

APPENDIX A

TREATMENTS BY UNIT GROUPS: ALTERNATIVE 4

- ❖ Refer to Forest Structure/Forest structure/Snag/Coarse Woody Debris (CWD) Prescriptions and Post-Salvage Fuel Reduction Prescriptions that follow these tables.
- ❖ Refer to detailed spreadsheet for specific conditions for each unit.
- ❖ Refer to “Post-Fire Mortality Estimation Guidelines” in Appendix B of the EIS.

GROUP 1: Elk/Mule deer and Whitetail Deer Winter Range					
Suitable for timber management (MA 9 and MA 13)					
Units	Fire Severity	Treatment Rx	Logging System	Total acs.	Treatment Comments
				(Treated acres)	
Group 1a: Units 3b, 5a-b, 6a-c, 8b, 11	High to Moderate 90+% tree mortality	Salvage / Leave tree patches 10-40%	Helicopter	387 (309)	<ul style="list-style-type: none"> ➤ Salvage of dead trees would occur in patches and blocks across the landscape, of various sizes and shapes (from about 5 to 20 acres), focusing on the areas of highest DF beetle risk (typically areas with more moderate burn severity, i.e. scorched trees). Merchantable trees would be removed in these harvest openings, except those left for forest structure, snag & woody debris needs. Safety considerations would require felling of unsound hazard trees in these openings. In most cases, these trees would be left on the site. ➤ Larger leave patches (minimum about 2 acres) would be left across the larger units, covering from 10-40% of the area; individual or small groups of leave trees would be left in the small units. Refer to Forest structure/Snag/coarse woody debris prescriptions A.1 and A.2
		Natural regeneration & Interplant PP,DF 162 acs.			
Group 1b: Units 3a, 4, 8a	High 90+% tree mortality	Salvage / Leave tree groups or individuals 15-30%	Ground (skidder)	201 (174)	<ul style="list-style-type: none"> ➤ Salvage of dead trees would occur across the treatment area, focusing on the areas of highest DF beetle risk (more moderate burn severity, i.e. scorched trees). Leave groups, patches and individual trees would be left, with patches a minimum of about 2 acres in size, and covering from 15-30% of the treatment area. Refer to Forest structure/Snag/coarse woody debris prescription B.1.
		Plant WP, DF,PP,L 174 acs.			
Group 1c: Units 1, 2a-b	Moderate 40-60% tree mortality	Salvage/ Shelterwood	Ground (skidder)	38 (38)	<ul style="list-style-type: none"> ➤ Harvest would remove most merchantable fire killed trees, except those left to meet snag prescription. Refer to Forest structure/Forest structure/Snag/coarse woody debris Prescription C.1. There would be an estimated 30-50 live and dead residual larch trees left after harvest.
		Natural regeneration			
Total Acres =				626 (521)	

GROUP 2: Elk/Mule deer and Whitetail Deer Winter Range Not Suitable for timber management (MA 13a)					
Units	Fire Severity	Treatment Rx	Logging System	Total Acs.	Treatment Comments
				(Treated Acres)	
Group 2a: Unit 17	High 95+% tree mortality	Salvage / Leave tree patches 15-25%	Helicopter	36	<ul style="list-style-type: none"> ➤ Salvage of beetle infested merchantable DF trees would occur across this unit. Larch, ponderosa pine, and other species besides DF would not be salvaged. Safety considerations would require felling of unsound hazard trees in the immediate area where salvage is occurring; but unless they meet criteria for removal, these trees would be left on the site. ➤ Untreated groups of dead trees would be left dispersed throughout the unit area, covering from 15-25% of the unit area. Refer to Forest structure/Snag/coarse woody debris Prescription A.3.
		Interplant PP 25 acs.		(25)	
Group 2b: Units 14, 15, 16a-b	Low to Moderate 25-60% tree mortality	Salvage / Leave tree patches and small groups 20-50%	Helicopter	203	<ul style="list-style-type: none"> ➤ Salvage of beetle infested merchantable DF would occur in patches and groups, estimated from a few acres in size up to about 10 acres. Larch, ponderosa pine, and other species besides DF would not be salvaged, whether dead or alive. Safety considerations would require felling of unsound hazard trees in the treated areas: unless these trees meet criteria for removal, these trees would be left on the site. ➤ Untreated groups and patches of trees would be left across the units, covering an estimated 20-50% of the treated area, depending upon fire pattern and severity. These leave groups/patches would be focused around the areas of live trees, if any, but would include many dead trees as well. Refer to Forest structure/Snag/coarse woody debris Prescription C.3.
		Natural regeneration where openings exist		(141)	
Total Acres =				239 (166)	

GROUP 3: Primary Forest Plan objective of timber production (MA 15)					
Units	Fire Severity	Treatment Rx	Logging System	Total Acs.	Treatment Comments
				(Treated Acres)	
Group 3a: Units 7a-b, 9b, 18, 34, 48a-c, 61	High to Moderate 80-100% tree mortality	Salvage / Leave tree patches & small groups 15-25%	Helicopter	322	<ul style="list-style-type: none"> ➤ Salvage of dead and fire-affected trees would occur in patches of various sizes (from about 5 to 20 acres). Merchantable trees would be removed in these areas. Safety considerations may require felling of unsound hazard trees in the treated areas; unless they meet criteria for removal they would be left on the site. ➤ Leave patches, small groups and sound, individual trees would be left across these treatment areas to meet forest structure and snag/woody debris needs. In larger units, patches would cover from 15-25% of the treatment area. Refer to Forest structure/Snag/coarse woody debris Prescription A.1 and A.2.
		Natural regeneration & Interplant PP,L,DF 303 acs.		(303)	

GROUP 3 (cont): Primary Forest Plan objective of timber production (MA 15)					
Units	Fire Severity	Treatment Rx	Logging System	Total Acs.	Treatment Comments
				(Treated Acres)	
Group 3b: Units 22, 23, 24, 37, 40a-b, 41a-b, 45, 47, 56, 57	Low to High patch mosaic	Salvage / Leave tree groups & individuals	Helicopter	338	<ul style="list-style-type: none"> ➤ Salvage of dead and fire-affected trees would occur in patches. Treated areas are generally <50 acs. in size and focused on the areas of highest mortality and beetle risk (the most fire-stressed trees), and/or where beetles have infested the trees. Most merchantable trees would be removed in these harvest openings. Safety considerations may require felling of unsound hazard trees in the treated areas; unless they meet criteria for removal, they would be left on the site. ➤ Groups, patches and individual live trees, and snags, would be left throughout the treated areas, varying in size, proportion and distribution depending upon fire severity and patterns. Refer to Forest structure/Snag/coarse woody debris Prescription C.2.
	40-70% tree mortality	Natural regeneration & Interplant PP,DF 46 acs.		(286)	
Group 3c: Units 9a, 10, 12, 13, 19, 21, 26, 28, 29, 31, 32, 33, 35, 43, 44, 49, 53, 62, 65	High to Moderate	Salvage/ Leave groups & individual trees	Ground/ Cable	495	<ul style="list-style-type: none"> ➤ Units range from 5 to 50 acres (except for Unit 65, which is larger). Harvest would remove merchantable fire affected trees across the unit area, leaving small, intact groups, patches (about 1-5 acres in size) or individual dead trees dispersed across the treated areas. Refer to Forest structure/Snag/coarse woody debris Rx B.2.
	>80% tree mortality	Natural regeneration & Plant L,WP,DF,PP 446 acs.		(471)	
Group 3d: Units 20, 27, 30, 42a-b, 46, 52, 58, 59, 63, 66	Low to Moderate mosaic	Salvage / Leave tree patches, groups & individuals	Ground/ Cable	473	<ul style="list-style-type: none"> ➤ Most of these are relatively small units (<40 acs.) and harvest would remove merchantable dead and fire affected trees across the unit area, focusing on the areas of highest mortality and beetle risk (the most fire-stressed trees), and/or where beetles have infested the trees. Most merchantable trees would be removed in these areas. ➤ After salvage, residual trees in patches, groups or as individuals are expected to cover portions of the unit area (up to 60% of the area in Unit 66), with amount and distribution dependent on fire severity and pattern. These trees would be mostly live, many dead, and largely larch or DF. Refer to Forest structure/Snag/coarse woody debris Prescription C.1.
	30-70% tree mortality	Natural regeneration & Plant L,PP 210 acs.		(400)	
Total Acres =				1628 (1460)	

FUEL MANAGEMENT UNITS					
Units	Fire Severity	Treatment Rx	Logging System	Total Acs.	Treatment Comments
Coal Creek	High 90+% tree mortality	Salvage merchantable or Slash nonmerch / Pile & burn / Regeneration	Ground (skidder)	67	<ul style="list-style-type: none"> ➤ Treatment area is characterized by sapling and pole sized fire-killed lodgepole pine. A “thinning” type of prescription would be applied, with trees slashed, piled and burned, or utilized for a commercial product if possible, across the unit area. “Thinning” would be heaviest in the area closest to the private land boundary, leaving 10 or fewer trees per acre standing. More trees would be left as you move away from the private boundary, up to about 40 tpa, creating a “feathering” effect of dead standing trees blending into the uncut forest. There are very few trees that survived the fire, but if there are, they would be left. No treatment would occur in stream management zones or within 300’ of Coal Creek. ➤ Max 15 tons/acre dead and down would be left on average over the unit.
		Interplant L, DF 67 acs.			
Big Creek Admin Site (Glacier Institute)	Low to High patch mosaic 40-70% tree mortality	Salvage merchantable or slash non-merch./ Pile & burn / Regeneration	Ground (skidder)	129	<ul style="list-style-type: none"> ➤ Treatment area is mainly small diameter lodgepole, with Douglas-fir and larch in some areas. Larger diameter, >9” dbh trees occur on some lower slopes and in the areas adjacent to Big Creek and to Glacier Institute. Mortality varies from near 100% fire killed trees, to some small unburned patches in areas near to Glacier Institute buildings. ➤ A “thinning” prescription would be applied across most of the area, with removal only of dead trees. They would be slashed, piled and burned, or utilized for a commercial product if possible. Thinning would be at variable densities, from about 30 up to 70 trees per acre left, blending into the surrounding uncut forest. All live trees would be left, as well as any additional dead or dying trees that are necessary to meet desired trees per acre. Trees may be left in groups, patches or individuals to create a diverse structure and appearance. ➤ Max 15 tons/acre dead and down would be left on average over the area. ➤ Planting of more fire resistant trees (ponderosa pine, larch and Douglas-fir) at wide spacing would occur across an estimated 100 acres. ➤ Anti-aggregate pheromone MCH would be applied in the unburned region near the Glacier Institute to protect remaining live Douglas-fir that are at high risk of Douglas-fir beetle infestation. These are valuable trees for aesthetic reasons, as well as being about the only live larger trees left surviving for some distance.
		Interplant L, DF, WP 100 acs.			

ALTERNATIVE 4: Forest Structure / Snag / Coarse Woody Debris Prescriptions

Each proposed salvage unit would follow at least one of the following prescriptions to meet Forest Structural, Snag and Downed Wood objectives. Leave trees (in groups, patches or as individual trees), along with the downed wood existing prior to the fire, wind thrown after the fire, or material left after the logging operation, are important forest and site components, perhaps particularly in a burned landscape. These values include: improved forest structural diversity (both now and into the future); habitat for numerous wildlife species; shade and protection on more exposed sites; long-term soil productivity and organic matter; soil erosion protection; and a host of other less understood ecological functions, such as providing a substrate for soil microorganisms and insect populations.

Treatment Features Common To All Proposed Salvage Units in Alternative 4

Post Salvage Slash Reduction

For all units, trees felled during the logging operation but not removed from the site would be left as intact as possible, with only limbs of trees removed to get slash closer to the ground if necessary and hasten its decomposition. In some units, this slash would be placed on designated skid trails to lessen the impact of skidding equipment. In others, it would be left scattered where it falls.

In most units, log length yarding would be required to ensure that desired levels of downed wood and unmerchantable material is left out in the unit as well distributed as possible, rather than brought into a landing for piling and burning. It is important that sufficient downed wood exists on these burned soils, to protect soil productivity and reduce erosion potential, provide site protection and wildlife habitat. There may be some units where slash loadings may be excessive. These would be evaluated after harvest to determine treatment needs, if any.

Upon completion of logging operations, all units would be evaluated for slash conditions and potential fuel hazard, with up to 30 tons/acre of slash being generally acceptable as low hazard and not needing treatment. Units over 30 tons/acre of slash material after harvest would be evaluated individually for possible fuel reduction needs. Factors such as slash size (larger diameter is less hazardous than small), slash continuity (discontinuous fuels may not pose a concern), unit location and surrounding fuel conditions. If determined to be necessary, fuel reduction activities (jackpot burning, excavator piling and burning) would be considered. Use of dozers would be avoided because of sensitivity of burned soils.

Forest Structure / Snag / Coarse Woody Debris

- ❖ All larch, live or dead, would be left within all treatment areas, standing wherever logging safety considerations allow, but if felled, left on the site to function as large downed wood.
- ❖ All Douglas-fir >18" dbh that has been killed by the fire with crown totally consumed would be left within all treatment areas, standing where possible, but if felled left on site to function as large downed wood.
- ❖ Large snags within 200 feet of an open road that have been left to meet the prescription should be designated and signed to protect from firewood cutters. This would mostly apply to the most desirable snags, larch >20" dbh, but there may be some 18" dbh larch that deserves special protection also, particularly in areas where large diameter snags are scarce.
- ❖ Non-merchantable trees of all species would be left standing within the treatment areas wherever possible, considering logging safety and accessibility to salvaged trees. These trees (mostly dead, but some would be live) fulfill important ecological functions, including smaller diameter snag habitat, hiding cover, shading and site protection, and contributing to a more diverse stand structure.
- ❖ The "Post Fire Mortality Estimation Guidelines" would be applied to all units to determine live trees that would be left. These trees have the highest probability of remaining alive and not dying from effects or after-effects of the fire. Trees would be left standing wherever possible. If felling of these trees is necessary for logging access or safety requirements, they would be left on site as downed woody material.
- ❖ Downed wood objectives would be met primarily by (1) leaving all unmerchantable material within the treatment areas (which includes tops of salvaged trees, smaller diameter trees, or larger diameter trees deteriorated to the point of no economic value—especially subalpine fir and spruce); (2) other trees left in groups or as individuals to meet snag and forest structural retention prescriptions; (3) patches, groups and individual live trees that would be left wherever they exist; and (4) all downed material that existed prior to the fire that would not be removed from the site. Abundant amounts of downed wood in the 12 or 14" diameter and lower classes are expected after salvage. The larger diameter downed wood requirements would be mostly by pre-existing downed wood and by the retention of the larger diameter snags and live trees as per prescriptions, many of which would gradually fall over time and become downed wood.

Forest Structure/Snag/Woody Debris Prescriptions That Are Unique To Individual Unit Groups in Alternative 4		
Rx A: Stands of High Tree Mortality (80-100%) and Helicopter Logging Systems		
Rx A.1	Rx A.2	Rx A.3
Suitable for Timber production (some winter range); Larger Unit Size	Suitable for timber production (some winter range); Small unit sizes (most <25 acs.)	Unsuitable for timber production; Winter range
Units 3b, 5a-b, 6a-b, 7b, 18, 34, 61	Units 6c, 7a, 8b, 9b, 11, 48a-c	Units 17
Untreated patches and groups of dead trees would be left as per the treatment prescription, dispersed throughout the unit area and of variable size and irregularly shaped, interconnected where possible, and using a maximum 600 foot distance between patches as a guideline for most situations. Patches would cover from 15-40% of the unit area, depending upon individual unit management objectives (higher percentage would be left in ungulate winter range areas) (refer to detailed spreadsheet for unit details). Leave patch location should favor draw bottoms/ephemeral streams, along live streams or wet spots of any kind, and around particularly desirable snags (i.e. >18" larch), as well as around any live trees that may exist.	These units are small (most <25 acres). Leaving all larch and the larger diameter dead Douglas-fir discussed above should result in the retention of numerous leave trees. Some of these may have to be felled due to safety considerations; if it is found that most or nearly all of them would need to be felled, then one or more leave groups and patches, minimum 1 acre in size, should be left within the units, centered around the better snags or live trees, to allow logging operations to occur without having to fell all trees.	Untreated patches of dead trees would be left dispersed throughout the unit area, of variable size and irregularly shaped, interconnected where possible, and using a maximum 600 foot distance between patches of leave trees as a guideline for most situations. Patches would cover from 15-25% of the unit area. Leave patch location should favor draw bottoms/ephemeral streams, along live streams or wet spots of any kind, and around particularly desirable snags (i.e. >18" larch or black DF) or any live trees. In addition, only the larger (>14") beetle infested DF and spruce would be removed from the treated areas of these units, leaving the smaller DF and S and all sizes of all other species on site. If these residual trees are felled for logging safety reasons, they would be left on the ground to contribute to the downed wood component.

Rx B: Stands of High Tree Mortality (80-100%) and Ground based logging systems (tractor or cable)	
Rx B.1	Rx B.2
Suitable for timber production; Winter range	Suitable for timber production; Not Winter range
Units 3a, 4, 8a	Units 9a, 10, 12, 13, 19, 21, 26, 28, 29, 31, 32, 33, 35, 43, 44, 49, 53, 62, 65
Intact patches, small groups and individual dead trees would be left dispersed throughout the unit area, in groups of variable size and shape, patch size minimum of about 2 acres, interconnected with one another where terrain is favorable and to provide hiding cover. Leave patches across the area of treated winter range would cover from 15-30% of the unit area. Leave patches should favor locations where large, especially desirable snags exist (i.e. larch >18"), or live trees, and stream/wet spots of any kind. Maximum distance between leave patches should not exceed 600'	Most of these units are relatively small (<50 acres). Residual tree component after salvage should be numerous with the leaving of all larch and larger burned Douglas-fir as described for all alternatives above. Minimum 20 snags of the larger size classes as available within the unit should remain after salvage. If larger trees aren't available, groups of trees of smaller diameter should be left, centered on the largest snags or any live trees present, to meet minimum density of snags. If trees would need to be felled for logging safety, then grouping of trees should also be done to preserve as many standing snags as possible

Rx C: Stands of Lower Tree Mortality (40-70%) where individuals and groups/patches of live trees occur across the unit		
Rx C.1	Rx C.2	Rx C.3
Suitable for timber production, Ground (skidder) or Cable Units	Suitable for timber production, Helicopter Units	Unsuitable for timber production, Helicopter Units
Units 1, 2a-b, 20, 27, 30, 42a-b, 46, 52, 58, 59, 63, 66	Units 22, 23, 24, 37, 40a-b, 41a-b, 45, 47, 56, 57	Units 14, 15, 16a-b
<p>Live groups and individual trees that are not being salvaged would be left across the unit area as per the treatment prescription, in addition to the larger diameter dead DF and larch that would be left for all alternatives. Most of these units are small (<40 acres), and the residual tree component is estimated to be up to 60% of the unit stocking, but ranges from 10-30% more commonly, dependent upon fire severity and pattern within the units. These individual leave trees and groups would typically be composed of larch and DF (those more lightly burned and at low risk to beetle). There is likely to be some continuing mortality in these residual trees, the latent effects of fire damage and/or beetle infestation in the DF. These dead trees would add to the snag component of the stand.</p>	<p>The treatment areas within these units would be generally <50 acres in size, and there would be live trees left within these units, as individuals or small groups, varying in proportion and size depending upon the pattern of fire severity and stand conditions. Some of these may have to be felled due to safety considerations; if it is found that all or nearly all of them would need to be felled, then one or more leave patches should be left within the units (minimum about 1 acre in size), centered around the better live trees and snags, to allow logging operations to occur without having to fell all trees. There is likely to be some continuing mortality in these leave groups, the latent effects of fire damage and/or beetle infestation in the DF. These dead trees would add to the snag component of the stand</p>	<p>Groups and patches of live and dead trees would remain in these units after harvest, and in some areas individual standing live and dead trees. Patches and groups would cover an estimated 20 to 50% of the treatment area, be irregularly shaped and distributed, depending upon fire severity and pattern within the unit. When choices exist, leave patches should focus around the areas of healthiest live trees, as well as favoring draw bottoms/ephemeral streams, along live streams or wet spots of any kind, and around particularly desirable snags (i.e. >18" larch or dead Douglas-fir, with crown burned entirely). There is likely to be some continuing mortality in these patches, the latent effects of fire damage and/or beetle infestation in the DF. These dead trees would add to the snag component of the stand and landscape.</p> <p>In addition, only the larger (>14") beetle infested DF and spruce would be removed from these units, leaving the smaller DF and S all sizes of all other species on site. If any of these leave trees are felled for safety reasons, they would be left on the ground to contribute to the downed wood component.</p>