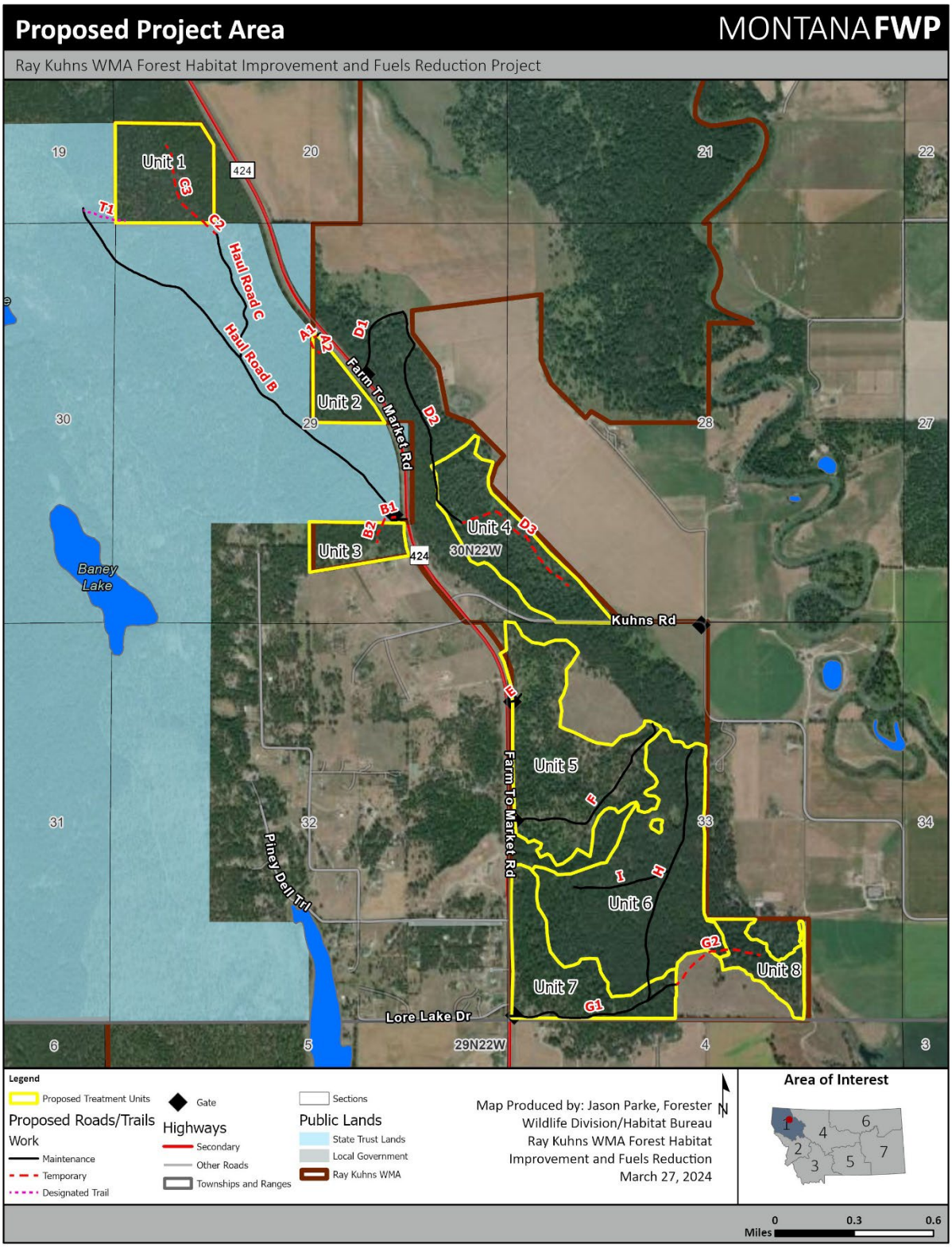
Appendix A – Detailed Unit Descriptions and Proposed Treatments

***Figure A.1**: Proposed treatment units and access roads.*

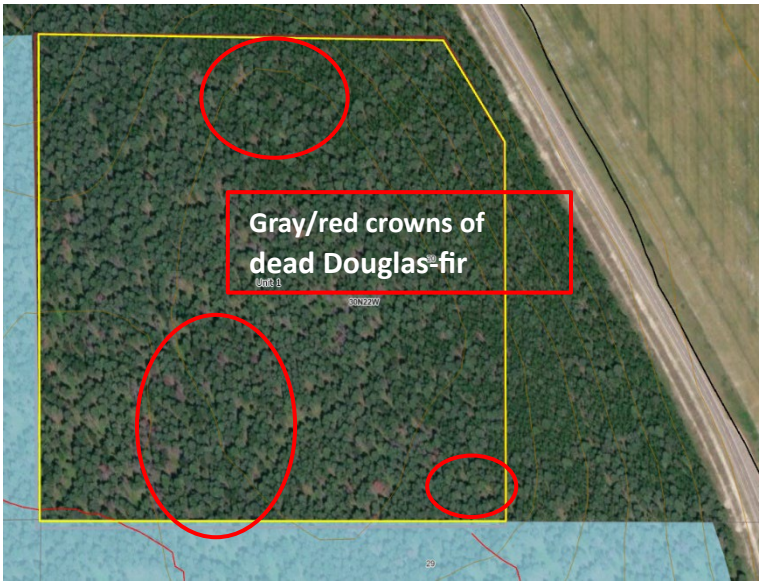


Unit 1 (39 acres)

- Cover type – Mixed conifer (Douglas-fir/western larch)
- Size class – sawtimber (>8" DBH)
- Crown cover – Medium high (50-75%)
- Aspect – Flat/north
- Elevation – 3,100'
- Habitat type – PSME/VACA (Douglas-fir/dwarf huckleberry)
- Succession class – Late seral, closed canopy
- Structure – Old Forest, single-strata

General conditions – Stand is comprised of mature Douglas-fir and western larch (~100 years old). Density averages 160 square feet basal area per acre (BA/acre), including live and dead trees, with larger diameter Douglas-fir (>12 inch DBH) making up 60% of the stand and densely stocked, pole-sized western larch making up 40% of the stand (occurring on the steeper northeast aspect, Figure A.3). Douglas-fir bark beetle is currently active in the stand and has been active for the past 5-10 years, affecting small pockets of large diameter Douglas-fir (Figure A.2). Approximately 3-5% of the overstory has been killed by Douglas-fir beetle, accounting for 5-10 square feet of basal area. The stand remains at a moderate to high risk of Douglas-fir bark beetle infestation due to the density, age, size, and species composition of the stand. The stand continues to provide excellent snow intercept and thermal cover for white-tailed deer despite the recent bark beetle infestation however live canopy cover is expected to continually decline with on-going beetle infestation.

Figure A.2*: Identified pockets of Douglas-fir beetle infested trees within proposed unit 1.*



Proposed treatment – Variable density thinning/group selection. The primary objectives of this unit are to reduce Douglas-fir bark beetle risk and maintain health of overstory trees for long-term white-tailed deer winter range. Suppressed overstory trees (greater than 5 inches DBH would be removed around dominant/co-dominant overstory trees. Crown health would be the

primary consideration for removal. Trees with thinning crowns and low crown ratios (less than 30% live crown) would be removed to favor trees with dense crowns and higher crown ratios. Overstory trees would be retained in a clumpy, variable pattern to maintain the natural character of the stand. The average density would be variable, with small openings (up to ½ acre) created around seed trees to promote natural regeneration and heavier leave pockets (2+ acres) where tree crowns are healthier, to maintain cover for white-tailed deer. The residual density will range from 60 BA/ac to 120 BA/ac, averaging approximately 110 basal area per acre (BA). Snags > 16 inches DBH; trees with visible nesting cavities; and trees with dead, deformed, or multiple tops would be retained for their value as wildlife trees. Understory trees (less than 5 inches DBH) would be removed below the dripline of overstory trees and would be thinned to a variable spacing in canopy gaps. In general, the largest trees (greatest DBH, tallest) with the highest crown ratio would be retained and relatively smaller trees with lower crown ratios would be cut.

***Figure A.3**:* Existing forest condition within proposed unit 1.

Unit 2 (14 acres)

- Cover type – Mixed conifer (Douglas-fir/western larch)
- Size class – sawtimber (>8" DBH)
- Crown cover – Medium high (50-75%)
- Aspect – Flat/north
- Elevation – 3,100'
- Habitat type – PSME/VACA (Douglas-fir/dwarf huckleberry)
- Succession class – Late seral, closed canopy
- Structure – Old forest, single-strata

General conditions – Stand is comprised of mature western larch and Douglas-fir (~100 years old). Density averages 140 square feet BA/acre, including live and dead trees. Species composition is 80% Douglas-fir, 20% western larch, averaging 15 inches DBH. Douglas-fir bark beetle activity has been minimal, but the stand remains at a moderate to high risk of Douglas-fir bark beetle infestation due to the density, age, size, and species composition of the stand. The stand is providing excellent snow intercept and thermal cover for white-tailed deer.

Figure A.4: *Existing forest condition within proposed unit 2.*

Proposed treatment – Variable density thinning/group selection. The primary objectives of this unit are to reduce Douglas-fir bark beetle risk and maintain health of overstory trees for long-term white-tailed deer winter range. Suppressed overstory trees (greater than 5 inches DBH would be removed around dominant/co-dominant overstory trees. Crown health would be the primary consideration for removal. Trees with thinning crowns and low crown ratios (less than 30% live crown) would be removed to favor trees with dense crowns and higher crown ratios. Overstory trees would be retained in a clumpy, variable pattern to maintain the natural character of the stand. The average density would be variable, with small openings (up to ½ acre) created around seed trees to promote natural regeneration and heavier leave pockets (2+ acres) where

tree crowns are healthier, in order to maintain cover for white-tailed deer. The residual density will range from 60 BA/ac to 120 BA/ac, averaging approximately 110 basal area per acre (BA). Snags > 16 inches DBH; trees with visible nesting cavities; and trees with dead, deformed, or multiple tops would be retained for their value as wildlife trees. Understory trees (less than 5 inches DBH) would be removed below the dripline of overstory trees and would be thinned to a variable spacing in canopy gaps. In general, the largest trees (greatest DBH, tallest) with the highest crown ratio would be retained and relatively smaller trees with lower crown ratios would be cut.

Unit 3 (16 acres)

- Cover type – Mixed conifer (Douglas-fir/western larch/ponderosa pine)
- Size class – sawtimber (>8" DBH)
- Crown cover – Medium (25-50%)
- Aspect – Flat/north
- Elevation – 3,100'
- Habitat type – PSME/VACA (Douglas-fir/dwarf huckleberry)
- Succession class – Late seral, open canopy
- Structure – Old forest, single-strata

General conditions – Stand is comprised of mature Douglas-fir, western larch, and minor amounts of ponderosa pine (~100 years old). Density averages 110 square feet BA/acre, including live and dead trees. Species composition is 75% Douglas-fir, 15% western larch, 10% ponderosa pine, averaging 14 inches DBH. The stand is providing moderate snow intercept and thermal cover for white-tailed deer, the southern 1/3 of the stand is open ponderosa pine/snowberry with openings up to 2 acres.

Figure A.5: *Existing forest condition within proposed unit 3*

Proposed treatment – Variable density thinning/group selection. The primary objectives of this unit are to reduce Douglas-fir bark beetle risk and maintain health of overstory trees for long-term white-tailed deer winter range. Suppressed overstory trees (greater than 5 inches DBH would be removed around dominant/co-dominant overstory trees. Crown health would be the primary consideration for removal. Trees with thinning crowns and low crown ratios (less than 30% live crown) would be removed to favor trees with dense crowns and higher crown ratios. Overstory trees would be retained in a clumpy, variable pattern to maintain the natural character of the stand. The average density would be variable, with small openings (up to ½ acre) created around seed trees to promote natural regeneration and heavier leave pockets (2+ acres) where tree crowns are healthier, in order to maintain cover for white-tailed deer. The residual density will range from 60 BA/ac to 110 BA/ac, averaging approximately 90 basal area per acre (BA). Snags > 16 inches DBH; trees with visible nesting cavities; and trees with dead, deformed, or multiple tops would be retained for their value as wildlife trees. Understory trees (less than 5 inches DBH) would be removed below the dripline of overstory trees and would be thinned to a variable spacing in canopy gaps. In general, the largest trees (greatest DBH, tallest) with the highest crown ratio would be retained and relatively smaller trees with lower crown ratios would be cut.

Unit 4 (47 acres)

- Cover type – Moist mixed conifer (Engelmann spruce/quaking aspen/Douglas-fir/western larch/ponderosa pine)
- Size class – seedling/sapling (0-5" DBH)
- Crown cover – Medium (25-50%)
- Aspect – Flat/east
- Elevation – 3,000'
- Habitat type – PICEA/CLUN (spruce/queencup beadlily)
- Succession class – Mid seral, closed canopy
- Structure – Young, multi-strata

General conditions – Stand is comprised of scattered overstory of mature (~100 year old) Douglas-fir, ponderosa pine, and western larch with dense, advanced regeneration (<30 years old) of spruce, Douglas-fir, and ponderosa pine in drier microsites. Quaking aspen and paper birch are interspersed throughout. Overstory density varies widely but is about 50 BA/acre on average. Understory density varies from about 250 trees per acre to 2,000 trees per acre. Hardwood species, which are important habitat for a variety of wildlife, are being crowded out by conifers. The stand does not provide much in the way of snow intercept or thermal cover for white-tailed deer.

Figure A.6: *Existing forest condition within proposed unit 4.*

Proposed treatment – Thin-from-below (low thinning)/group selection/overstory thinning. Promoting quaking aspen growth and regeneration would be the highest priority. Conifer trees above and below the dripline of aspen would be cut and most conifers would be removed within 60 feet of aspen. Ponderosa pine and larch would be favored to leave within aspen clones due to their more open crown structure which allows more sunlight to reach the understory compared to Douglas-fir and spruce which have denser crowns. Where aspen is not present, overstory trees would be thinned to a variable spacing, favoring dominant and codominant trees. Crown health would be the primary consideration for removal. Trees with thinning crowns and low crown ratios (less than 30% live crown) would be removed to favor trees with dense crowns and higher crown ratios. In general, the largest trees (greatest DBH, tallest) with the highest crown ratio would be retained and relatively smaller trees with lower crown ratios would be cut. Understory trees (less than 5 inches DBH) would be removed below the dripline of overstory trees and would be thinned to a variable spacing (10-15 feet) in canopy gaps. In general, the largest trees (greatest DBH, tallest) with the highest crown ratio would be retained and relatively smaller trees with lower crown ratios would be cut. Snags > 16 inches DBH; trees with visible nesting cavities; and trees with dead, deformed, or multiple tops would be retained for their value as wildlife trees.

Unit 5 (78 acres)

- Cover type – Ponderosa pine
- Size class – Sawtimber (>8" DBH)
- Crown cover – Low (10-25%)
- Aspect – Flat
- Elevation – 3,100'
- Habitat type – PSME/SYAL-CARU (Douglas-fir/common snowberry-pinegrass phase)
- Succession class – Mid seral, open canopy
- Structure – Young, multi-strata

General conditions – Stand is comprised an overstory dominated by mature (~100 year old) ponderosa pine (70%) with varying amounts of Douglas-fir (30%). Understory is dense clumps of advanced regeneration (<30 years old) of Douglas-fir and ponderosa pine. Overstory density varies but is about 80 BA/acre on average. Understory density averages around 600 trees per acre. Dense, ladder fuel conditions occur in many areas. Remnant rough fescue bunchgrass, an important forage species for big game winter range, occurs in much of the stand but, due to fire exclusion, is being supplanted by snowberry, pinegrass, and Douglas-fir.

Figure A.7*. Existing forest conditions in proposed unit 5.*

Proposed treatment – Thin-from-below (low thinning)/overstory thinning. The primary objectives of this unit are to reduce ladder fuels and promote rough fescue. Overstory trees would be thinned to a variable spacing, favoring dominant and codominant trees. Ponderosa pine and western larch would be favored over Douglas-fir. Crown health would be the primary consideration for removal. Trees with thinning crowns and low crown ratios (less than 30% live crown) would be removed to favor trees with dense crowns and higher crown ratios. In general, the largest trees (greatest DBH, tallest) with the highest crown ratio would be retained and relatively smaller trees with lower crown ratios would be cut. Understory trees (less than 5 inches DBH) would be removed below the dripline of overstory trees and would be thinned to a variable spacing (10-15 feet) in canopy gaps. In general, the largest trees (greatest DBH, tallest)

with the highest crown ratio would be retained and relatively smaller trees with lower crown ratios would be cut. Snags > 16 inches DBH; trees with visible nesting cavities; and trees with dead, deformed, or multiple tops would be retained for their value as wildlife trees.

Unit 6 (105 acres)

- Cover type – Douglas-fir
- Size class – Sawtimber (>8" DBH)
- Crown cover – Medium high (50-75%)
- Aspect – East
- Elevation – 3,100'
- Habitat type – PSME/VACA (Douglas-fir/dwarf huckleberry)
- Succession class – Mid seral, closed canopy
- Structure – Closed stem exclusion

Figure A.8: *Existing forest condition in proposed unit 6.*

General conditions – Stand is comprised a single layer of densely stocked, mature (~100 year old) overstory of Douglas-fir (70%), western larch (20%), and ponderosa pine (10%). Overstory density averages around 180 BA/acre. Douglas-fir bark beetle is active within the stand and minor amounts of Douglas-fir bark beetle mortality occur throughout but are more apparent on the north side of the stand, where heavy accumulations of large woody debris are present. Some neighbors have expressed concern about the fire hazard created by the downed wood along the eastern boundary of the WMA. Due to the high overstory density, live crown ratios have dwindled to less than 20% (portion of the tree with live needles in proportion to the height of the tree). Competition stress is high and vigor is low, which is allowing Douglas-fir beetle to continually infest portions of the stand, especially in drought years. The stand provides excellent snow intercept and thermal cover for white-tailed deer.

Proposed treatment – Variable density thinning/group selection. The primary objectives of this unit are to reduce Douglas-fir bark beetle risk and maintain health of overstory trees for long-term white-tailed deer winter range. Suppressed overstory trees (greater than 5 inches DBH would be removed around dominant/co-dominant overstory trees. Crown health would be the primary consideration for removal. Trees with thinning crowns and low crown ratios (less than 30% live crown) would be removed to favor trees with dense crowns and higher crown ratios. Overstory trees would be retained in a clumpy, variable pattern to maintain the natural character of the stand. The average density would be variable, with small openings (up to ½ acre) created around seed trees to promote natural regeneration and heavier leave pockets (2+ acres) where tree crowns are healthier, in order to maintain cover for white-tailed deer. The residual density will range from 60 BA/ac to 120 BA/ac, averaging approximately 110 basal area per acre (BA). Snags > 16 inches DBH; trees with visible nesting cavities; and trees with dead, deformed, or multiple tops would be retained for their value as wildlife trees. Understory trees (less than 5 inches DBH) would be removed below the dripline of overstory trees and would be thinned to a variable spacing in canopy gaps. In general, the largest trees (greatest DBH, tallest) with the highest crown ratio would be retained and relatively smaller trees with lower crown ratios would be cut.

Unit 7 (42 acres)

- Cover type – Ponderosa pine
- Size class – Sawtimber (>8" DBH)
- Crown cover – Medium (25-50%)
- Aspect – Southwest
- Elevation – 3,100'
- Habitat type – PSME/SYAL-CARU (Douglas-fir/snowberry-pinegrass phase)
- Succession class – Mid seral, closed canopy
- Structure – Closed stem exclusion

Figure A.9: *Existing forest condition in proposed unit 7.*

General conditions – Stand is two-storied, with mature (~100 year old) overstory of ponderosa pine (60%) and Douglas-fir (40%). Overstory density averages around 110 BA/acre. Understory is predominantly Douglas-fir advanced regeneration (<30 years old). Similar to unit 5, dense ladder fuels have developed in some areas. Some neighbors have expressed concern about the fire hazard created by the ladder fuel condition along the southern boundary of the WMA. Rough fescue bunchgrass is also present in the understory, but is being supplanted by more shade-tolerant grasses, shrubs, and trees. The stand provides moderate canopy closure and therefore moderate snow intercept and thermal cover for white-tailed deer.

Proposed treatment – Thin-from-below (low thinning)/overstory thinning. The primary objectives of this unit are to reduce ladder fuels and promote rough fescue. Overstory trees would be thinned to a variable spacing, favoring dominant and codominant trees. Ponderosa pine and western larch would be favored over Douglas-fir. Crown health would be the primary consideration for removal. Trees with thinning crowns and low crown ratios (less than 30% live crown) would be removed to favor trees with dense crowns and higher crown ratios. In general, the largest trees (greatest DBH, tallest) with the highest crown ratio would be retained and relatively smaller trees with lower crown ratios would be cut. Understory trees (less than 5 inches DBH) would be removed below the dripline of overstory trees and would be thinned to a variable spacing (10-15 feet) in canopy gaps. In general, the largest trees (greatest DBH, tallest) with the highest crown ratio would be retained and relatively smaller trees with lower crown ratios would be cut. Snags > 16 inches DBH; trees with visible nesting cavities; and trees with dead, deformed, or multiple tops would be retained for their value as wildlife trees.

Unit 8 (16 acres)

- Cover type – Moist mixed conifer (Douglas-fir/ponderosa pine/western larch/Engelmann spruce/quaking aspen)
- Size class – Sawtimber (>8” DBH)
- Crown cover – Medium (25-50%)
- Aspect – Flat/east
- Elevation – 3,000’
- Habitat type – PICEA/CLUN (spruce/queencup beadlily)
- Succession class – Mid seral, closed canopy
- Structure – Closed stem exclusion

Figure A.10: *Existing forest condition in proposed unit 8.*

General conditions – Stand is comprised of a varying mix of mature (~100 year old) overstory Douglas-fir, ponderosa pine, western larch, and Engelmann spruce with quaking aspen interspersed throughout. The stand borders an ephemeral area that is seasonally wet and supports wetland associated vegetation such as common horsetail. Overstory density averages around 120 BA/acre. Understory is predominantly Douglas-fir, ponderosa pine, and Engelmann spruce advanced regeneration (<30 years old). Similar to unit 4, quaking aspen is being supplanted by conifers. There is also an extensive Canada thistle infestation within and adjacent to the unit. The stand provides moderate canopy closure and therefore moderate snow intercept and thermal cover for white-tailed deer.

Proposed treatment – Thin-from-below (low thinning)/group selection/overstory thinning. Promoting quaking aspen growth and regeneration would be the highest priority. Conifer trees above and below the dripline of aspen would be cut and most conifers would be removed within 60 feet of aspen. Ponderosa pine and larch would be favored to leave within aspen clones due to their more open crown structure which allows more sunlight to reach the understory compared to Douglas-fir and spruce which have denser crowns. Where aspen is not present, overstory trees would be thinned to a variable spacing, favoring dominant and codominant trees. Crown health would be the primary consideration for removal. Trees with thinning crowns and low crown ratios (less than 30% live crown) would be removed to favor trees with dense crowns and higher crown ratios. In general, the largest trees (greatest DBH, tallest) with the highest crown ratio would be retained and relatively smaller trees with lower crown ratios would be cut. Understory trees (less than 5 inches DBH) would be removed below the dripline of overstory trees and would be thinned to a variable spacing (10-15 feet) in canopy gaps. In general, the largest trees (greatest DBH, tallest) with the highest crown ratio would be retained and relatively smaller trees with lower crown ratios would be cut. Snags > 16 inches DBH; trees with visible nesting cavities; and trees with dead, deformed, or multiple tops would be retained for their value as wildlife trees.

***Table A.1**: Roads by length, road work, and log hauling*

Road	Length (mi)	Road Work	Log Haul Road?
A1	0.01	Maintenance	Y
A2	0.06	New Temporary Construction	Y
B1	0.04	New Temporary Construction	Y
B2	0.05	New Temporary Construction	Y
C2	0.04	New Temporary Construction	Y
C3	0.23	New Temporary Construction	Y
D1	0.21	Maintenance	Y
D2	0.59	Maintenance	Y
D3	0.36	New Temporary Construction	Y
E	0.04	Maintenance	Y
F	0.51	Maintenance	Y
G1	0.45	Maintenance	Y
G2	0.25	New Temporary Construction	Y
H	0.65	Maintenance	Y
I	0.25	Maintenance	Y
Haul Road B	1.17	Maintenance	Y
Haul Road C	0.33	Maintenance	Y
T1	0.11	Designated Skid Trail	N