an ECA of 16 percent, one percent above the NMFS's level of concern. Since the actual timetable of activities would spread activities out over several years, the ECA for this subwatershed would most likely not exceed 15 percent. The model predicts that there is a very low risk of any of the treatments would cause measurable changes in water yield or timing of flows.

Equivalent Clearcut Acres (%) and Road Density before and after Treatment by Alternative

HUC Code	SWS Name	Existing% ECA	Alt. B % ECA First Year	Alt. C % ECA First Year	Alt. D % ECA First Year	Alt E % ECA First Year After harvest	Alt E % ECA In Fourth Year Following Burning
84B	Little Phillips Creek	1.0	3	1	3	3	2
84C	Middle Phillips Creek	0.8	12	14	16	13	14
84D	East Phillips Creek	4.6	8	6	6	8	5
84E	Upper Phillips Creek	6.1	10	6	6	10	6
84I	Dry Creek	0.7	8	7	8	10	7
84	Combined SWS in Pedro Colt	2.4	7.5	5.8	6.8	8.1	5.9

Impacts to the Grande Ronde River: There would be no water temperature or flow effects in the project area and sediment effects would be either so minor as to be unmeasurable in the project area or very short term in occurrence. Although stream temperature and sediment are water quality concerns in the Grande Ronde River, water quality and flow regime leaving the National Forest would not detrimentally affect those parameters. In the short-term there would be no increase in water temperature or sediment concentrations in the Grande Ronde River resulting from the combined effects of proposed projects, ongoing projects, and reasonable foreseeable future projects. In the long-term, improvement in water quality on NFS lands would contribute to improving water quality in the Grande Ronde River.

Summary: All alternatives in the analysis would improve watershed health and resiliency to the extent fuel reduction treatments reduce the risk of high intensity wildfire in stands with uncharacteristic fuel accumulation and to the extent that harvest activities create the conditions for healthy, site appropriate stands. The actions would lower the risk of future impacts to water quality, sedimentation, or flows brought on by catastrophic wildfire events. Wildfires would be able to be contained at smaller sizes or have low intensity that would allow the landscape to function within historic hydrologic bounds. Protection from future impacts to water quality is related to acres of fuel reduction. Alternatives D and E treat the most acres in a way that not only breaks up the landscape for controlling the size of wildfires but also reduces intensity. Alternative C and D are designed to control the size of a wildfire. The results of the analysis show no effect to stream temperature, immeasurable effects to background sediment levels at the Forest boundary, and no slowing of recovery to pre-management levels from the combined current, proposed, or future activities in the Planning Area or with private lands in the Willow Creek or Phillips Creek watersheds.

**Riparian and Fish habitat:** Goal: Provide and maintain a diverse, well-distributed pattern of fish habitats. The goal applies to all areas dominated by riparian vegetation, including areas containing anadromous and resident fish, perennial and intermittent stream courses, wetlands, and floodplains.

Summary of Findings:

- Snake River steelhead and redband trout utilize the streams in the planning area. Steelhead and rainbow/redband trout are management indicator species for the Forest Plan. Snake River Steelhead are listed as Threatened under ESA and redband are listed as sensitive by the Regional Forester. Effects on these species are included in the general effects to fisher habitat and in the section on Endangered Species and Regional Forester’s Sensitive Species.
- The area has a history of low summer flows with most of the streams, or major portion of streams, going dry. East Phillips and Pedro Creeks are the major sources of perennial stream flows. The natural flow regime limits habitat quality.
- Approximately 24 percent of the area within RHCAs of fish bearing streams has had regeneration harvest with 76 percent of the harvest occurring in the past 20 years.
- Road density within RHCAs is approximately 1 mile per stream mile in all subwatersheds except East Phillips. East Phillips is less than 0.1 miles per stream mile.
- Road density for the planning area is 3.8 miles per square mile with an open road density of 1.1 miles.
- Sediment transport does not appear to be impacting spawning area. Cobble embeddedness is low, ranging between 18 to 39 percent.
- Fish habitat is marginal because of the high proportion of dry channel, warm water temperatures in the summer, and habitat simplification from past logging on the floodplain.

- The Grande Ronde River is a water quality limited stream for temperature, sediment, and habitat modification. Phillips and Willow Creeks are tributary streams. The *Upper Grande Ronde Subbasin Water Quality Management Plan* identifies the Phillips-Willow Creek subwatershed as a high priority for improving temperature, sediment, and flow to the Grande Ronde River.

Effects are summarized from input provided by the fisheries biologist found in the *Pedro/Colt Fisheries Report* and *Pedro/Colt Timber Sale and Fire Reintroduction Project Biological Evaluation for Aquatic Species*, and supplemented in the EA.

### **Alternative A - No Action**

**Direct and Indirect Effects** - There would be no direct effects on fish habitat. Historical low flow conditions would continue and water temperatures would remain warm were pools are feed by subsurface flow with little to no stream shade. Stream shade in stream reaches previously harvested would continue to recover slowly, with cottonwoods and willow supplying the majority of the shade. Recovery of stream shade would be the same for all alternatives because the action alternatives do not propose additional plantings and no vegetation management or fuel reductions are proposed within RHCAs. The cottonwoods are regenerating well, showing good growth and relatively high stocking levels. Water temperatures would remain warm until streamside trees grow sufficiently to shade streams.

In those areas where timber harvest removed trees and large wood right down to or across the stream channels, new large wood recruitment would remain limited for many years. Natural recruitment may be hundreds of years away, until trees grow in size and fall. Aquatic habitat complexity would remain low in these reaches, approximately 24 percent of the length of fish bearing streams. Pool formation, cover, and spawning gravel accumulations facilitated by additional large woody debris would be forgone. What little large wood in these areas is rotting and will be lost in the near future.

Erosion and sedimentation from the existing road conditions would continue. Sediment delivery would continue to occur from gullies forming in the floodplain below culverts, roads no longer needed within RHCAs, and roads needing improvements for drainage or improved road surface. Culverts would also continue to restrict fish passage to the upper reaches of Little Phillips and Pedro Creeks.

**Cumulative Effects** - Catastrophic events associated with insects and wildfires would continue to be a risk. The effects of a stand replacement fire can only be generalized due to the probabilistic nature of the event. If a stand replacement fire were to occur, the potential for duff removal, creation of hydrophobic soils and erosion would be greater than that of action alternatives. Approximately 20,000 of the 22,000 acres in the planning area are in the frequent and mixed fire regime. Ninety-two percent of the frequent fire regime and 44 percent of the mixed fire regime is in condition class 2 and 3 or about 66 percent of the total planning area. Extensive forest areas could be lost in a stand replacement wildfire. The potential for a reduction in shade along perennial streams would increase as the fire spreads into riparian areas with 80 to 100 percent removal of canopy cover over portions of the RHCAs and uplands.

A benefit that may come through time is the movement of beaver into the area; this is also true for any of the action alternatives. The lower reaches of Phillips Creek, below the forest boundary, are reported to have beaver. As the cottonwoods and willows age and provide a food source, beaver may move onto the forest and begin to pond water and possibly generate year round flows. In the future, Forest Road 3740, where it crosses the floodplain, would need to have design features to allow Phillips Creek to meander.

### **Harvest Alternatives B, C, D and E**

**Direct and Indirect Effects** – Riparian functions and fisheries habitat related to temperature, large woody debris, and shade would not be impacted by vegetation management actions. No harvest is proposed neither would prescribed fire be ignited within RHCAs. Past monitoring of prescribed fires that have backed into RHCAs indicated low intensity fires that kill individual sapling size trees and thinned the outer edge or killed the lower limbs of clumps of regeneration. The duff layer burned but remained intact, retaining filtering and infiltration functions. Mortality to larger, shade producing, trees are rare and stream shade would not be significantly reduced. The 1.1 miles of road proposed for obliteration in RHCAs would allow riparian vegetation to regenerate and eventually provide additional shading. Canopy closure for shade would remain at existing levels and continue to recover from past timber management; the source for large and small woody debris would be unchanged; and stream channels would not be impacted. Pool frequency would remain the same or be improved by the future placement of large woody debris in the stream channel. Riparian functions and recovery would be largely unhindered by these upland vegetation actions.

The proposed reconstruction includes surface blading, placement of surface gravel, and culvert replacement. Culvert replacement on FR 3217030 with rolling dips would generate short-term, low level, flushes of sediment when water returns

to the channels or during rains or snow melt. Most of the road reconstruction occurs distant to fish bearing stream channels near near ridgetops; dense vegetation and debris downstream from the work would filter and trap the small amount of sediment that might be eroded before it would enter fish bearing streams. The installation of drainage dips and road surface hardening associated with work on Forest Roads 3734 could lead to a small amount of sediment entering Little Phillips Creek. Flushing of sediment would occur in the fall as stream flows are renewed, before fish movement occurs. Steelhead enters the stream in the spring for spawning.

Logging associated sources of sediment include log haul within RHCAs, landing construction or use, and the transport of logs to landings. Log haul over gravel roads during wet weather increases sediment yield from the road surface. Approximately two-thirds of the volume would be hauled on Forest Road 3738 or 3734 within Phillips and Little Phillips Creek RHCAs. The other third uses a ridgetop road system to reach Highway 204 and is not expected to deliver sediment to fish bearing streams. Most of the haul would come down Forest Road 3738 along Phillips Creek. Though the gravel surface can reduce sediment yield by 80 percent when compared with native surface, wet weather haul works the fines to the surface and increases the risk of sediment moving directly into the stream when water is flowing off the road. Since the streams are sediment supply limited, effects would be related to increased amounts of sediment in the water column and physiological stress. Haul would contribute to and be additive with sediment already in the water column. If the haul occurs during a summer thunderstorm the affects would be small because of the amount of dry channels. During the spring, haul related sediment could affect steelhead behavior while migrating in the streams. Restricting haul to dry conditions reduces the risk. Early spring haul would likely not occur, shifting activities to summer months when these sections of streams are dry.

Timber harvest and the 140 acres noncommercial thinning are not expected to increase sediment delivery to stream channels even though the acres harvested vary by alternative: Alternative B, 1,108 acres; Alternative C, 1,586 acres; and Alternative D and E, 1,981 acres. The cut-to-length and helicopter logging systems would expose or compact very little soil and causes very little erosion (see soils effects). The noncommercial thinning leaves a surface cover of chips or debris. Erosion would be trapped by undisturbed vegetation and by having no harvest within PACFISH RHCAs. Retaining surface roughness in the harvest and thinning units along with the RHCAs prevents sediment delivery into the streams.

Alternative B and E treats the most acres using prescribed fire. Natural fuels treatments are proposed on 4,450 acres in Alternative B and 550 acres in Alternatives C and D and 4,520 acres in Alternative E (This is in addition to the acres proposed for harvest). The risk of erosion from prescribed burning is limited due to short slope lengths of exposed soil and the risk of sediment delivery is low due to surrounding unburned debris and vegetation. Sediment might enter channels during intense storms or spring runoff from exposed soil adjacent to channels as a result of fire backing into an RHCA. This is a one-year risk until vegetation stabilizes the site. There is a low risk that sedimentation would occur at levels that would measurably affect water quality or deposition in channels. The mosaic of unburned vegetation in RHCAs and current levels of debris and other channel roughness would slow and reduce or eliminate the transport of sediment entering streams. The risk would not extend beyond the first growing season after burning due to re-growth of surface vegetation and accumulation of natural mulches.

Fuels mastication would occur on 215 acres with Alternative B and E, 117 acres with Alternative C, and 537 acres with Alternative D. The machine mulches the sapling to small pole size trees along with surface fuels and brush. It would not enter RHCAs. The machine is not expected to expose soil. The mulched material would filter any erosion and sediment would not be delivered to the streams.

In summary there are potential impacts to fish habitat by sediment delivery from timber haul along valley bottom roads, the removal of culverts, road obliteration in Pedro Creek, and a backing fire burning into an RHCA. The mitigation for dry conditions during haul would reduce the major source of sediment. Sediment from spring burning and timber haul in RHCAs could impact steelhead migrating through the systems. Sediment derived from roadwork and fall burning would move through the system before steelhead enter the streams. Impacts would be short term. Since the streams are sediment supply limited, impacts to spawning gravels and hiding cover from in-channel deposition is not likely. Water column impacts associated with behavior and physiological stress would be short lived because of the flashiness of the streams. The level of sediment is expected to be so low as to be biologically insignificant but not discountable. A short-term flush could affect fish behavior but would not be of sufficient duration to cause a long-term effect. There would be no impacts to stream temperatures.

**Cumulative Effects** – Impacts to fish habitat would come from those actions that occur within RHCAs and directly along fish bearing streams. The activities are non-vegetation management actions that include road obliteration, culvert removal, and log haul described in the action alternatives along with area improvement projects. Improvement projects include the placement of large wood in Phillips Creek, the removal or replacement of culverts causing barriers to fish passage, the repair of gullies in the Phillips Creek floodplain and within the lands acquired by the Forest Service, and subsoiling. Other than subsoiling and log haul these actions would improve fisheries habitat but cause a short-term, low level, movement of sediment during the first fall rains. Since these actions are expected to occur at different times and location in the watersheds there would be little overlap of effects. Impacts in the Dry Creek/Willow Creek system do not connect with

Phillips Creek. Like the direct impacts from sediment delivery into the stream systems, any cumulative sediment is not expected to impact spawning gravels from channel deposition. Impacts would be associated with the water column affecting behavior and causing physiological stress. Impacts are not expected to reach the Forest boundary so there would be no cumulative impacts with activities on private lands. Hydrological analysis indicates there would be no measurable sediment effects leaving the Forest boundary.

Fish habitat could be improved. The placement of large wood would cause scouring of the channels. The scour would create pools and sort substrate to produce patches of gravel sized material appropriate for spawning. The new pools may be deep enough to intercept ground water flows to retain water during the summer. Since these pools would be within areas of no stream cover, the water may warm. The pools would not be fully functional until the cottonwoods and willows shade the stream. The placement of large wood has the potential to kill fish when the wood is placed in the stream. Most likely the fish would swim away, however, any fish seeking cover under rocks could be crushed. The placement would most likely occur when the channel is dry and not kill fish. The short-term sedimentation and loss of a few individuals is countered by improved habitat complexity with associated pool formation and spawning gravel accumulation. Fish benefit in the long-term by the placement of large wood and the culvert replacement by increasing fish passage, creating pools, increasing habitat complexity, and opening habitat in the upper reaches.

There is very low risk that any of the treatments would cause measurable changes in water yield or timing of flows because Equivalent Clearcut Acres (ECA) showed that all alternatives would have low ECAs, below 15 percent. Since there is a very low risk of changes in streamflow attributable to the timber harvest and fuel treatment, risks to fish and aquatic habitat would be discountable and if they did occur they would be so small as to be biologically insignificant.

The sheep allotment does not contribute impacts to fish habitat. Water developments away from streams and herding sheep quickly through the RHCAs control instream impacts associated with grazing. The combined impacts of grazing, harvest, prescribed fire, and other recreational use are not expected to increase sedimentation of streams. The flush of sediment would occur in the fall when water flows return to the streams. The flush would be well ahead of ascending steelhead trout. BMPs and management requirements should provide protection to fisheries habitat.

Impacts from the action alternatives and reasonable foreseeable future projects are not expected to effect viable populations of management indicator aquatic species, that is steelhead or rainbow trout. Most of the sediment would move through the system in the fall well before steelhead ascend the streams for spring spawning. Other than the replacement of a fish barrier culvert on FR 3738, the road obliteration in Pedro Creek, and Fire Area D in East Phillips Creek the sources of sediment are below the reaches where fish summer. Sediment from the actions would flush through the system before steelhead arrive in the spring. Outside of Fire Area D harvest and prescribed fire are not proposed in the upper reaches. Fire Area D would use prescribed fire only to reduce fuel continuity. Management requirements and BMPs would protect fisheries habitat. Effects from sediment or to water temperature would be immeasurable. There are no vegetation actions proposed in the RHCA that would impact riparian management objectives. The occasional fire creeping into the RHCA is not expected to modify riparian cover to cause a measurable impact to water quality. The actions would not cause farther degradation of riparian conditions but would allow riparian vegetation to recover and improve riparian function.

**Fire and Fuels:** Goal; Provide and execute a fire protection and fire use program that is cost efficient and responsive to land and resource management goals and objectives. Resource goals and objectives include:

- Increasing stand resilience to naturally occurring fires.
- Use fire disturbance in shaping forest cover to reflect structure and fire intensity associated with historical forest types.
- Use landscape fire in areas seral to ponderosa pine to reduce hazardous fuels and excess crown cover to emphasize a regime of low intensity surface fire.
- Restore the diversity of vegetation patterns reflective of historical disturbance processes and with a low risk to epidemic insect outbreaks.

Summary of Findings;

- The National Fire Plan considers the southern portion of the planning area a wildland urban interface. Year round residences are located along Dry Creek, the town of Elgin is within 3.5 of the southern boundary, and Tollgate/Spouts Springs is within 6 miles of the northern boundary.
- Historical fire records indicate a fire return interval of every 10.8 years on any given 1,000 acres.
- Frequent fire regime makes up 55 percent of the planning area; mixed fire regime, 37 percent; and Infrequent fire regime, 8 percent.
- Fuel condition is getting more complex. Condition Class 2 and 3 are found on 92 percent of the Frequent Fire Regime and 44 percent of the mixed fire regime.

- Stand replacement wildfire events are more likely to occur than what was experienced historically.

Effects are summarized from input provided by the Fuels Specialist found in the *Pedro/Colt Fuels Report* and *A Discussion of Fuelbed Dynamics and Fire-Induced Mortality to Dry Forest Stands*, and supplemented in the EA.

### **Alternative A - No Action**

**Direct, Indirect and Cumulative Effects** - Successional processes would continue, increasing biomass through time as forest stands become increasingly homogeneous in composition, structure, and fuels. Shade tolerant species would out-compete seral ponderosa pine and western larch. Stress induced mortality would represent a greater proportion of the fuels development in stands maintained by frequent fires. Dead-standing and surface fuels would continue to accumulate. Higher stocking levels would produce smaller diameter trees at greater risk to mortality from wildfires. The remnant, large diameter trees would be at greater risk to mortality from Douglas-fir bark beetles and mountain pine beetles and from the development of ladder fuels and risk to crown fire. The increase in surface fuels would retain fire longer on the site, also contributing to increased mortality to larger diameter trees. Reduced stand vigor would increase the risk to spruce budworm outbreaks and mortality from defoliation. All these stress related processes would increase mortality, increase standing and surface fuels, and increase aerial fuel structure that would change the historical fire behavior. The frequent fire regime would burn with higher intensity and severity with a higher risk to fire reaching into crowns. The risk of active crown fire would increase. Approximately 60 percent of the planning area is already in condition class 2 and 3; more acres are transitioning to high-risk conditions. The homogeneity of fuels and stand structure would create greater available fuels, with larger and more severe wildfires. Prevailing southwest and west winds would push wildfires to the northeast and east. Spotting distances could be as far as a half mile increasing the likely hood of a fire jumping Highway 204. Erratic spotting behavior would place Elgin and Tollgate at risk.

The existing mosaic of grasslands, timberlands and roads would not provide for firefighter safety or control the extent of wildfire on the landscape. Individually or in combination meadows, ridge top roads and previous harvest units do not provide a fuel break or defensible space. Under wildfire conditions, meadows made up of cured herbaceous material can contribute to the rapid fire spread. Burning conditions, fuels, slope, wind and spotting distance need to be considered when taking suppression action on a ridge top. Cured grass meadows burn rapidly during a wildfire. There is usually very little ecosystem damage from a grass fire using burn severity as a measure of damage because of the rapid passage of the flaming front. However this rapid passage can deliver fire to heavier fuels along the meadow edge setting the stage for a mass ignition of adjacent timber stringers that other wise would burn much slower than the grass. Mass or multiple ignitions in heavy timber greatly increases the likelihood of crown fire. Fire in light fuel, such as grass, is one of the common denominators in fire entrapments. See Appendix E for a more detailed discussion about fire suppression risks and concerns in timbered grasslands.

#### **Comparing Flame Length and Rate of Spread Between Grass and Heavy Timber Fuel Types for a Single Point Ignition.**

	1 Hour Fuel Moisture	Wind Speed	Slope	Flame Length	Rate of Spread
Grass	6%	2 mph	45%	3.5 Ft.	58 Ft/Min
Heavy Timber	6%	2 mph	45%	4.2 Ft.	7 Ft/Min

### **Action Alternatives**

**Direct and Indirect Effects** - Both the Forest Plan and the National Fire Plan give a priority for treatments within the frequent fire regime where it is deviating from historic fuel conditions. Maintenance of stand conditions before deviations occur is also important because of the resilience provided by stands developed by frequent fires. The low intensity wildfires of the frequent fire regime allows for safer fire fighting conditions and protection of property. Portions of the mixed fire regime were included where they intermingled with the frequent fire regime because they would have a short fire return interval around 35 to 50 years that maintained western larch. The following tables display how management actions are focused in the frequent fire regime. Based on stand data and plant communities Alternative B treats 35 percent of the frequent fire regime in the planning area and 17 percent of the mixed regime; 69 percent of the treated acres are condition class 2 and 3. Alternative C and D are similar since they involve treating areas by harvesting and fewer acres without landscape prescribed fire. Alternative C treats 15 percent of the frequent fire regime and 5 percent of the mixed regime; 97 percent of the treatment acres are condition class 2 and 3. Alternative D treats 16 percent of the frequent fire regime and 8 percent of the mixed regime; 89 percent of the treated acres are condition class 2 and 3. Alternative E treats about 41 percent of the frequent fire regime and 22 percent of the mixed fire regime in the planning area; 73 percent of the

treated areas are in condition class 2 and 3. Alternative B treats 26 percent of the condition class 2 and 3 in the planning area; Alternative C treats 15 percent; Alternative D treats 16 percent, and Alternative E treats 33 percent.

Summary of Treatments in Frequent and Mixed Fire Regimes Compared with Current Condition of Planning Area

Alternative	Acres in Frequent Fire Regime	Acres in Mixed Fire Regime	Acres proposed Timber Harvest	Acres in Condition Class 1	Acres in Condition Class 2	Acres in Condition Class 3
Planning Area	12,066	8,054		5,440	11,051	3,629
B	4,172	1,369	1,089	1,760	3,622	159
C	1,835	442	1,586	78	1,729	470
D	1,947	706	1,962	319	1,864	470
E	4,889	1,733	1,962	1,760	4,392	470

The acres summarized for Planning Area represent the current condition and is presented so the reviewer can see how the proposed treatments relate to restoration of high risk areas.

Proposed Harvest by Fire Regime and Condition Class

Alternative	Condition Class 1 Acres	Condition Class 2 Acres	Condition Class 3 Acres
<b>Frequent Fire Regime</b>			
B		588	159
C		1,052	330
D		1,164	330
E		1,164	330
<b>Mixed Fire Regime</b>			
B	319	23	
C	78	126	
D	319	149	
E	319	149	
<b>Infrequent Fire Regime</b>			
B	19		
C	0		
D	19		
E	19		
<b>Total for Alternative</b>			
B	338	611	159
C	78	1,178	330
D	338	1,313	330
E	338	1,313	330

Where pretreatment is needed to reduce ladder fuels and create open stand structure, harvest is being proposed. All harvest proposed in the frequent fire regime is within condition class 2 and 3; prescribed fire would be used in condition class 1 to maintain fuel and stand structure. Removing fire intolerant trees and intermediate crowns restores resilience to the stand and lowers the risk for fire reaching into the crowns or killing large diameter trees. Alternative B, D and E harvest more acres of condition class 1 in the mixed fire regime than Alternative C. These mixed fire regime stands have a short fire return interval in the range of 35 years and are transitioning to condition class 2 because it has been 100 or more years since the last large scale wildfire. Units 61 and 65 are stands in the Mixed Fire Regime that were visited in May of 2001. These stand were found to actually be displaying the attributes of Condition Class 3 and had a need to remove understory prior to underburning. *Pedro Colt Field Trip May 30, 2001*. In Alternative B and E only 338 acres of the total 1,370 to 1,730 acres proposed for treatment in the mixed fire regime would utilize harvest pretreatments. Alternative C focuses on ponderosa pine management favoring drier sites so most of the harvest occurs in condition class 2 and 3 stands. All alternatives move the forest structure to seral species.

Prescribed fire effects would come from mainly two types of burns. The general landscape prescribed fire would treat natural fuels in stands within condition class 1 and 2. Stands requiring a harvest pretreatment would have both natural fuels and harvest generated slash treated at the same time. Alternative D (188 acres) and E (40 acres) have units with a

third type were natural fuels would be burned, dead trees removed, followed by the harvest slash being burned. Fire intensity is expected to be higher when slash is added to the natural fuels. Under prescribed burning conditions it is unusual for more than 60 percent of the defined ignition unit to be blackened. This mosaic or patchiness is due in large part to the discontinuous nature of the fine fuels that carry fire. The following table displays increase in surface fuels from the harvest and the reduction within blacked areas after prescribed fire. Most of the increase and decreases in fuels would be in the 0 to 3 inch size class. This is the size class that ignites easiest and spreads fire. The burn mosaic would break up surface fuel concentrations such that fire suppression measures would be easier and reduce the risk of spot fires becoming a hazard. The areas of fuel reduction would help to break up the landscape to control the size of potential wildfires.

#### Surface Fuel Changes

Condition Class	Current Fuel Load		Post Harvest Fuel Load		Fuel Load after Harvest and slash treatment		Fuel Loads after Natural Fuel Treatment	
	Total Tons/ac	0 to 3 inch Tons/ac	Total Tons/ac	0 to 3 inch Tons/ac	Total Tons/ac	0 to 3 inch Tons/ac	Total Tons/ac	0 to 3 inch Tons/ac
3	30	9	40	17	10	0		
2	21	6	34	17	6	0	4	0
1	12	5	24	17	4	0	3	0

Treatments of harvest slash would occur in the fall or spring after harvest. Windows of opportunity can sometimes be short and the slash could remain on the ground a year or two. A wildfire under the heightened fuel condition would have a high potential for spotting and cause torching in the retained stand. There would be a temporary increase in fuel loads from the slash and the opening of crowns would allow winds into the stands. Fuels would dry and four to six feet flame lengths would be expected from a wild fire. Tree mortality would be high. The fuel concentrations would hinder construction of control lines, increasing the potential for fire escaping initial attack. This elevated level of harvest-generated slash would be short lived, likely to exist for no more than one summer season before treatment occurs. The risk associated with the elevated levels would be short term, likely one year. Once the stand is opened and the harvest slash and natural fuel buildup treated, wildfires would move through the area with low intensity, increasing fire fighter safety and the ease of control during future wildfire suppression actions.

Prescribed fire treatments of the harvest slash and natural fuels would produce a fire of various intensities; from a creeping ground fire to one with flame lengths of 1 to 2 feet. The burn window, the low intensity fire, and the concern of tree mortality may require multiple burns to reach the fuel levels characteristic of frequent fire regimes. Units mechanically treated would gradually develop greater fuel loadings over time. The stands would be at an early, less fire prone successional stage, since much of the biomass contributing to fuel buildup would be removed and would favor fire adapted species.

Stands receiving only prescribed fire treatment for natural fuels would experience an accelerated cycle of fuel accumulation. Biomass killed by fire would deteriorate within 3 to 5 years, adding branch and limb wood to litter on the forest floor. After 8 to ten years, most of the small diameter boles would have fallen, contributing to fuel loads in the 3 to 9 inch size class. Subsequent fuel treatments would be necessary on 5 to 8 year intervals to maintain the desired level of fire protection or historic fuel loads and wildfire behavior. Burning prescriptions would be set to remove the 0 to 9 inch size classes of fuel.

Estimates of fire-induced mortality are based on predictive models constructed by Reinhardt and Ryan, March 1986 using representative stand exam information. Typically trees less than 6 inches in diameter and the thin barked species have the higher mortality rates. Mortality rates rapidly decrease with increases in diameter, depending on species. Spruce and grand firs have the highest rates of mortality in large tree size classes. These are the targeted species to remove from the frequent fire regime. The following table shows how effective the burning would be in reducing grand fir from stands.

#### Estimated Mortality Rates by Wildfire and Prescribed Fire for Species and Size Class

Species	Wildfire Mortality (4 foot flame length)			Prescribed Fire Mortality (2 foot flame length)		
	% Mortality of 6" Diameter	% Mortality of 24 inch diameter	Percent Average Mortality	% Mortality of 6" Diameter	% Mortality of 24 inch diameter	Percent Average Mortality
PSME	91	0.05	32	48	0.05	20
PIPO	56	0.06	27	56	0.06	27
LAOC	54	0.05	25	54	0.05	25
PICO	78	50	66	78	50	66
ABGR	85	11	40	62	11	35

Present wildfire behavior is expected to be moderate. Overall mortality is similar between prescribed fire and wildfire. Both reduce shade tolerant species and would favor seral tree species. Tree mortality would be primarily to small diameter trees. Timing of the event causes differing effects. Fuel moisture during an average to extreme fire season is relatively homogeneous, resulting in greater uniformity of fire effects across the landscape. Weather and fuel conditions during spring and fall prescribed fire vary by slope and exposure controlling the extent of a burn, particularly in RHCAs. Eighty percent or more of a wildfire area is blackened while up to 60 percent of a prescribed fire area is blackened. Even though the percent mortality is similar, mortality would be more extensive with a wildfire because more acres are blackened with higher flame length and severity.

The areas proposed for natural fuel reductions have a high component of small trees; fire would be effective in reducing shade tolerant species. Follow-up prescribed fire would be needed to reduce surface fuels generated as the small trees fall to the ground. Condition class 2 and 3 stands have a larger component of 9 to 16 inch trees. Harvest is proposed in these stands to reduce shade tolerant, fire intolerant, tree species that create ladder fuels in the lower to intermediate canopy. Removing the larger fuels prior to prescribed fire lowers the severity of fire needed to move the stand to frequent fire characteristics providing safer prescribed fire conditions with lower impacts to other resources. The proposed harvest and post sale treatments in the mixed fire regime would reduce stocking levels to increase growth and resilience to insects as well as reduce surface fine fuels.

When treating natural fuels, the prescribed fire burning in condition class 1 would be a low severity fire with less than 20 percent basal area reduction. Prescribed fire in condition class 2 would produce mixed severity conditions with approximately 45 percent basal area reduction. The basal area reduction would be mainly the result of grouped mortality due to the patchiness of fuels creating high enough severity to kill trees.

The proposed alternatives do not treat all acres in condition class 2 and 3 at this time. It is not desirable or possible to treat them at this time. Laws, regulations and Forest Plan standards would not allow the extensive harvest needed to reduce the intermediate crown layers. It has taken years for the stands to reach their current condition and making quick changes to the landscape would shock the species that have developed along with the changes. The proposed action and alternatives would break up the landscape to control the size of a wildfire. Public and fire fighter safety would be improved and future suppression costs would be lower because of the areas of reduced fuel size and structure. The reduction of fine fuels would lower the risk for ignition of spot fires while keeping them small because of discontinuous surface fuels. Taking the higher priority stands first allows learning from adaptive management and the ability to use what is learned for the rest of the area.

Alternative C, D and E would provide greater protection along the wildland-urban interface. These alternatives treat more acres along the Forest boundary. Stands would be thinned and opened such that a wildfire would move or stay on the ground. The extra width of fuel reduction would help to make the road along the boundary an effective fire control line. The thinning of the ponderosa pine and Douglas-fir stands would fit with the historic character produced by short fire return intervals and the dry meadow fingers along the forest boundary.

Alternative B and E uses a landscape approach to control the potential size of a wildfire. A mosaic of treatment areas using prescribed fire and harvest would provide control lines to constrain the size of the wildfire. With Alternative B, no treatments would occur along the forest boundary, however the landscape above the boundary would be broken up by fuel reductions. A fire moving across the landscape would lose intensity when it reaches one of the treated areas. The loss of intensity would lower the risk of wildfires moving across the Forest Boundary from the National Forest, however it does not reduce the risk for a crown fire coming off the private lands.

Treatments in Alternatives C and D would help contain the spread of a wildfire because treatments are focused in blocks along ridgetops and the Forest Boundary. Treatments occur within high priority stands that are transitioning to complex fuel structures. Treatments in Alternative B and E would work towards lowering the wildfire intensity over strategic areas while maintaining and restoring the character of the frequent fire regime.

**Cumulative Effects** – The primary goals of the fuel reduction is to provide safe conditions for fire fighters and the public while maintaining the frequent fire regime in its historic structure. The alternatives provide landscape treatments to break up fuel continuity. Alternatives C, D and E focused treatments in the wildland urban interface. The broadscale treatments of Alternatives D and E provide greater safety to fire fighters and the public. Grazing has the potential to affect the maintenance of the fuels and stand structure of the frequent fire regime. Grazing reduces the fine fuels needed to carry fire (this also increases fire fighter safety because of lower intensity wildfires). Mortality from the initial prescribed fire would provide enough surface fuels to carry fire the first couple of burn cycles and create understory grassland conditions that could be grazed. As grazing occurs in the open stands, fine fuels would be reduced and hinder the spread of fire. Future prescribed fire could occur during one of the 5-year rest cycles for pastures. Grasses would be ungrazed and the fine fuels at higher levels. The plant vigor gained during the non-grazing period would provide rapid recovery of the vegetation and ground cover. The grazing rest cycle fits well with the 15 to 20 year fire return intervals. Currently the allotment has not been used for two years and is likely not to be used the next season.

Approximately 40 percent of the fire starts in the planning area are human caused fires. Historically for the District, 65 percent of the human caused fires are from campfires. Dispersed recreation opportunities increase the risk of wildfires. The fuel treatments provide escape areas for the public in areas of low fuels and fire intensity. The ridgetop roads and recreation sites would be safer because of the low levels surface fuels and reduced risk to crown fires.

A finding of the Interior Columbia Basin Ecosystem Management Project for *The Effects of Thinning and Similar Stand Treatments on Fire Behavior in Western Forests* Graham et al 1999, PNW-GTR-463 concluded “The best general approach to managing wildfire damage seems to be managing tree density and species composition with well designed silvicultural systems at a landscape scale that includes a mix of thinning, surface fuel treatments, and prescribed fire with proactive treatment in areas with high risk to wildfire.” The action alternatives are responsive to this finding. The landscape was evaluated for fire risk and a variety of stand treatments were proposed based on stand and fuel treatment needs. A variety of harvest, mastication, and prescribed fire prescriptions were developed to break up landscape fuels to control the extent and intensity of a wildfire. Once additional areas are treated over a sixty-year period the landscape would be able to function under more natural conditions. For now, strategically placed areas of fuel reduction can keep wildfires from jumping RHCA's and decrease the rate of spread allowing easier control and lower rates of mortality. Through time the treatments would lower the fire severity increasing the survival of larger trees on the landscape. Resilience would be restored.

Recent research indicates that stands treated to reduce fuels experience lower fire severity than untreated stands that burn under similar weather and topographic conditions. The Final Report of the *Effects of Fuels Treatment on Wildfire Severity* by the Omi et al from the Western Forest Fire Research Center at Colorado University, March 25, 2002 supports the observations and antidotal information about wildfires burning into treated areas. They compared four wildfires in frequent, low severity fire regimes that burned into treated areas that included repeated prescribed fires, single prescribed fires, debris removal, and mechanical thinning both with and without slash removal. They found a good correlation between fire severity indicators and measures of crown fire hazard to fire resistance that illustrated the importance of treating fuel profiles in their entirety. Height to live crown had the strongest correlation to fire severity along with stand density and basal area. Crucial variables that determine a tree's resistance to fire damage were height and diameter; thinning from above, with a primary focus on removing the largest trees, would be ineffective within the context of wildfire management. There was good correlation for reducing surface fuels as well as the importance of thinning the stand for wind driven wildfires. Even with untreated slash, a thinned stand sustained less damage than untreated stands when the wildfire was driven by winds.

Omi concludes that crown fire potential cannot be ignored in protecting landscapes from damage. *“While surface fire intensity is a critical factor in crown fire initiation, height to crown; the vertical continuity between the fuel strata, is equally important. Further, crown fire propagation is dependent on the abundance and horizontal continuity of canopy fuels. Treatments that reduce canopy fuels increase and decrease fire hazard simultaneously ... Fuels treatment practitioners have gambled that a reduction in crown fuels outweighs any increase in surface fire hazard. Our research demonstrates that their bets have been well placed. Fuel treatment moderate extreme fire behavior within treatment areas.*

*The greatest contributions of fuel treatments may be the options they provide for landscape management that balances society preferences with the unavoidable recurrence of Wildland fires. Where fire threatens societal values, fuels treatments can facilitate suppression by providing safe access and egress for firefighters, as well as possible counter-firing opportunities. In wildlands managed to include natural processes, fuel treatments may help restore fire to its historic regime, either by restoring fuel profiles ... or by buffering the border between values-at-risk and extensively managed areas where natural ignitions are allowed to play themselves out.”*

The action alternatives look at different ways to treat fuels on the landscape, not relying on a single prescription or treatment method. They propose a complete treatment of fuels such that both surface and vertical fuels would be reduced. It may take several burn cycle to accomplish the fuel reduction goals. Experience and emerging research indicate that fuel treatments are effective in reducing fire severity and modifying fire behavior. Stands with reduced fuels become safer places to take action on wildfires given wind and topographic conditions.

**Air Quality:** Maintain air quality at a level adequate for protection and use of national forest resources and meet or exceed applicable Federal and State standards and regulations.

#### Summary of Findings;

- The planning area falls within a Class II airshed.
- Air quality is relatively high in the planning area.
- Airflows predominately move toward the east with potential effects to northern Union County and Wallowa County. Elgin and Summerville could be impacted by downslope drift of smoke.

- EPA records since 1994 shows seasonal peaks in the pollutant standard index daily values for PM10. None of the days exceed the daily standard of 150 ug/cubic meter. Late summer peaks are associated with wildfires, fall peaks with prescribed fire and wood heating, and winter peaks with wood heating.
- There are days when visibility is reduced from field burning, wildfires, and slash burns. The levels do not appear to cause unacceptable air quality problems, even during high fire years.

**No Action**

Air quality would remain unchanged. Summer wildfires have the chance of degrading air quality, mainly as it affects visibility. EPA monitoring of air quality in the communities of potential impacts indicates that particulate material did not exceed standards in 1996, a high fire year. Visibility was affected but air quality remained within standards. Increased biomass would add to emissions produced by a wildfire, see table below. Dispersion and transport of emissions would depend on the nature of the meteorological conditions.

**All Action Alternatives**

Past experience has shown that significant air quality declines are limited in scope to the general burn area and of short duration. Most significant impacts occur under strong, persistent inversions or highly stable air masses. Both phenomena are uncommon during the primary burning seasons (Mid May to June and Oct to Nov). All of the Walla Walla District is considered a class II airshed. Areas of potential impact from burning include the Wenaha-Tucannon Wilderness, the Grande Ronde River drainage and down-canyon communities, particularly Elgin. These areas would be affected by smoke if a strong, nighttime inversion develops or stable air holds smoke in the area. The following table shows the amount of Total Suspended Particulates, PM2.5, and PM10 produced compared between prescribed fire and a summer wildfire.

Fuel Consumed and Emissions Produced from Dry Forest

Burn Event	Tons/Acres PM2.5	Tons/Ac PM10	Tons/Ac Total PM	Percent Area Burned
Alt A Wildfire	0.26	0.30	0.49	90
Alternatives B, C, D and E				
Post Treatment Wildfire	0.11	0.13	0.21	80
Natural Fuels Treatment	0.13	0.17	0.25	60
Activity Fuels Burning	0.22	0.24	0.46	60

PM10 describes particles small enough to enter the human respiratory system. Particulate matter alone or in combination with other pollutants can constitute a health hazard. Monitoring by EPA does not indicate thresholds of health concerns are being reached during the periods of wildfires or prescribed fires. The burning of fuelwood remains below levels during winter inversions and stagnant air. Weather conditions are expected to disperse particulate matter to levels that would not exceed standards in the communities of concern. Visibility would be reduced, however fall rains would clean the air.

Burning would be conducted in compliance with National Ambient Air Quality Standards and Oregon Department of Environmental Quality (ODEQ) regulations and restrictions contained in the Oregon Smoke Management Plan (ODEQ Directive 1-4-1-601). An operator’s burn plan is developed prior to ignition. On site weather conditions are monitored before, during, and after an ignition. Ocular smoke observations are made throughout the ignition phase. Residual smoke is monitored for dispersion and direction. No ignitions will occur if there is an air stagnation advisory in place within the northeast Oregon geographic area. No ignitions would occur if existing or forecast conditions would transport measurable smoke into down wind communities. Air quality monitoring with nephelometers is in place down wind of the planning area at Asotin in Washington and in Enterprise, La Grande, and Baker, Oregon. These stations would monitor smoke coming from fuel treatments from private and public lands. Cumulative effects from the smoke have not exceeded standards.

Few health effects from smoke would occur to forest users due to limited exposure. Warning signs and public notices would warn forest users of areas with active burns so they may avoid the areas. Some impacts from smoke may occur to nearby residents should strong, persistent inversions hold dense smoke close to the ground for several days. The nearest community, Elgin, is 4 miles southeast of the planning area, upwind by prevailing wind pattern. Greatest impacts would be when heavy smoke flows down the drainage during the night. Atmospheric mixing would keep this impacts short duration, several days. Each day would bring improved air quality. Monitoring by EPA does not indicate thresholds of health concerns are being reached during the periods of wildfires or prescribed fires or field burning on private agricultural lands.

**Range:** Goal: To manage the forage resources for an upward vegetation trend in areas in "less than fair" condition and an upward or stable trend for areas in "fair" or better condition, while providing for forage productivity and making suitable range available for livestock grazing. Increase the level of forage production where cost efficient and consistent with resource goals.

This analysis does not propose any changes to the existing grazing allotment. The affects analysis will be confined to impacts to grazing and the use of the area when any of the proposed actions occur. Where grazing causes a cumulative effect with the proposed action, it will be discussed under the resource issue. A summary of findings:

- Actions are within the Northend Sheep and Goat Allotment.
- The Phillips Creek and Middle Ridge grazing units fall within the planning area. They are used June 1 to Oct 9. They are rested every five years, Phillips Creek is proposed for resting in 2002.

**Alternative A - No Action**

**Direct and Indirect Effects** - Grazing trends would continue unchanged. Monitoring indicates that overgrazing is not occurring in natural meadows and transitory range provides adequate forage.

**Cumulative Effects** – Over the next five to ten years plantations making up transitory range would no longer provide forage, sheep may compete for grasses produced in natural meadows with big game. Currently there are 1,600 acres of plantations less than 25 years old that provide transitory range. Approximately 16 percent of the transitory range would be lost in 10 years and 62 percent would be lost in 15 years.

**All Action Alternatives**

**Direct and Indirect Effects** – Historically, logging operations have not been a problem for sheep. Logging and routing schedules would be coordinated so the logging operations would not interfere with the timing of grazing. The operator is required to protect improvements such as fence lines, cattle guards, and watering developments. The landscape fire proposed in Alternative B and E would cause tree mortality. As trees fall they could become barriers to sheep passing through the area. The mortality would be mainly small diameter trees, less than 6 inches, and patchy in nature. Larger woody debris caused by fire mortality would be scattered with some patch mortality ranging from small clumps of trees to several acres in size. Large tree mortality would not be extensive and sheep should be able to move around them. The small diameter trees would be compacted to the ground by snow. The down material would not affect sheep usage of the area. The ridge system between the Umatilla and Grande Ronde drainages has a history of blowdown that has not impacted sheep usage or passage.

**Cumulative Effects** - Monitoring plots in natural meadows do not show over-grazing where sheep compete with big game. Years of monitoring show a stable trend. Utilization has remained the same. Management actions in the frequent and mixed fire regimes would increase transitory range and available forage. Improvement harvest and thinning would reduce stand densities to recommended stocking levels creating open stand conditions favorable to the production of forage. Opening the stands and continued prescribed fire would improve grass production while reducing brush competition. The crown closure may limit forage production, however forage would be available over a longer period of time because crowns would remain in open.

Treatment Acres to Create Open Forest Conditions  
And Available for Grazing in Ten Years

Alternative	Acres of Improvement harvest	Acres treated by Shelterwood and Seed Tree	Acres treated by Prescribed Fire Only	Total Acres Available for Grazing
B	421	393	4,450	5,244
C	1,095	314	550	1,959
D	1,201	443	550	2,144
E	1,201	443	4,520	6,164

Management requirements listed in Chapter II would reduce conflicts between grazing, timber harvest, and landscape prescribed fire. The whole area would not be burned at one time. The burning would stimulate grasses and the forage made available the following spring and summer. The prescribed fire should not impact the timing and use of the grazing units.

**Transportation System:** Goal; Provide and manage a safe and economical road and trail system and facilities needed to accomplish the land and resource management and protection objectives on the Umatilla National Forest.

Summary of findings:

- There are currently 123.1 miles of roads in the Planning Area, 38.2 miles are open, 13.1 miles are restricted, 11.3 miles are seasonal and 60.5 miles are closed
- Under the 1993 Access and Travel Management Plan there was approximately 160 miles of road, 54.9 miles are open, 32.0 miles restricted, 17.9 miles of seasonal, and 55.4 miles of closed.
- FR 3217 was obliterated in the mid 1990s. This road provided public access to Finley Ridge. The only access to the ridge is via 3217040, a closed road. ATVs are using the old 3217 road route for access.
- Total road density is 3.8 miles per square mile in the planning area with an open road density of 1.1 miles per square mile.
- Primary access is with stream bottom roads, Forest Roads 3738, Phillips Creek Road, and 3200, Dry Creek Road. Approximately 37 percent of the road miles are located on ridgetops.
- Transportation planning identified 7.5 miles of road no longer needed for forest management, due to changes in logging systems and access being achieved using other road systems. The roads proposed for obliteration are either user defined ridge top systems or within riparian areas with an alternate route with less impacts to water quality.

### **Key Issue 3: Access and Travel Management**

The planning area currently has a high road density, 3.8 miles per square mile. The open road density is 1.1 miles per square mile. Comments received during scoping questioned the need for new construction when the area has been designated as a high priority for road obliteration. New roads and changes to the access and travel management plan increases access of ATVs, leading to wildlife harassment and other resource damage. There is also conflict with obliterating roads that provide access to the Forest to maintain and exercise existing treaty rights.

### **Alternative A - No Action**

**Direct and Indirect Effects** - Road maintenance on closed roads, site reconstruction, and surface rock replacement would not occur. These improvements are needed for public safety, drainage improvements, and prevention of future damage. Drainage related problems would not be corrected until an event occurs that causes a failure with associated resource damage, particularly to water quality. Damage is often discovered a month or more after the event. The cost for repairs is often higher than maintenance because more extensive repairs are needed. Public safety risks are associated with narrowing of the road and possible debris flows. New standards for culvert sizing of cross drains and in-channel have been adopted. Protection provided by culvert replacement would not occur and small culverts increase the risk for blockage and diversion of water down the roads. The winter of 2002 had water diverted down the Phillips Creek road. The lack of maintenance and reconstruction increases the risk for detrimental damage to resources. Drainage problems on Forest Road 3734 would continue to carry water down the road depositing sediment into Little Phillips Creek. Not making necessary repairs increases risks to public safety and for detrimental impacts to water quality and fish habitat.

There would be little impacts by not doing the proposed road obliteration. Approximately 30 miles of road obliteration occurred over the past ten years. All of the proposed obliteration occurs in Management Area C4, Wildlife, which already has a low road density, 1.5 miles per square mile. The opportunity to remove a mile of road from RHCAs would be postponed along with restoring connectivity to additional fish habitat in Pedro Creek.

**Cumulative Effects** - No action would continue existing problems and perpetuate degrading road conditions that would impact water quality. Base material would move to the surface, increasing the suspension and transport of fine sediment off the road. Surface blading would become more difficult resulting in improper drainage and rutting of the road surface. Accident rates would increase as a result of rough surfaces. Public access to Finley Ridge would not occur. FR 3217040 would remain closed and ATV access to the ridge would continue along the old FR 3217 route in the Finley Creek RHCA.

### **Action Alternatives**

**Direct and Indirect Effects** - All action alternatives propose reconstruction (maintenance actions) along portions of 12 miles of road. No new construction is proposed. Surface hardening, blading, and brushing improve the safety of forest travelers. Public safety would be improved or maintained by replacing surface rock to provide a smooth surface to drive on and brushing would improve site distances. FR 3217040 would become open providing access to Finley Ridge and the surfaced improved to reduce rutting. Maintenance and road improvements help to protect resources along access routes.

Impacts to water quality would be reduced by maintenance and reconstruction projects. Hardening the road surface or resurfacing the road reduces sediment yields; Research by Burroughs and King 1989 indicated four inches of 1.5 minus gravel can reduce sediment production by 79 percent compared with native surface. Approximately 3.0 miles of native surfaced road (FR 3217040) would be graveled and opened for public access to Finley Ridge. Construction of drainage dips shortens the distance water moves along roads spreading drainage water over shorter distances and allowing overland flow to be filtered or absorbed into the soil (0.6 miles on FR 3834). These repairs, replacements, or surface changes are needed to avoid the high cost of major repairs from road failures while providing a safe road for public and commercial travel. The proposed 25 to 31 miles of road maintenance would also improve drainage. When hauling is completed, the roads would be self-draining with additional cross drains. Replacement of surface rock and improved drainage reduces maintenance costs and potential sediment production from these non-point source sites.

Roads scheduled for obliteration and decommissioning would be "hydrologically obliterated". This means the road surface would be subsoiled, channel crossings removed and reshaped, cross drain culverts removed, unstable fills removed or stabilized, inslope ditches altered or outsloped, and native plants used to stabilize the surface. Subsoiling would increase infiltration rates from 0 - 4 mm per hour to 15 - 30 mm per hour. This does not restore infiltration to rates found in lightly disturbed soils, but it is adequate for preventing overland flow and erosion under most storm and snowmelt conditions. Proper drainage would be implemented to ensure that newly obliterated roads would not exacerbate erosion. Revegetating with native seed would further reduce the risk. Cross drains, mulching, and seeding enhance the road's hydrologic function. Sediment yields are expected to be low in the short term, and at background levels in the long term. Road density would be reduced to 3.6 miles per square mile in the planning area.

Access and Travel management: Forest Road 3217040 is a self-defined road along a rocky ridge. The road would be shaped to drain and allow truck haul but would not change existing flow and moisture gradients along the open ridge system. Places that currently rut would be hardened and smoothed providing a stable road surface during moist conditions. The road is currently closed and would become open to allow access that was allowed to the lower portions of the ridge before Forest Road 3217 was obliterated. Finley Ridge provides good dispersed recreation opportunities. Day use would be the primary recreational use because there are no water sources available along the ridge. Traffic on the road may increase but could also stop the illegal use of ATVs accessing the ridge using the old route of FR 3217. Eliminating ATV use would allow the riparian corridor along Finley Creek to fill in along the old roadbed.

Opening FR 3217040 and changing FR 3217030 from restricted to closed changes the Access and Travel Management Plan and increases open road density. The open road density would increase from 1.1 miles per square mile to 1.2 miles per square mile. This is lower than the 1.6 miles per square mile open road density proposed in the 1993 Access and Travel Management Plan. The change would not measurably increase the anticipated result of an average Forest-wide road density of 2.0 miles per square mile when implementing roads management direction in the Forest Plan.

Changes in Road Density

Existing Rd.Density (mi/mi <sup>2</sup> ) (PC)	HUC Code	Post Trtmt. Rd.Density (mi/mi <sup>2</sup> ) (PC)
3.5	84B	3.2
3.2	84C	2.8
3.5	84D	3.3
4.9	84E	4.8
2.5	84I	2.5
3.6	Planning Area	3.4

The proposed change fits within the affects disclosed by the Access and Travel Management EA. The objectives for elk management, hunter experience, and providing recreation opportunity would be met. No additional access is provided in Forest Plan Management Area C4, an area having wildlife emphasis. The opening of FR 3217040 is compatible with the Forest Plan standards and guideline for Management Area E2 that allows emphases on wood fiber and forage production and moderate level of big game and other wildlife habitat. Management Area E2 standards for big game will be met (see wildlife effects section in this Chapter). The new access to Finley Ridge has fewer impacts than the original route of FR 3217, adjacent to Finley Creek. Water quality and fish habitat would not be impacted by the ridgetop location. There would be fewer miles of open road (3.0 miles) needed for access than the original access provided by FR 3217 of 4.7 miles.

Changes in Access and Travel Management for the Planning Area

	Total NF Road Miles	Open Road Miles	Closed Road Miles	Restricted Road Miles	Seasonal Road Miles	Total Road Density	Open Road Density
1993 Access and Travel Management Plan	152.9	47.4	55.6	32.0	17.9	4.5	1.4
Current Access	123.1	38.2	60.5	13.1	11.3	3.6	1.1
Proposed Access	115.6	41.2	51.2	11.9	11.3	3.4	1.2

**Cumulative Effects** – The 1993 Access and Travel management EA disclosed a District Open Road Density of 1.4 miles per square mile for implementing the Wildlife Habitat Alternative (the selected alternative). A partial review of past decisions since 1996 indicates that the District has closed or obliterated more than 15 miles of open road across the district. The opening of 3 miles of closed roads does not increase the District’s open road density above the 1.4 miles disclosed in the Access and Travel Management Plan EA. Within the Planning Area there would be less miles of open road than when the Access and Travel Management Plan was implemented. Cross-country use by ATVs would still be prohibited and they would be allowed on Restricted roads and there are currently fewer miles of roads available for ATV use than in the Access and Travel Management Plan however several of the roads have been changed to trails.

Current recreational use would not be impacted. The proposed obliteration of 7.5 miles of currently closed road would have no impacts to public access to the area of Middle Ridge. The roads are no longer needed for the logging systems or would require extensive construction to improve user-developed roads. The changes would not impact access for grazing. The herder would pass the sheep through the area and pick them up on open roads at the end of the season.

**Timber:** Goal: Provide for production of wood fiber consistent with various resource objectives, environmental constraints, and considering cost efficiency.

The Forest Plan established Management Areas to accomplish various resource management objectives. Current Forest Plan Management Areas are A3, Viewshed 1, 1,466 acres; A4, Viewshed 2, 1,231 acres; A5, Roaded Natural, 302 acres; A9 Special Interest Area, 9 acres; C1, Dedicated Old Growth, 722 acres; C3 Big Game Winter Range, 880 acres; C4, Wildlife Habitat, 8,320 acres; C5, Riparian and Wildlife, 1,204 acres; C8, Grass-Tree Mosaic, 4 acres; E2, Timber Management and Big Game, 7,835 acres; and F3 High Ridge Evaluation Area, 23 acres. All management areas except A9, C1, and C8, 735 acres, allow timber harvest. The selected silvicultural systems will be guided by the following criteria (see pages 4-67 and 4-68 of the Forest Plan):

- Selected method must produce a volume of marketable trees.
- Selected method must use available and acceptable logging methods.
- Selected method must be capable of meeting special management and multiple-use objectives.
- Selected method must permit control of vegetation to establish desired species composition, density, and rates of growth.
- Selected method must promote stand structure and species compositions that minimize risks from insects, disease, and wildfire.
- Selected method must assure that lands can be adequately restocked.
- Selected method must be practical and economical in terms of transportation, harvesting, preparation, and administration of timber sales.
- The planning area is in the North Associated Group; strong consideration should be given to maintenance of stands dominated by early successional species including ponderosa pine, Douglas-fir, western white pine, and western larch.

Summary of Findings

- Scheduled Harvest is permitted on 20,057 acres.
- Harvest has occurred on approximately 52 percent of the planning area. Regeneration harvest occurred on approximately 16 percent of the planning area making up 30 percent of the past harvest.
- Limits to sustaining wood production include: 1) 93 percent of the frequent fire regime has missed two or more fire cycles. 2) 44 percent of the mixed fire regime has missed two or more fire cycles. 3) Stands in the planning area have departed from historic vegetation conditions and have become overstocked with shade tolerant climax tree species. Early seral species are not regenerating. 4) Ladder fuels loading could lead to stand replacement wildfire events not characteristic of the frequent fire regime. 5) 32 percent of the Dry Forest and 51 percent of the Moist Forest have stand densities within or above the “self thinning” zone where trees compete with each other for moisture, sunlight, and nutrients.

## **Alternative A - No Action**

**Direct and Indirect Effects** - No Action does not support the goals and objectives for timber production as permitted by the Forest Plan. The build up of fuels and complexity of structure place most of the planning area at risk for a stand replacement wildfire. High severity wildfires can be expected on major portions of the landscape that historically were low severity. The fuel conditions and associated risk for stand replacement wildfire is expected to increase over the landscape. Without silvicultural treatments early seral species would not regenerate. Crown closure would inhibit regeneration of ponderosa pine and western larch. A wildfire could kill extensive areas of overstory, particularly large trees, such that a natural seed sources would be too distant to reestablish trees. The overstocked conditions on dry sites increases the risk of insect infestation. Root rot pockets have developed from past forest management actions and will persist because shade tolerant species are the most susceptible species. No actions would occur that increase forest health or resilience to disturbance events such as wildfire, insects, or root rots. The resilience provided by early seral species would continue to be lost from the landscape.

**Cumulative Effects** - Marketable volume of trees would be lost as the larger diameter trees die from insects and are not utilized. Multiple-use objectives would not be met; habitat would become more uniform in structure and composition, forage for sheep grazing and big game would be reduced, marketable volume would not be utilized, and the risk of a catastrophically altered landscape would continue to increase. The current stocking would produce more cubic feet of volume than thinned stands, however the trees would remain small. Overall there would be a loss in potential diversity of resource goals and objectives than the landscape could sustain.

## **All Action Alternatives**

**Direct and Indirect Effects** - All action alternatives would produce marketable volume that would meet utilization standards. They all reduce stocking levels, increase growth and vigor, and produce future merchantable trees. Alternative B would harvest 10,013 mbf; Alternative C, 10,220 mbf; and Alternative D and E, 13,100 mbf. The proposed logging systems, cut to length and helicopter, have been used on the district in the past and are easily available. These systems provide acceptable resource protection with much lower impacts than conventional ground skidding or the construction of mid-slope roads to make skyline yarding feasible.

Alternative D would use service contracts to accomplish fuel reduction. Mastication and burning treatments are proposed prior to designating trees for removal. Prescribed fire is proposed on 188 acres while mastication is proposed on 537 acres. Burning units prior to removal would lower the value of the timber; approximately 2,400 mbf would be affected. Though 13,100 mbf is proposed for removal, it could be up to 1,600 mfb less because the mechanical pretreatments might be enough to increase the distance to crowns and merchantable trees would not have to be removed.

The silvicultural objectives for harvest units would increase early seral tree species on the landscape: Approximately 754 acres or 68 percent of acres proposed for harvest with Alternative B has early seral objectives; approximately 1,414 acres or 89 percent with Alternative C; and approximately 1,586 acres or 80 percent with Alternative D and E. Each alternative also harvests in root rot pockets that would be shifted to resistant early seral tree species. Alternative B and E also uses prescribed fire to reduce stocking levels in stands that do not need a harvest pretreatment. The prescribed fire proposed in Alternative B and E would kill small, shade tolerant tree species over approximately 4,450 acres and 4,520 acres outside of harvest units.

Stocking level objectives would be the same for each alternative. In Forest Plan Management Area C4 stocking levels would be brought to the upper end of recommended levels. Management Area E2 would be brought to the low end of the recommended levels. Managing stands between the upper and lower levels reduces or eliminates suppression-induced mortality. By managing C4 to the upper stocking level, a degree of suppression would occur providing future unique habitat and bedding areas for big game. The development of suppressed tree character creates habitat diversity. The higher stocking levels would also increase the risk of insect activity but is expected to remain at endemic levels. The stands would function within historical mortality rates from insects while providing resilience through growth and vigor of individual trees.

The early seral tree species and lower stocking levels would reduce the risk of large-scale mortality from insects, disease and wildfire in both the frequent and mixed fire regimes. Prescriptions favor the increased dominance of ponderosa pine and western larch. These species and proposed stocking levels promote the landscape's resilience to disturbance. Tree vigor would increase providing protection from insects. Fire resistant species would dominate the landscape providing a large tree component that would survive fires.

The proposed prescriptions and harvest methods would meet Forest Plan Standards and Guidelines and multiple-use objectives. The open nature of the stands would tend to pull wintering elk off private lands earlier in the spring and keep

them on the National Forest later in the fall. The open stand structure would also restore habitat diversity, allowing the development of single stratum with large trees. A prescribed fire program benefits mushroom and forage production. No harvest or related activities are proposed within RHCAs. Water quality and fisheries habitat would be protected.

Stocking level control, either by noncommercial or commercial thinning, would allow trees to grow larger, quicker and move the stands to mid succession stage at an earlier age. The larger trees would produce higher quality fiber providing more uses than trees from overstocked stands. High stocking levels would produce more cubic feet of fiber but from small diameter trees. By managing stands within the recommended stocking levels, 72 to 85 percent of the potential gross cubic volume growth at full stocking levels would be captured. Cubic volume production would be lost but the social and monetary value associated with large trees would increase and the probability of severe mortality from insects greatly reduced. Managing for remnant large trees reflects a volume loss over the Forest Plan's even-aged management focus; however, the large trees provide resilience to wildfire because they have the greatest chance of surviving the event.

Past harvest in this area shows no problems with reforestation. Regeneration units have reforested within the required five years. The regeneration in stands managed for open or single stratum conditions would not be uniform as in a plantation. The uneven-age managed stands would have a mosaic of age classes. Single stratum stands would have lower stocking levels than even aged plantations. Grass and brush would contribute a larger share of site productivity than current conditions. Fire disturbance processes or harvest would keep the stands in open conditions, producing larger trees and less cubic volume than would be produced by even aged management.

The predicted bid rate gives a relative measure of how practical and economical each alternative is. None of the alternatives generate a positive bid rate. Current stumpage values are low and helicopter logging is expensive. Stumpage rates may change by the time the sale is advertised. Helicopter logging makes up approximately 49 percent of the volume in Alternative B, 52 percent of Alternative C, and 44 percent of Alternative D and E. Just logging the forwarder units yields a positive bid rate. The helicopter units provide an important link in accomplishing fuels reduction and restoring the landscape to historic conditions. The proposed harvest is needed to increase the height to crown and lower the severity of the wildfire. The helicopter units work together with the ridgetop units to control the size of wildfires. The difference between logging with and without helicopters is the cost to restore the frequent fire regime and provide fuel conditions favorable to the control of wildfires. The difference between bid rates with and without helicopter ranges from \$1,280,000 for Alternative B to \$1,600,000 with Alternative D and E. This equates to the cost of suppressing a 1,340-acre to 1,690-acre wildfire. Suppression efforts in the past have kept wildfires small, less than 8 acres. The historic trend is to have larger fires. Over the past five years the District has had 600 to 4,000 acre wildfires in similar vegetation types. Access to a wildfire is easier in this planning area, however, if a wildfire reached 100 acres, it would likely be larger than 2,000 acres by the time control is achieved. The negative bid rates means the sale is deficit however the advertised rate would cover costs needed to reforest. Money to cover improvement projects would have to come from other sources, unless there happens to be an overbid. The fuels reduction would still occur, but at a higher cost to the government, the sale of timber offsets the cost of fuels reduction. The restoration of the landscape to characteristics of the frequent fire regime provides other resource values related to habitat diversity, resilience of the forest to wildfire or outbreak of insects, while easing control of wildfires, increasing fire fighter safety, providing protection along the Wildland/urban interface, and increasing tree vigor.

#### Summary of Silvicultural Objectives and Bid Rates

Alt.	Volume mbf	Total Harvest Acres	Stocking Control Acres	Acres for Seral Species	Treatment for Root Rot Acres	Acres Non- commercial thinning	Regen for Decadence Acres	Acres Planted	Predicted Bid Rate, \$	Bid Rate without Helicopter
B	10,010	1,108	129	754	131	580	94	376	-732,750	547,630
C	10,220	1,586	0	1,414	172	720	0	304	-911,680	612,325
D and E	13,100	1,980	129	1,586	172	720	94	410	-611,930	994,135

**Cumulative Effects** - All action alternatives provide for varying degrees of multiple uses while meeting the goals of the Purpose and Need. Specific effects to resources are discussed in other sections of this chapter. Resource protection is provided through various management requirements, the logging systems, and fuel ignition standards. Forwarders and helicopters have low impacts to soil and water quality and the no harvest or ignitions within RHCAs provides additional protection and maintains riparian functions. RHCAs would be allowed to continue developing under the current conditions, those with high mortality from insects would be at risk for catastrophic wildfire, but effects would be buffered by the fuel reductions occurring adjacent to them. Management requirements for Fish and Water Quality, Wildlife, Control of Logging, Noxious Weeds, and Prescribed Fire should be effective in reducing impacts to these resources.

Multiple-use benefits include:

- Increase of habitat diversity by restoring frequent fire characteristics on the landscape. This benefits bird species dependent on open stand conditions and attracts big game onto the forest earlier in the spring to take advantage of improved browsing conditions. Alternative B creates more habitat than Alternative D and C. See wildlife and biodiversity.
- The project would improve fish habitat by replacing or removing culverts that are a barrier to fish passage. Large wood placement in Phillips and East Phillips Creek would create pools and increase habitat complexity.
- Improve grazing without reliance of transitory range developed under even-aged management strategies.
- Utilization of timber. Harvest volume by Alternative B, 10,013 mbf; Alt C, 10,220 mbf; Alt D and E, 13,100 mbf.
- Fuels would be reduced providing a mosaic of fire intensities based on fire return intervals. This should increase resilience and lower resource impacts should a wildfire occur in the planning area. Acres of Total Fuel Reduction: Alternative B, 5,560; Alternative C, 2,277 acres; Alternative D, 2,672 acres; Alternative E, 6,641 acres.
- Thinning the stands would improve stand vigor, growth, and resilience to insect attack and wildfire, also protecting multiple resource values. Total acres treated: Alternative B, 883 acres; Alternative C, 2,105 acres; Alternative D and E, 2,406 acres.
- Management for the reduction of Root Rot. Total acres treated: Alternative B, 131 acres; Alternative C, D, and E, 172 acres.
- Increased opportunity for mushroom gathering. Alternative B and E burns more acres and provides greater opportunity.
- Increases fire fighter safety by reducing surface and ladder fuels and increasing the ease to control a wildfire.
- The modified fuel and stand structure along the Forest boundary would help reduce the intensity of a wildfire moving along the boundary. Alternative C, D, and E.
- Improved road drainage and safety.

**Visual Quality:** Visual quality objectives come from Forest Plan Management Area A3 and A4. Forest stands would be occasionally logged in order to maintain long-term health and vigor and to encourage a park-like character with big trees in the immediate foreground. The viewsheds would be managed for an overall mix of size classes of trees. Created opening standards are no more than 8 percent in retention, 20 percent in partial retention for A3; and 10 percent of the foreground and 20 percent of the middle ground in A4. The size of created opens would not exceed two acres for uneven-aged management and range from 3 to 10 acres for even-aged management in A3 and 5 to 10 acres for even-aged management in A4.

Summary of Findings;

- A3: Currently created openings make up 3.5 percent of the Management Area. A 15-acre opening was cut in 1989.
- A4: Currently 3 percent of the Management Area is in created openings.

### **Alternative A - No Action**

Visual quality within Management Areas A3 and A4 would continue with the current trends. Tree in the created openings from 1989 would continue to grow. They are currently 15 feet high and have filled in with lodgepole pine. In another ten years they would no longer be considered openings however, they would have a different color and texture because the surrounding stands are mainly subalpine fir and grand fir. No changes in visual quality along Highway 204 or Forest Road 31 are expected. Blowdown would likely continue during the winters.

### **Action Alternatives**

Alternative B, D and E have potential impacts to visual quality. The upper boundary of Fuel Treatment Areas A and C includes portions of A4 along Forest Road 31. Prescribed fire is proposed in ponderosa pine stands adjacent to the grasslands. Burned grasses and dead trees would be seen from the road. The thinning by fire would reduce encroachment and favor the development of large trees. The burned areas would green up within the first year and would be subordinate after the second year.

Portions of Units 4, 5, 6, 7, 8, 9 and 16 fall within A3. The units are located in the background viewed from Highway 204. Units 4, 5, and 6 are improvement harvests and Unit 16 is a commercial thin. These units would not create an opening. The RHCA along the Highway would not have any activity. The stands would take on a thinned appearance, releasing western larch. The harvest meets visual quality objectives for A3 and would create large trees.

Unit 7, 8, and 9 are proposed for regeneration as a shelterwood harvest. These grand fir stands have stagnated and have many attacks from spruce budworm. Unit 7 has approximately 10 acres; Unit 9, 10 acres; and Unit 8, 3 acres in Management Area A3. The alignment of the Highway does not lend to views into the units and the RHCA along highway would also break up the viewing. The harvest would remove many of the dead and stressed trees from several spruce budworm epidemics from the 1980s and 90s. Large trees would remain within the shelterwood units. Helicopter is the proposed logging system and would not create ground disturbance that would be viewed from the highway. The proposed harvest increases the percent created openings to 5 percent. The proposed harvest meets the standards and guidelines for created opens for both size and percent of Management Area A3. Alternatives B, D, and E would meet Forest Plan Standards for Visual quality.

**Pest Management:** Protect forest and range resources from unacceptable losses due to destructive forest pests (insects and noxious weeds).

Insects have been discussed under timber management. Noxious Weeds will be discussed here.

Summary of findings:

Natural conditions that prevent the spread of noxious weeds include: herbaceous cover, duff and forest floor litter, and canopy closure.

Noxious weeds occupy approximately 157 net acres spread over 1,630 acres, almost all the sites have knapweed and are located along the road system.

### **Alternative A - No Action**

Treatment of noxious would continue under the Forests Noxious Weed EA. The District has an agreement with Union County that allows them to treat weeds along open forest roads. Spread of weeds would be controlled and the sites revegetated naturally to prevent the continued occurrence of the weeds.

### **Action Alternatives**

The Noxious Weed Management Plan found in Chapter II includes prevention measures for the control of noxious weeds. The road system and rock sources would be surveyed for noxious weed sites. Seed heads would be removed by mechanical methods so that road maintenance activities or development and placement of gravel would have reduced risk for spreading noxious weeds. Treatments are confined to the haul and access roads. The low levels of exposure of soil decrease the risk for spreading of noxious weeds into the forest. There would be no loss to forest productivity by controlling the spread of noxious weeds. Cumulatively, grazing and public vehicle access, including ATVs, would continue to be vectors for the spread of noxious weeds. The access and travel management plan allows vehicle use within 300 feet of open roads. There would be risk of spreading noxious weeds through recreational use when ground disturbance occurs, particularly on the dry grassland sites. The spread of weeds into the harvest units is not likely because ground cover and tree canopy would reduce success. Past monitoring of harvest units on the district indicates that noxious of weeds of high concern have not become established in units. Noxious weed spread is confined to the road system. Windblown seeds, like thistle, get established after burning exposes soil but it is shaded out when the forest canopy closes.

### **Forest Plan Amendments**

Modification of Management Area C1 dedicated old growth: Management Area C1 would be shifted 150 feet from Forest Road 3200, the Dry Creek Road and replaced with Management Area E2 found in the upper reaches of Dry Creek. There would be no net loss of dedicated old growth. The replacement stand is currently late old structure. Most of the current C1 being replaced is grassland and forest on west slopes. The replacement protects the late old structure portion of an undeveloped area by changing the Forest Plan designation from E2 to C1. The portion of C1 being replaced is to the east of the Dry Creek road and is too narrow to provide interior habitat. The change improves the integrity of the current C1 because a road would no longer pass through the edge and the RHCA of Dry Creek would provide a buffer along the road to the remaining interior habitat. The replacement C1 in upper Dry Creek is isolated and provides suitable old forest habitat with much lower disturbance than if a road passed through it. Public safety would increase by being able to remove hazard trees along the Dry Creek road; a major access road through the middle of the District. Approximately 127 acres of C1 would be replaced with 127 acres of E2.

Changing Management Area C3 to C4: Elk very seldom use the winter range. Snow depths force them to lower elevations in the Grande Ronde valley. The District wildlife biologist has monitored use and found elk to use the area in late fall and early spring. Winter snow depths exceeded 18 inches. The C3 is 880 acres and makes questionable the use of the HEI model when it is intended to be used for areas over 2,000 acres. Elk habitat values are hard to maintain on such a small area.

Habitat enhancement is not reflected in the HEI model. A small change in forage, cover, or spacing would have a major effect on HEI that would limit habitat enhancement. The proposed burning and harvest would improve forage quality and quantity. The opening of the stands would result in earlier snowmelt but not enough to change peak flows. The enhanced forage would tend to attract wintering elk to the area earlier in the spring and hold them longer in the fall. This would tend to reduce the depredation problems elk often pose on lower level private lands (pastures, crops field, etc). The area is important late fall and early spring habitat that is not used in winter. The satisfactory cover standard would change from 10 percent to 20 percent while the HEI standard would change from 70 percent to 60 percent; allowing better attainment of management objectives for big game. The change in standards would allow more forage enhancements to occur under C4 than C3 with an opportunity to pull animals off private lands sooner in the spring and keeping them later in the fall. The change would have little affect on other resource values. Competition with grazing would be light because elk would pass through the area before sheep are turned out and the forage standards for the range allotment would provide adequate forage in the fall greenup.

The proposed changes are non-significant changes to the Forest Plan. This amendment occurs close to the end of the Forest Plan period. Handbook direction indicates that the later in the time period, the less significant the change is likely to be. The Forest Plan is in the process of being revised. These changes would be evaluated during the revision process.

The amendment involves small acres of change both in the context of the Forest and of the planning area of 21,000 acres. The proposed changes to C1 do not affect the total acres of C1 in the planning area or the Dry Creek watershed at a smaller scale. Connectivity between the original C1 area will be maintained by areas of C5 – Riparian Habitat. Changing the 880 acres of C3 to C4 does not change the use of the area by big game. The amount of area does not establish good core winter range and is not connected to other winter range on the Forest or identified by the State of Oregon.

The proposed changes do not alter goals, objectives, or outputs of the Forest Plan. Equal acres of C1 and E2 are exchanged. The change of C3 to C4 does not change the emphasis of big game along Middle Ridge. The management of C4 is controlled by road closures that would not change. The change would allow better utilization of the area for forage production in the spring and later in the fall to retain animals on the National Forest longer. Even though both C3 and C4 allow schedule harvest the change of 880 acres to C4 would not cause a measurable effect to the timber harvest predictions stated in the plan.

The changes in the Forest Plan will apply to this project and future management decisions because of adjustments to Forest Plan Management Areas. Old Forest in upper Dry Creek currently E2 would be protected from future forest management actions by becoming C1. Likewise hazard tree removal would be able to occur along a major Forest access road. The lands above Forest Road 32 would be able to be managed for open forest, in character with the landscape conditions currently containing grasslands and forest. The desired condition for closed canopy multistoried old growth forest would be easier to maintain. The proposed change of C3 to C4 would not change the management emphasis for big game. The mosaic of large grasslands and managed forest would maintained and the area would remain closed to vehicle traffic during winters. Road closures would continue to provide security for big game protecting important calving and fawning areas while providing a quality hunting experience. Dispersed recreation would continue to be non-motorized.

## **Compliance with other Laws Regulations and Policies**

This section describes how the action alternatives comply with applicable State, and Federal laws, regulations, and policies.

### **National Historic Preservation Act**

A review of the Umatilla National Forest heritage files indicates that the majority of the Pedro/Colt analysis area has been surveyed. As a result of surveys, a total of 64 sites were located and recorded. Forty of the sites are isolated finds and are not considered eligible for listing in the National Register of Historic Places (NRHP). The remaining 24 sites are considered potentially eligible for inclusion in the NRHP and would be protected from project activities associated with the Pedro/Colt Timber Sale and Fire Restoration Project. Avoidance measures would be implemented where necessary, per Stip.III.B.2(a-d) of the Programmatic Agreement between the Advisory Council on Historic Preservation (ACHP), the Oregon State Historic Preservation Officer (SHPO), and the United States Forest Service (USFS) Region 6, signed March 1997. Because heritage resources would not be affected by proposed project activities under any of the proposed alternatives, there would be *no effect* to any cultural property listed in, or eligible to the NRHP. Documentation to this affect will be forwarded to the Oregon SHPO, in compliance with the National Preservation Act of 1966 (as amended), 36 CFR 800.4 and the Programmatic Agreement.

### **Disclosure Statement for Compliance with the Migratory Bird Treaty Act (MBTA) and Executive Order 13186**

This project may result in an unintentional take of individuals. However the project complies with the USFWS Directors

order #131 related to applicability of the MBTA to federal agencies and requirements for permits for “take”. In addition, this project is compliant with the E.O. 13186 because the analysis meets our obligation as defined under the January 16, 2001 MOU between the USDA Forest Service (USFS) and USDI Fish and Wildlife Service (USFWS) designed to complement E.O. 13186. The actions expected under this MOU will be a precursor to help form more specific protocols that will be developed in a subsequent interagency MOU. The purpose of this MOU is to strengthen migratory bird conservation through enhanced collaboration between the USFS and the USFWS and with state tribal, and local governments. As required under this MOU, this project 1) identifies management practices that may affect high priority species as defined in the MOU and Partners in Flight, and 2) develops conservation measures to avoid or minimize impact to migratory birds.

#### Conservation measures:

- Prescribed fire would burn in a mosaic of fuel concentrations. Typically no more than 60 percent of a prescribed fire area is blackened.
- Natural Fuel burning would occur before the second week in May when species move into the area and begin nesting behavior. Treatment of logging slash after this date would be confined to 500 acres. Burning in any year would ignite no more than 2,500 acres.
- Ignitions would not occur within riparian habitat. Fire would be allowed to back. Spring prescribed fire would be low intensity with little creep because of high humidity within the RHCAs.
- Prescribed fire near RHCAs would occur when humidity is rising within RHCAs.
- The mixed severity prescribed fire would create snags and cause stress on trees that would die over a five-year period creating insect habitat.
- Restoring open forest characteristics of the frequent fire regime creates a diversity of habitat utilized by eight migratory bird species of concern.

### **Endangered Species Act and Regional Forester's Sensitive Species**

The Endangered Species Act requires protection of all species listed as "threatened" or "endangered" by federal regulating agencies (Fish and Wildlife Service and National Marine Fisheries Service). The Forest Service furthermore maintains through the Federal Register a list of sensitive species which are proposed for classification and official listing under the Endangered Species Act, species that appear on an official State list, or that are recognized by the Regional Forester as needing special management to prevent their being placed on Federal or State lists. This section identifies the action taken to comply with the Endangered Species Act. Details regarding the actual species found within the Pedro Colt Planning Area are found in Chapter III. The potential effects of proposed activities on those species and their habitat are contained in this section. The following determinations are summarized from the Biological Evaluations for Terrestrial, Aquatic, and Botanical Species.

### **Terrestrial Wildlife Species**

There is no habitat for the following sensitive species within the planning area: American peregrine falcon, upland sandpiper, gray flycatcher, or California bighorn sheep. The proposed projects have been determined to have no impact on these species.

**Gray wolf** – Threatened. The proposed alternatives would have **no effect** on gray wolf. Harvest, thinning, or burning activities would not directly affect the gray wolf because the species is not known to occur in the project area. Improvements in forage made by prescribed burning would benefit wolf prey species. Spatially and temporally the level of human activity and disturbance would be near the same levels observed in the planning area over the last 20 years.

#### Cumulative Effects

Cumulatively the proposed activities in combination with other ongoing projects and future foreseeable projects will not adversely affect wolves because of the limited duration and intensity of activities, and the small percentage of area impacted. Past activities and events have affected prey species abundance and road densities. The Mt. Emily elk population is currently in a downward trend. Future low-intensity fires would periodically enhance forage quality and quantity for elk and deer, key prey species for wolves. Livestock grazing competes with big game for forage, potentially affecting prey populations. The presence of domestic sheep could pose management conflicts if wolves establish a territory in this area.

**Canada lynx** - Threatened. The proposed activities would have **no effect** to Canada lynx. Potential habitat in the Langdon Lynx Analysis unit will not be affected by any proposed activities. Lynx are not known to occur in the area. There are no forest or fuels management activities proposed within lynx habitat. There would be no snow compaction since winter harvest and hauling is not proposed.

Proposed activities would occur in the daytime, so even in the remote chance that a lynx happened to pass through the area, there would be a temporal separation since lynx are least active during daylight hours.

#### Cumulative Effects

The proposed activities in combination with past, ongoing, and future foreseeable projects would not cause cumulative effects to Canada lynx. Any future management activities within lynx habitat would follow the guidelines in the Lynx Conservation Assessment and Strategy.

**California wolverine** - Sensitive. The proposed activities would have **no impacts** to California wolverine. No potential denning habitat is known in the analysis area. Although there have been unverified sightings adjacent to the analysis area, there are no indications that wolverine do more than pass through the area. If wolverine happened to be in or pass through the general area while project work was occurring, a brief disturbance could result in animals moving elsewhere. Project operations will not adversely affect habitat conditions or prey resources, nor cause long-term animal movements. The quantity and quality of habitat will not change as a result of the proposed alternatives. Canopy cover and forest structure would be maintained, providing suitable habitat for travel and foraging.

#### Cumulative Effects

Cumulatively the proposed activities in combination with other ongoing projects and future foreseeable projects will not adversely affect wolverine because of the limited duration and intensity of activities, and the small percentage of area impacted.

**Northern Bald eagle** - Threatened. The proposed activities would have **no effect** on the northern bald eagle or its habitat. Bald eagles are not known to use the planning area for winter roosting or nesting. Proposed thinning and salvage would not alter potential nesting or roosting habitat. Proposed activities would not alter riparian habitat along major streams in the analysis area. Prey species should continue to be available in the Grande Ronde River system and the proposed activities would not affect potential habitat for those species. Bald eagles wintering along the nearby Grande Ronde River would not be affected since winter log hauling is not planned.

#### Cumulative Effects

Over the last 15 years, bald eagle populations have been increasing, and the species is proposed for delisting. Past and present activities in the planning area have not impacted potential northern bald eagle populations or their habitat. Wintering eagle populations have expanded throughout the river system and should remain stable or increase over the next few years. No proposed and future foreseeable activities in the planning area would impact potential northern bald eagle populations or their habitat because the activities are too far from the river to cause effects.

#### Other Wildlife Species of Interest - Northern goshawk.

Potential habitat for goshawk occurs in small patches throughout the analysis area. Nesting has not been observed in the project area or in affected units. Proposed activities would maintain or improve potential goshawk habitat in the analysis area. Treatments would restore conditions favorable to goshawk and reduce the probability of stand replacing fires.

### **Plant species**

The planning area was surveyed as parts of seven plant surveys from 1990 to 1998. The surveys did not find any sensitive plants.

***Carex crawfordii* and *Carex interior*** (sensitive): These species were added to the sensitive species list in May, 1999. Habitat is located within RHCAs, in wet areas beside streams or perennial wet areas. Analysis of survey records, species identification lists, and area maps indicate that potential habitat for these two sedge species does not occur within the project area. Site visits to the area confirmed that it is primarily a dry landscape with few small springs and no habitat for the sensitive sedges. PACFISH RHCA measures would protect wetlands habitat. Road obliteration, placement of large wood in Phillips Creek, culvert replacement, and a backing prescribed fire are the only activities proposed within RHCAs. Most of these actions occur in dry portions of stream channels that do not provide habitat for the species. A backing fire entering the RHCA could burn over an area in the fall. The intensity would not be very high with the only damage occurring to above ground vegetation. Below ground rhizomes would not be damaged allowing the plants to sprout. No harvest is proposed within RHCAs and perennial water is distant to any harvest units. No ground disturbance should occur near or within this species habitat. There would be no impact to *Carex crawfordii* or *Carex interior* or other listed species.

***Silene spaldingii*** is listed as Threatened by the USDI Fish and Wildlife Service. No suitable habitat was identified in the Planning Area during the course of plant surveys. The proposed projects have been determined to have no effect on *Silene spaldingii*.

## Aquatic Species

**Middle Columbia River steelhead trout** *Oncorhynchus mykiss*. This fish species is listed as "Threatened" by the National Marine Fisheries Service. Review of existing data indicates that habitat for this species is not present in the project area, but is present downslope and downstream in the Umatilla and Meacham Creek Watersheds. Field surveys have documented the presence of this species in numerous streams in those watersheds. Implementation of the no action alternative would have "no effect" on this species. Implementation of either of the action alternatives would also have "no effect" on this species.

**Snake River steelhead trout** *Oncorhynchus mykiss*. This fish is listed as "Threatened" by the National Marine Fisheries Service. Review of existing data indicates that habitat for this species may be present in streams within the project area. Field surveys have documented the presence of steelhead trout in Phillips Creek, Little Phillips Creek, and East Phillips Creek, Dry Creek, and Finley Creek. Implementation of the no action alternative would have "no effect" on this species. Implementation of the Pedro project "may affect and is likely to adversely affect" this species. This "likely to adversely affect" determination is based primarily on the short-term results of several in-stream projects that would have long-term beneficial effects and immeasurable sediment reaching the stream from prescribed fire and spring timber haul. The major sediment pulse would flush from the streams before steelhead arrive. Haul would be a chronic source of sediment during wet times when water pools on the roads. Sediment would be quickly deluted by the stream and would likely not impact the behavior of migrating fish.

**Columbia River bull trout** *Salvelinus confluentus*. This fish species is listed as "Threatened" by the US Fish and Wildlife Service. Review of existing data indicates that habitat for this species is not present in project area. Field surveys have documented the presence of this species in the several streams in the Umatilla River Drainage and in the Grande Ronde River and several of its tributaries downstream of the project area. Implementation of the no action alternative would have no effect on this species. Implementation of any of the action alternatives would have "no effect" on this species because they are not present in the Willow or Phillips Creek watersheds and their downstream habitat is distant and mainly migratory. The minimal activity (hazard tree removal along Forest Road 31) in the small part of the project area in the Umatilla drainage will have no effect on bull trout in that basin.

**Redband trout** *Oncorhynchus mykiss*. This fish species is listed as "Sensitive" by the Regional Forester. Review of existing data indicates that habitat for this species may be present in streams within the project area. Field surveys have documented the presence of redband trout in all fish-bearing streams within the project area. Implementation of the no action alternative would have no impact on this species. Implementation of any of the action alternatives may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species. This determination is based primarily on the short-term results of several in-stream projects that would have long-term beneficial effects.

**Westslope cutthroat trout** *Oncorhynchus clarki lewisi*. This fish species is listed as "Sensitive" by the Regional Forester. Review of existing data indicates that habitat for this species is not present in either the Umatilla River subbasin, the Phillips Creek or Willow/Dry Creek watersheds, or in the Grande Ronde River downstream of the project area. Implementation of any alternative, action or no action, would have "no impact" on this species.

**Mid-Columbia spring chinook salmon** *Oncorhynchus tshawytscha*. This fish species is listed as "Sensitive" by the Regional Forester. Review of existing data indicates the listed stock of this species is no longer present in the Umatilla River subbasin. And there is no habitat for this species in the Phillips or Willow/Dry Creek subwatersheds, or in the Grande Ronde River downstream of the project area. Implementation of any alternative, action or no action, would have "no impact" on this species.

**Snake River fall chinook salmon** *Oncorhynchus tshawytscha*. This fish species is listed as "Threatened" by the National Marine Fisheries Service. Review of existing data indicates that habitat for this species may be present in the lower Grande Ronde River many miles downstream from the project area. Field surveys have documented the presence of fall chinook salmon in the Grande Ronde River. Implementation of the Pedro-Colt project, would have "no effect" on this species.

**Snake River spring/summer chinook salmon** *Oncorhynchus tshawytscha*. This fish species is listed as "Threatened" by the National Marine Fisheries Service. Review of existing data indicates that habitat for this species may be present in the Grande Ronde River many miles downstream from the project area. Field surveys have documented the presence of spring/summer chinook salmon in the Grande Ronde River. Implementation of the Pedro-Colt project would have "no effect" on this species.

**Margined sculpin** *Cottus marginatus*. This fish species is listed as "Sensitive" by the Regional Forester. Review of existing data indicates that habitat for this species is not present in the project area but may be present in streams downstream and downslope from project area within the Umatilla basin. This species is not present in the Grande Ronde Basin. Implementation of the no action alternative or any of the action alternatives would have "no effect" on this species.

**Pacific Lamprey** *Lampetra tridentata*. This fish species is listed as "Sensitive" by the Regional Forester. The Pacific lamprey is anadromous and may spawn in gravels in streams downslope and downstream of the project area in the Umatilla River Basin, and larval stages may occupy some downstream reaches in that basin as well. Pacific Lamprey are not known to be present in or near to the project site and have probably been extirpated from the Grande Ronde Basin. Implementation of the Pedro-Colt project would have "no impact" on this species.

**Northern leopard frog** *Rana pipiens*. This amphibian species is listed as "Sensitive" by the Regional Forester. Review of existing data indicates that habitat for this species may be present in lower elevation ponds on private lands several miles downstream of the project area. Implementation of the no action alternative or any of the action alternatives would have "no impact" on this species.

**Columbia Spotted frog** *Rana luteiventris*. This amphibian species is listed as "Sensitive" by the Regional Forester. Review of existing data indicates that habitat for this species may be present in ponds and streams within the project area. Field surveys have documented the presence of this species at several locations in the Northern Blue Mountains. Implementation of the no action alternative would have no effect on this species. Implementation of either of the action alternatives may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.

**Painted turtle** *Chrysemys picta*. This reptile species is listed as "Sensitive" by the Regional Forester. Review of existing data indicates that habitat for this species is not present in the project area but may be present in lower elevation ponds on private lands several miles downstream. Implementation of the no action alternative or any of the action alternatives would have "no effect" on this species.

**Chinook salmon essential fish habitat.** Essential fish habitat for chinook salmon was designated by the National Marine Fisheries Service in September of 2000. Essential fish habitat exists downstream of the boundary of the planning area and for coho salmon, may exist within the lower reaches of Phillips Creek in the planning area. Implementation of the no action alternative would have no effect on EFH. Implementation of either of the action alternatives would not adversely affect essential fish habitat.

## **Roadless Areas and Undeveloped Areas**

No actions are proposed in inventory roadless areas. There are four undeveloped areas within the planning area; two are larger than 1,000 acres. Only one is proposed to have harvest in preparation for fuels reduction and restoration of the frequent fire regime. The East Phillips Creek Undeveloped Area is approximately 2,600 acres. All action alternatives propose harvest in 13 units totaling 225 acres, 188 acres have transitioned into condition class 2 and 37 to condition class 3. Alternatives C and D would burn natural fuels over an additional 258 acres. Fuel Treatment Areas C and D in Alternative B and E propose treatment of approximately 2,950 acres of natural fuels. Half of the acres fall within the undeveloped area. The prescribed fire would be located on western aspects of ponderosa pine and grasslands, approximately 70 percent of the stands fall within condition class 2. The 225 acres of harvest are necessary to reduce ladder fuels so prescribed fire could be reintroduced on the landscape. No roads would be built into the undeveloped areas. The proposed obliteration of Forest Roads 3734040 and 3738500 followed by becoming a trail could join the East Phillips and Highway 204 undeveloped areas into one area totaling 3,710 acres. The proposed fuel treatments become important for the control of wildfire spotting along the Highway 204 corridor.

Part of the acres discussed for prescribed fire and harvest is Unit 97, which is common to Alternatives C and D. The unit treats natural fuels. Inside the boundary are harvest Units 54, 56, 59, 60, and 62 that would remove ladder fuels on approximately 97 acres. The units are located near the southern Forest Boundary where Phillips Creek leaves the Forest. The treatments are on the east side of Phillips Creek and would connect with treatments coming from the west along the Forest Boundary. This would help control a wildfire moving up Phillips Creek from private lands.

All harvest units would be logged utilizing a helicopter. Units 14 and 15 could be flown to a landing on Middle Ridge or downhill with other units to Forest Road 3738. The southern portion of units could be flown to a ridge top landing across Phillips Creek.

Changes in natural integrity, apparent naturalness, solitude, remoteness, inherent characteristics, and manageability will be used to describe any potential effects the proposed activities may have on the East Phillips Creek undeveloped area. There will be no difference between alternatives for the other undeveloped areas because no vegetation actions are proposed.

Natural integrity is the extent to which long-term ecological processes are intact and operating. Apparent naturalness is an indicator of whether an area appears natural to most people who are using the area. Solitude is defined as isolation from sights, sounds, and presence of others and the development of man. Remoteness is the perceived condition of being secluded. Inherent Characteristics for the East Phillips Area include habitat for ESA listed Snake River steelhead, diversity of plant and animal habitat, primitive non-motorized dispersed recreation, and an isolated stream system with restricted access from the ridgetop road system. Manageability relates to the ability of the Forest Service to manage an area to meet the size criteria for wilderness consideration (at least 5,000 acres) and maintain the items listed above.

### **Alternative A – No Action**

Direct and Indirect Effects: No resource management actions would occur at this time. The natural integrity would remain compromised because much of the forested area has transitioned into condition class 2 and 3. The resilience of the ponderosa pine forest to wildfire events would be lost because of increased stocking levels of fire intolerant species and surface and ladder fuels. The apparent naturalness, feeling of solitude and remoteness, and impacts to the inherent characteristics would remain unchanged and not impacted. Manageability would remain unchanged. The area is less than 5,000 acres however interior access is limited and isolates nearly the whole of the East Phillips Creek drainage. The ridgetop road system is closed to access to protect big game values. The only open road access is from FR 3738 at the confluence of East Phillips Creek with Phillips Creek.

Cumulative Effects: The sheep and goat allotment has not been used the past two years. If use continues the impacts from browsing would not likely be noticed because of the short duration of passage and sheep graze mainly in transitory range outside the undeveloped area. Current use of the area would not change. Since no road decommissioning would occur, the ridge top four-wheel drive road between the East Phillips and Highway 204 undeveloped areas would remain. This will do little to change the attributes because the system is closed, though the evidence of a road would remain.

### **Alternatives B, C, D and E – The Action Alternatives**

Direct and Indirect Effects: Natural integrity would be improved. The removal of ladder fuels, fire intolerant tree species, and surface fuels by landscape prescribed fire and limited timber harvest would restore landscape resilience to wildfires and insects. The risk and impacts from uncharacteristic wildfire would be reduced. The overstocked conditions would be reduced and the open nature of a frequent fire maintained ponderosa pine forest returned to the landscape. From the distance, the actions would look natural. To a person walking through the area evidence of the action would be seen as stumps and charred surface and base of trees. The apparent naturalness would be impacted to a user of the site under close inspection. The open character of fire maintained ponderosa pine would be viewed but charred stumps would remain for many years. The burned vegetation and grasses would be evident the first year after the prescribed fire but new growth would mask the visual impacts. Saplings and pole size trees killed by the prescribed fire would remain visible for many years until winter snows compact them to the ground and follow up prescribed fires remove the fine fuels.

In the short-term the feeling of solitude and remoteness during the harvest and prescribed fire would be lost for the month it takes to log the area with a helicopter or the several weeks of burning. In the-long term it would not be much different than no action. The state highway to the northeast would remain and noises buffered by middle ridge. Vehicle access to the area would be unchanged with the only roaded access remaining East Phillips Creek or longer walks along the closed ridgetop road system. The distant views of the Grande Ronde Valley and Wallowa Mountains provided from the southwestern aspect would not be impacted. The feeling of solitude along East Phillips Creek, isolated from outside sounds would remain. The opportunity for primitive non-motorized recreation would remain unchanged. Where harvest occurs, the stands would look open. The areas proposed for harvest and burning are middle to distant background viewed from Forest Road 3738, the Phillips Creek Road. Stumps would not be viewed from the road. The area is not a high use for recreation hiking or cross-country travel. The ground is steep, over 60 percent, discouraging users. East Phillips Creek would continue to provide some recreation opportunity for solitude due to the narrow canyon and limited access. The midslope areas above Phillips Creek provide distant views to the Grande Ronde Valley and encompass the whole of Phillips and Willow Creek watersheds. The isolated stumps and charred wood on the forest floor could be a distraction for someone walking through the treated areas. The restored landscape would better fit the character of the frequent fire regime and the burned areas would green after several seasons of grass and brush growth. Open ponderosa pine would be the norm on the dry south and western aspects of the undeveloped area. The action would increase habitat diversity by restoring open forest conditions currently lost on the landscape.

East Phillips and Pedro Creek are the primary sources of perennial water to the Phillips Creek system and provide summer rearing habitat for Snake River steelhead trout. The majority of the harvest and burning actions would take place on southern and western aspects above Phillips Creek. The only proposed harvest within the East Phillips subwatershed would be Units 14 and 15, totaling 37 acres, other harvest units occur on the uplands of Phillips Creek. Fuel Treatment Area D proposes 654 acres of natural fuels reduction within the East Phillips subwatershed divided almost evenly between Pedro and East Phillips Creeks. Impacts to fisheries and water quality have already been discussed and the action alternatives are not expected to impact rearing in East Phillips Creek.

The manageability of the area would remain unchanged like that discussed under no action.

Proposed Harvest Units in the East Phillips Creek Undeveloped Area

Unit Number	Prescription	Acres	Silvicultural Objective	Fire Regime	Condition Class
14	HSST	13	PP/DF	Frequent	3
15	HSST	24	PP/DF	Frequent	3
19	HSST	24	ROOT ROT	Frequent	2
25	HSST	29	ROOT ROT	Frequent	2
39	HSST	13	ROOT ROT	Frequent	2
40	HSST	16	ROOT ROT	Frequent	2
46	HSST	5	ROOT ROT	Frequent	2
48	HSST	4	ROOT ROT	Frequent	2
54	HITH	14	PP	Frequent	2
56	HIIM	16	PP	Frequent	2
59	HIIM	14	PP	Frequent	2
60	HIIM	36	PP	Frequent	2
62	HIIM	17	PP	Frequent	2

**Cumulative Effects:** Impacts from grazing would be the same as described for the no action alternative. Future road obliteration would allow the ridgetop four-wheel drive road to heal over and not be as visible allowing the two adjacent undeveloped areas to appear to be one. The combined 3,700 acres is still under the 5,000 acres for wilderness consideration. Manageability of area would not be impacted. Harvesting and burning within the East Phillips Creek Undeveloped Areas area would have little to no effect on the roadless character mainly from the encountering stumps. All harvest focuses on restoring stand character of the frequent fire regime treating condition class 2 or 3 stands. The open stands would increase tree vigor and restoring seral species would provide resilience to wildfires. No road construction would be required. Portions of the landscape would look modified because of the removal of ladder fuels, but overall the landscape would have the appearance of the frequent fire regime. It is a different forest from what exists today, but more in character with the natural disturbance processes. The low levels of disturbance from helicopter logging, burning, grazing, and road decommissioning would allow the area to continue providing protection of the inherent characteristics.

**Wetlands and Floodplains**

Executive order 11988 requires government agencies to take actions that reduce the risk of loss due to floods, to minimize the impacts of floods on human health and welfare, and to restore and preserve the natural and beneficial values served by floodplains. The proposed road repair and obliteration would reduce the risk of loss to infrastructure and fish habitat and help preserve the values provided by flood plains. Harvest would not occur within 100-year floodplains due to management requirements detailed in Chapter II and are sufficient to comply with the requirements of this executive order.

Executive Order 11990 requires that government agencies take action to minimize the destruction, loss or degradation of wetlands. Streamside riparian areas, seeps, springs, and other wet habitat exists within the project area. These areas would be avoided according to RHCA boundaries defined in PACFISH and the mitigation measures identified in Chapter II. These measures are judged to meet the intent of Executive Order 11990.

**Clean Water Act**

The actions proposed in the Pedro Colt analysis area have been designed and mitigated so that adverse affects to water quality and the aquatic system have a low to very low risk of occurrence. PACFISH interim RHCAs are incorporated into the design of all actions. PACFISH RHCAs protect shade and terrestrial inputs (large woody and other inputs) by protecting vegetation within one site potential tree height for intermittent streams, 150 feet for perennial non fish-bearing streams, and 300 feet for fish bearing streams. Based on the studies of sediment travel below roads and road fills, RHCAs provide a high degree of protection from sedimentation to channels and aquatic resources from logging produced sediment (Belt, O’Laughlin, Merrill, 1992).

Low disturbance logging systems and fuel treatments and special regard for protecting RHCAs provide for maintenance of riparian management objectives and do not retard the recovery toward those objectives where recovery is needed. By implementing PACFISH interim direction and using best management practices (BMPs) the USFS will manage for potential vegetation and aim to increase shade. The proposed projects are compatible with the findings and recommendations of the

Upper Grande Ronde River Sub-Basin Total Maximum Daily Load (TMDL) and Water Quality Management Plan (WQMP) completed in 1999.

The Forestry WQMP relies on current laws, management plans and, BMPs to provide the basis for improving water quality in the forested landscape (ODEQ 1999). All federal land management activities must follow standards and guidelines (S&Gs) listed in the Umatilla National Forest Plan, as amended by PACFISH, and BMPs as defined in the Implementation Plan for 208 (Water Pollution Control Act, PL 92-500, as amended). PACFISH provides management direction in the form of interim Riparian Habitat Conservation Areas (RHCAs) and S&Gs for Key Watersheds. All of the NFS lands in the Grande Ronde River Basin have been designated as Key Watersheds.

Sediment, temperature, and habitat modification are the primary concerns in meeting water quality standards on forested lands. Strategies to improve water temperature conditions include providing shade, and providing conditions for the development of natural channel morphologies, which are generally narrower and less easily heated than management affected channels. Current policies, regulations, BMPs, and adaptive management techniques are expected to minimize unwanted sedimentation from forestry related activities. Habitat conditions are expected to be improved through implementation of BMPs developed for the temperature TMDL which promote riparian conditions that improve channel stability and reduce erosion and promote the protection and recovery of channel morphology to the most stable forms. These conditions provide for the continuation of processes which develop and maintain shade, large woody material, protect channel morphology, and allow improvement in channel stability to the potential of the sites within the activity areas. Future proposed restoration projects would correct some existing erosion sites, reduce miles of road, improve fish passage, and add large wood debris to Phillips and East Phillips Creek.

**Clean Air Act**

All prescribed burning operations associated with each action alternative would comply with the State of Oregon's Smoke Management Implementation Plan and would be implemented within guidelines of the Smoke Management Program. Fuel treatments can be timed to minimize the impacts of smoke on forest users and local communities. The removal and direct treatment of biomass would reduce emissions should a wildfire occur. The effect of smoke under any action alternative would be short term and restricted to dispersed campgrounds. Particulate matter is not expected to exceed standards in the communities of concern (Asotin, Elgin, Enterprise, and La Grande). See Air Quality analysis.

**National Forest Management Act Compliance**

The proposed harvest and prescribed fire activities and vegetation manipulation will meet direction of CFR 36 219.27. Resource protection measures have been included in the project design and effects disclosed in the analysis. Soil productivity and water quality are being protected and management requirements minimize serious and long lasting hazards. The project as a whole is focused on prevention or reduction of serious, long lasting hazards and damage from pest organisms and wildfire through the use of silvicultural systems that maintain stand vigor and seral tree species characteristic of historical fire disturbance processes. The implementation of PACFISH guidelines protects stream, streambank, and wetland habitats providing adequate fish habitat to maintain viable populations of fish. Proposed placement of large wood into Phillips Creek improves the functioning of the stream. The future replacement of the culvert on Forest Road 3734 with an arch prevents future detrimental damage to water quality and fisheries habitat. The proposed actions within the frequent and mixed fire regimes restore the open stand condition to the landscape, increasing the forest's ability to maintain viable wildlife populations that are dependent on a diverse mix of habitats.

Objectives of HSSW, HSST, and HCPH Prescriptions by Alternatives

Alternative	Total Harvest acres	Ponderosa pine acres	Western Larch acres	Root Rot acres	Regeneration acres	Percent of Total Harvest
B	1,108	172	150	131	94	49
C	1,586	215		172		24
D and E	1,980	215	150	172	94	32

All proposed harvest units are planned on suitable land, and will be capable of re-stocking within 5 years of harvest either by natural or artificial means. The action alternatives favor the development of stands dominated by seral tree species. The proposed action and alternatives accomplish multiple-use resource goals. Even aged harvest prescriptions are being proposed because the desired leave trees would give the appearance of shelterwood or seedtree prescriptions once harvest is completed. Alternative B, D and E have 94 acres proposed for regeneration objectives. Stands managed for ponderosa pine would have lower stocking levels and retain an open appearance. Root rot objectives would be met by shifting the dominant tree species from grand fir. Western larch and regeneration objectives would have traditional stocking levels; however western larch stands would most likely experience additional intermediate thinning to maintain growth.

Units 20 and 23 are adjacent units with seedtree prescriptions. The units include category 4 RHCAs that would not receive treatment. The lower boundary extends to the Category 1 RHCA along Finely Creek. The gross size of these units together is 57 acres. They appear to violate the 40-acre size limitation in CFR 36 219.12 (d) (2). The lower reaches of the units are dominated by grand fir; these areas would not be included in the unit when layout occurs. Additional acres would be reduced for RHCAs. The final size of the units will be less than 40 acres. The prescriptions restore open ponderosa pine conditions in a stand that has many remnant large trees maintained by past fire disturbance.

## **Forest Plan Consistency**

Gross Acres of Harvest in Current Forest Plan Management Areas  
C1 will become E2 and C3 would become C4

Alternative	A3	C1	C3	C4	C5	E2	Total
B	102	0	128	148	2	728	1,108
C	0	10	128	97	8	1,343	1,586
D	102	10	128	148	8	1,585	1,981
E	102	10	128	148	8	1,585	1,981

The interdisciplinary team determined that the action proposed under alternatives B, C, D and E are consistent with the Forest Plan. All alternatives accomplish Forest Plan goals for resources of concern summarized in Chapter 1 and impacts evaluated and determined to meet Forest Plan Standards and Guidelines in Chapter 4. A non-significant Forest Plan amendment is being proposed. The C1, Dedicated Old Growth boundary in Dry Creek would be moved 100 feet off Forest Road 32. Acres of C1 would be replaced by acres of Late Old Structure found in the upper reaches of Dry Creek that have limited road access. The other amendment would change 880 acres of C3, Big Game Winter Range to C4, Wildlife Habitat because the winter range is too small to manage and is not used because of snow depth.

All timber harvest activities are proposed within Forest Plan Management Areas that allow scheduled harvest. Approximately 10 acres of Unit 83, a ridgetop ponderosa pine and grass unit, falls within Management Area C1 Dedicated Old Growth, in the area proposed for relocation with a Forest Plan Amendment. Further review of Unit 83 reduced it in size from 169 acres to 27 acres, none of the acres fall within the old C1 area. Units 37 and 98 have portions of the units that fall within Forest Plan Management Area C5, Riparian (Fish and Wildlife); PACFISH buffers removed these portions of the units.

The project has been designed to conform to Forest Plan Amendment 10 for PACFISH. Management Requirements have been identified in Chapter 2 and Appendix A for Best Management Practices. Impacts to water quality and fisheries habitat has been disclosed in relation to meeting PACFISH guidelines.

The harvest activities meet the specifications of Forest Plan Amendment 11 (Eastside Screens). An HRV analysis was performed. The wildlife screen for late old structure indicated Moist Forest was within or above HRV and the Dry Forest was below HRV for single structure stands. Though 57 acres of Old Forest Multistrata in Moist Forest would remove trees greater than 21 inches, the stands would remain Old Forest single strata. There are 340 acres of Moist Old Forest Multistrata that would be entered with harvest from 6,780 acres of moist old forest (about 30 percent of the Moist Forest) and 1,360 acres of dry old forest (about 13 percent of the Dry Forest). Approximately 262 acres would change structural stage. Approximately 191 acres would become old forest single strata and 71 acres would become understory reinitiation because of the amount of regeneration left in the stands. Even the understory reinitiation would have enough large trees to remain old forest. Old Forest stands would retain connectivity. The harvest of trees larger than 21 inches are only proposed in 2 units because the grand fir would probably not survive an understory burn once the understory grand fir and Douglas fir are removed. The proposed harvest in Moist Forest meets the criteria for Scenario B of the screens. Old Forest is not being lost but mainly changed to single strata; there would be no fragmentation of old forest stands, regeneration harvest is not the objective, and canopy cover will remain to meet old forest criteria (Appendix B). Old structure is being retained in the Dry Forest stands and no dry old forest stands would be entered; the criteria for Scenario A would be met.

After harvest and prescribed fire snag levels would meet Forest Plan standards. The Umatilla Forest Plan (1990) established standards and guidelines for dead standing and downwood for various levels of biological potential in each management area. The plan was amended in 1995 by the Regional Forester as Umatilla Forest Plan Amendment #11, also known as the "Eastside Screens." Based on the amended direction, "new" snag requirements and replacement trees objectives were developed for the vegetative working groups on the Forest and documented in the memo, "*Interim Snag Guidance for Salvage Operation*" (Umatilla National Forest 1993). The 0.14/acre density for snags greater than 20 inches reflects the 100 % PPL for the Eastside Screen amendment.

The Decayed Wood Advisor (DecAid) by Mellen et al. (2003) is a source of information that provides guidance to land managers evaluating effects of forest conditions and existing or proposed management activities on organisms that use snags,

downwood, and other wood decay elements. DecAid is a statistical summary of empirical data from published research on wildlife and deadwood. Data provided in DecAid allows the user to relate the abundance of deadwood habitat for both snags and logs to the frequency of occurrence of selected wildlife species that require dead wood habitat for some part of their life cycle. Tolerance levels provided in DecAid provide estimates of all individuals in the population that value a particular parameter (e.g., snag density, snag diameter, downwood density, etc. (Mellen et al. 2003). Tolerance levels are equivalent to the likelihood that individuals will use an area given a specified density. The lower the tolerance level, the fewer individuals will likely use the area. DecAid evaluations are best performed at the landscape, watershed, or larger scale. In DecAid, the 50% tolerance level for the pileated woodpeckers is 30.4 snags per acre greater than or equal to 10 inches in diameter of which 7.3 snags per acre are greater than or equal to 20 inches in diameter. Tolerance levels are not the same as potential population levels. The tolerance levels for the pileated woodpecker display the potential (percent) for individuals to occur in an area having certain snag characteristics. Other factors such as amount of canopy cover, how close snags are to edge, tree species composition, amount of decay, amount of ground cover, and size of trees within the stand also affect the likelihood that species will use the area.

The analysis indicates that the projects would meet Forest Plan standards and guidelines for management indicator species. Monitoring of habitat, observations of species, and inventory efforts are occurring on the forest. This information may not show up in the Forest's monitoring reports but is typically documented in watershed assessments and individual project files. Monitoring for MIS is a broad scale analysis and not a site-specific analysis. For example, literally hundreds of pileated woodpecker observations were recently entered into the FAUNA database. Surveys are being done in some areas of the forest, but not specifically for this project. Trend data from the Partners in Flight program is useful and was used in this analysis. Historic and current habitat conditions are presented in Watershed Assessments, and probable effects to habitat are discussed in the Pedro Ridge EA.

### **Prime Farmland, Rangeland, and Forestland**

No prime farmland, rangeland, or forestland occurs within the analysis area.

### **Irreversible and Irretrievable Effects**

An "irreversible" commitment of resources refers to a loss of future options with nonrenewable resources. An irretrievable commitment of resources refers to loss of opportunity due to a particular choice of resource uses.

Alternatives B, C, D, and E would have an irreversible commitment of rock used to resurface roads, however this would not significantly deplete the overall supply of rock suitable for road surfacing. The production of crushed and pit run rock would produce an irreversible change to the natural landscape. Rock would come from five sources. BMPs, sale design, and other mitigation identified in Chapter II would prevent significant loss of soils to erosion.

There would be no new construction of permanent roads. Up to 400 feet of temporary road construction is proposed to access helicopter landings. Temporary road and helicopter landing construction would pose an irretrievable loss of productivity. Decommissioning and subsoiling would restore productivity for many of the temporary roads and landings, particularly by the reduction of compaction. Since full recontouring would not occur, temporary road construction would result in some irretrievable losses in hydrologic function. Roads and landings would be closed and drained so water would not flow directly into streams. There would be areas of filtration or catch basins that would trap sediment, keeping it from impacting streams. Helicopter landing construction would produce irreversible changes in the appearance of the landscape, depending on use and location. Most landings would be located on existing exposed areas, such as rock pits or past tractor landings. Topography changes would not be restored when landings are no longer needed. Using existing open, flat areas would reduce the impact. Obliteration would greatly reduce the appearance of landings, particularly when low impact construction techniques are used.

There is an inherent risk of accelerating landslides, erosion, and soil compaction when harvesting timber, performing road obliteration, or using prescribed fire that can lead to a loss in productivity. Road obliteration and subsoiling past harvest units also partially restores irreversible effects of past actions. The soil and water protection measures identified in the Forest Plan, and management requirements in Chapter II are designed to avoid or minimize the potential for irreversible losses to soil productivity. Past harvest activity has not indicated a problem with landslides or compaction impacts to productivity. Phillips Creek and Dry Creek currently provides high quality during fall to spring flows.

It is not presently possible to quantify irreversible or irretrievable commitments of fisheries resources that cause decreases in fish habitat conditions. Shade, sources of large woody debris, pools, and channel stability is protected by restricting vegetation management activities to areas outside of RHCAs. Instream projects such as culvert replacement, road obliteration, and placement of large wood would cause sediment to move through the system. The sediment pulses would be short term and would occur in the fall as water flows return to the streams, before steelhead enter the streams. Road obliteration, road maintenance, and timber harvest would contribute to short-term sediment production but would not be

measurable. Road obliteration would likely decrease long-term sediment yields. Culverts presenting barriers to fish passage would be replaced with an arch, increasing fish use of the streams. The placement of large woody debris would restore habitat diversity and increase pools. Though these actions have a short-term affect they would provide healthier fisheries in the future. Management requirements, BMPs, and the choice of logging systems would minimize the impacts on fish.

Species extinction is irreversible, so it is essential that habitat for sensitive species be maintained or enhanced. The proposed management actions would simplify stand structure, reducing the complexity of stand layers. The actions would also increase habitat diversity by restoring single stratum forests to the landscape critical to eight migratory bird species of concern. The mosaic of forest structure would be more resilient to wildfires and insect epidemics because of the increase of early seral tree species, the lowering of stocking levels, and lower fire severity.

There would be an irretrievable loss of large trees from the Moist Forest. Only Units 20 and 23 have large trees (larger than 21 inches) proposed for harvest. The proposed Seedtree harvest would leave the largest, healthiest trees. These trees would be left for future snags. Though large trees are removed there is still a major component left in the stand to provide future habitat and the units would be old forest open structure. Ponderosa pine larger than 21 inches would not be removed. The restoration of the characteristics of the frequent fire regime would allow for the development of future large trees.

## **American Indian Treaty Rights**

Because the government is bound to perform its trust duties in a manner that will not diminish, abridge, violate or abrogate reserved treaty or executive order rights, the Umatilla National Forest has endeavored to solicit the comments of the Nez Perce and the Confederated Tribes of the Umatilla Indian Reservation to determine what effects may occur to Tribal welfare and treaty resources as a result of implementing projects included in the planning area. The Confederated Tribes of the Umatilla Indian Reservation provided comments and visited the planning area with the District Ranger, Planning Staff, and Fisheries Biologist. The Planning Area has historically been used as a travelway between the Umatilla and Grande Ronde basins. How the action alternatives are responsive to the issues raised by the Tribe during early involvement is discussed in Chapter 1. This section will recap potential impacts to exercising treaty rights. More detail can be found in the analysis for the resource earlier in this chapter.

Impacts to fisheries: Project design protects habitat from detrimental impacts. The majority of the stream systems are dry in the summer, only the upper reaches of Phillips Creek, and Little Phillips Creek contain year round habitat. Additional year round habitat is found in East Phillips Creek and Pedro Creek. Vegetation management projects occur distant to streams and PACFISH guidelines protect habitat from degradation. Potential impacts to fisheries habitat come from instream improvement projects. Work on these projects would occur during the summer and the major sediment pulse would flush through the system before steelhead move into the streams in the spring. The streamside would be revegetated and would stabilize within two years. In support of the Northwest Planning Council's Columbia River Basin Fish and Wildlife Program the Phillips Creek system would receive habitat improvements that may increase steelhead habitat and help the survival of fish during the summer dry periods. Large woody debris would be placed in sections of Phillips Creek that do not meet PACFISH riparian standards. Three culverts with fish passage problems would be replaced or removed. The crossing of Pedro Creek would be removed and riparian vegetation allowed to regenerate. A large culvert on Little Phillips Creek would be replaced with an arch allowing more life cycle stages to pass up the stream and avoid potential detrimental effects should the culvert fail. Another culvert on Phillips Creek would also be replaced with an all life cycle passable structure. The improvement projects would have a short term negative impact to fisheries habitat, increase sediment, but provide a long term benefit by improving habitat complexity and allowing fish to move more freely through the system.

Viable populations of existing and desired wildlife species: The proposed vegetation management treatment begins restoration of the frequent fire regime to reflect historic character. This increases habitat that is not currently found on the landscape. It supports development of habitat needed to maintain viable populations of species dependent on open forest conditions. No large diameter (greater than 21 inches) ponderosa pine would be cut. Harvest emphasizes the removal of small diameter trees however occasional large diameter thin bark species (grand fir and spruce) would be removed because they would not survive prescribed fire. Wildfire would burn at lower intensity and allow the development of old forests with open canopies.

Road and Access: The Access and Travel Management Plan was reviewed and roads no longer needed for management actions were identified for obliteration. Thirty miles were obliterated in the past and an additional 7.5 miles identified. Approximately 1.1 mile is with RHCAs and would reduce sediment delivery into streams. The roads are currently closed roads and would not affect current access for exercising treaty rights. Reconstruction and maintenance of Forest Road 3217040 would maintain existing drainage along the ridge to protect habitat of cultural use plants and provide access that was closed when FR 3217 was obliterated.

Threatened and Endangered species: Impacts to fish have been summarized above. More detail can be found with the EA.

Lynx habitat would not be impacted by the project. No actions are being proposed within lynx habitat.

### **Consumers, Minority Groups, and Women**

Alternatives B, C and D and improvement projects would be governed by a Forest Service contracts, which are awarded to qualified purchasers regardless of race, color, sex, religion, etc. This contract also contains nondiscrimination requirements. While timber harvest identified here creates jobs and provide consumer goods, no quantitative output, lack of output, or timing of output associated with these projects would affect the civil rights, privileges, or status quo of consumers, minority groups, and women.

### **Environmental Justice**

Executive Order 12898 requires that federal agencies adopt strategies to address environmental justice concerns within the context of agency operations. With implementation of any of these alternatives, there would be no disproportionately high and adverse human health or environmental effects on minority or low-income populations. Smoke management would keep particulate matter within standards. Past burning and wildfires did not show degradation below standards at EPA stations in La Grande, Oregon. The actions would occur in a remote area and nearby communities would mainly be affected by economic impacts related to timber harvest or contractors implementing rehabilitation activities. The proposed actions should have a positive affect on mushroom and cultural plants, which often consist of low income or minority groups. Racial and cultural minority groups could be prevalent in the work forces that implement harvest, prescribed fire, tree planting, herbicide application, thinning, or fish habitat improvement projects. Contracts contain clauses, which address worker safety, and additional measures regarding herbicide application have been detailed in mitigation measures from the Forest Noxious Weed EA.