Silvicultural Prescription and Marking Guidelines

Black Hills Project Environmental Assessment
Fremont-Winema National Forest

Planning Project ID:	Black Hills EA
Timber Sale/Project Implementation ID:	Spot Stewardship/Sale number 16012
Ranger District:	Bly Ranger District

Stand Delineation and Types:
This prescription for Spot Stewardship (Spot) covers approximately 1,548 acres of the Black Hills Project. This area is within the Marsh Reservoir-Sycan River and Chester Spring-Sycan River subwatersheds in the Lower Sycan River Watershed.

Unit delineation was primarily based on plant association but also took into consideration roads and planning direction. Determination of plant association for each unit was based on GIS data and then verified by field reconnaissance. Areas of allocated old growth lodgepole pine (Management Area 3 and 14) was field verified to determine actual plant association and whether it should be treated with a group selection cutting as proposed in the environmental assessment. Only one area (in unit 11) is not an actual lodgepole stand and will not be treated the same as the old growth lodgepole stands. The stand in question is a ponderosa pine and lodgepole stand. Plant associations from Simpson (2007) was used in the field to determine the plant association. The area was divided into a total of 12 units, 7 ponderosa pine and 5 lodgepole pine.

Prescriptions and marking guides were then developed for each unit. All trees for retention and removal will be designated by prescription.

Current Condition:
The 1,548 acre Spot area is predominately composed of dry ponderosa pine forest with some lodgepole pine forest. Average elevation is 5050 feet with ranges from 4900 feet to 5200 feet. Slopes generally range from 0 to 15 percent, with some short steeper pitches. Intermittent streams run through a few of the units. Sycan River borders the north end of this sale.

The treatment area is mostly composed of ponderosa pine stands with some lodgepole stands mostly in the southern portion. The ponderosa pine stands are composed mostly of ponderosa pine with some lodgepole pine in the overstory and understory. Areas that have been treated (commercial and/or noncommercial) have less lodgepole pine due to its targeted removal. The lodgepole stands consists of lodgepole pine with a minor amount of ponderosa pine in the margins where it transitions to a ponderosa pine stand. Some stands have a significant quaking aspen component. Structural stage is stem exclusion or understory reinitiation in the lodgepole stands. Lack of fire has allowed conifers to encroach on meadows and aspen stands. For the ponderosa pine stands, past management, specifically fire exclusion and selective logging, altered density, structure, and species composition of the stands. Stands are now denser, contain multiple layers, and includes more lodgepole pine.

An informal walkthrough was conducted in May 2016. Current density levels are higher than the recommended density levels for low levels of mountain pine beetle mortality. Current average basal area generally ranges from 120 to 160 and 160 to 170 square feet per acre for ponderosa pine and lodgepole stands, respectively. Stand density index (SDI) ranges from 208 to 288. In addition to elevated risk of mountain pine beetle mortality, high density is contributing to tree vigor decline in the large mature ponderosa pine in some areas and elevated risk for high severity fire due to horizontal and vertical fuel

continuity. Stumps, mostly large ponderosa pine, from selective harvests are generally present in all stands. Some stands have been harvested since the selective logging practices of the past and they have lower basal area and are predominately ponderosa pine. The easily accessible lodgepole stands are visited by firewood cutters. Quaking aspen stands can be found in unit 5 and 7. Shrub species were mainly antelope bitterbrush and some wax currant. A small amount of greenleaf manzanita and snowbrush in unit 6.

Stand Structure:
Ponderosa pine stands: Most stands consists of 2 to 3 vertical strata. Stand structure is largely influenced by fire exclusion resulting in high mid-story density consisting generally of pole sized trees and past timber management resulting in a reduction of large diameter overstory pine species. These stands have relatively few seedlings. Sapling-to-pole sized trees (~2-12" DBH) predominate when considering stems per acre. Scattered-to-clumpy large diameter trees persist throughout most of the stands. A majority of the stands have relatively high canopy cover (> 40%). A few stands are single stratum due to past commercial and noncommercial cutting. Most trees in these stands are intermediate-sized ponderosa pine with little to no large trees, saplings, and pole-sized trees present.

Lodgepole pine stands: Stands are either 1 or 2 strata. The 1 stratum stands are currently in the stem exclusion stage. The 2 strata stands are undergoing understory reinitiation. Regeneration ranges from mostly seedlings and some saplings to thicket of saplings. Downed trees are common in the 2 strata stands. Quaking aspen is common in some areas.

Plant Associations taken from Simpson (2007):
The major plant associations for the units are CPS210 (ponderosa pine/bitterbrush) and CLM311 (lodgepole pine/blueberry-forb pumice), with some smaller areas of CPS219 (ponderosa pine/greenleaf manzanita), CLM211 (lodgepole pine/bearberry), and CLS214 (lodgepole pine/bitterbrush/Idaho fescue).

Insect and disease:
Insects and disease are a concern due to high stocking. Currently only minor mortality have been seen from mountain pine beetle but stands are likely at risk for greater mortality in the future due to current density. Mountain pine beetle mortality thresholds can be calculated for ponderosa and lodgepole pine based on Cochran's methods (1994). Dwarf mistletoe infections on ponderosa pine and lodgepole pine is low to high. Root rot is present in unit 6 in the ponderosa pine. While infected areas of insects and disease are generally contained to localized pockets, high densities of trees put these stands at high risk of insect and disease mortality.

Desired Condition:

Historically the majority of the stands in the Spot area were single story ponderosa pine stands with areas of denser forest. The goal is to restore these stands back to large ponderosa pine, open single story stand conditions with a residual basal area ranging 40 to 60 (average 50) square feet per acre while favoring retention of large ponderosa pine. Some stands will have higher densities based on abundance of trees over 21 inches dbh. Allocated old growth lodgepole stands will be treated by creating openings of ½ to 1 ½ acres in size to promote a second cohort of lodgepole pine through natural regeneration. Treatments would be focused on creating openings within stands to facilitate seral stage diversity that will provide for future old growth long-term, while still allowing the stands to function as old growth in the short-term.

Reducing density is expected to decrease susceptibility to mountain pine beetle and reduce the potential of crown fire establishment. Residual stands will be composed mostly of ponderosa pine with much lower stocking levels of lodgepole pine. Quaking aspen will be promoted and meadows will be enhanced by removing encroaching conifers. Spatial pattern of residual trees will be non-uniform.

Planning Direction:

Spot units are a site-specific application of the Black Hills Project environmental assessment. Direction in the environmental assessment is provided by the Fremont National Forest Land and Resource Management Plan (Forest Plan) as amended by the Regional Forester's Eastside Forests Plan Amendment 2 (Eastside Screens), the Inland Native Fish Strategy, and Forest Plan amendment #37—(1) the removal of white fir trees greater than 21 inches dhh when it would benefit an adjacent mature ponderosa pine or sugar pine and (2) utilizing a commercial timber sale in Management Areas 3 and 14 to benefit old growth habitat.

Management Area 5 – Timber and Range Production
Every unit is covered by Management Area 5; however, single story late-old structure (LOS) conditions will be emphasized due to direction from the Eastside Screens' amendment to the Forest Plan. This will be addressed by a thin from below that targets removal of small diameter trees while retaining large diameter individuals and most trees over 21 inches dbh. A Forest Plan amendment allows the removal of white fir trees greater than 21 inches dbh when it would benefit an adjacent mature ponderosa pine or sugar pine tree.

Management Area 3 – Old-growth Habitat for Dependent Species Above the Management Requirement Level and Management Area 14 – Old-growth Habitat to Provide Management Requirements for Dependent Species
Goal: Manage stands of old growth on the Forest to maintain minimum viable populations of dependent, native vertebrate species. A Forest Plan amendment allows a commercial timber sale in this area to develop sustainable conditions that will benefit old growth habitat. Treatments will be focused on maintaining or promoting LOS conditions, while creating resilient forest conditions. The Forest Plan's direction for lodgepole stands is to manage on a 120-year rotation with replacement stands when converting an allocated stand to early seral stage. Allowing wildfire to burn uncontrolled or clearcutting through these lodgepole stands is not socially acceptable in the current landscape. The Forest Plan amendment seeks to treat these stands with openings to promote a second cohort of lodgepole pine. This allows these stands to function as old growth in the short-term while facilitating seral stage diversity that will provide for future old growth long-term.

Project Treatment Objectives & Expected Results:

Treatments will focus on maintaining and/or promoting late-old structure conditions while creating resilient forest conditions. Stand density will be reduced by thinning from below via variable density management. Variable density management is the process of selecting then removing trees in a non-uniform pattern. Healthy, large diameter ponderosa pine and sugar pine will be treated with a radial thin to reduce competition and fuel concerns. Treatments will focus on reducing stand density index to the preferred management zone by prescribing a reduction in basal area equivalent to the stand density index range as appropriate for each plant association. In the old growth lodgepole stands, treatments will focus on creating openings within stands to facilitate seral stage diversity that will provide for future old growth long-term, while still allowing the stands to function as old growth in the short-term. Throughout the sale area, aspen and meadows will be treated by removing encroaching conifers.

No ponderosa pine or sugar pine tree over 21 inches dbh will be cut, except in the rare case where safety may be compromised. Forest Service will identify said trees prior to being cut.

Old growth juniper is not targeted to be cut. These are trees whose bark is thick, fibrous with well-developed vertical furrows, crown is flattened or rounded, and contain dead branches that are often covered by a light green lichen (Miller et al 2005). Snags and down logs are expected to meet Forest Plan requirements at the landscape scale.

Residual ponderosa pine stands will have stand density, structure, and composition more akin to their historical ranges. Residual stands will be composed mostly of ponderosa pine with much lower stocking levels of lodgepole pine. As a result of more growing space, more photosynthate will be available in

residual trees to allocate towards faster growth rates, improved defenses, and greater overall vigor. Average residual basal area will be 50 square feet per acre. Stands may have some areas with residual basal area exceeding what was prescribed depending on density of trees over 21 inches dbh and retention areas. Openings and retention areas will be dispersed within the treatment units. Residual stands are expected to withstand low to moderate intensity fires. Crown fire initiation will be unlikely and potential for sustaining active crown fire will be reduced.

Allocated old growth lodgepole stands will have ½ to 1 ½ acre openings to facilitate creation of an early seral stage. Approximately 50% of the individual stands would be treated with openings. The one other lodgepole stand will have average residual basal area of 70 square feet per acre. Mortality from mountain pine beetle will be reduced. Aspen stands will be treated by thinning encroaching conifers. As a result of more growing space, aspen trees will have greater overall vigor and stands should increase in size.

Suggested Treatment Sequence:

Yr.	Activity	Act. Units	Units	FACTS CODE	Funding	Treatment Description
0	Commercial thin via conventional tractor or mechanized system	1,231	1, 2, 3, 6, 10, 11	4220	XXXX	Thin from below to an average basal area of 50 square feet per acre (range 40 to 60).
0	Commercial thin via conventional tractor or mechanized system	35	4, 12	4220	XXXX	Thin from below to an average basal area of 70 square feet per acre (range 60 to 90).
0	Commercial thin via conventional tractor or mechanized system	4	13	4220	XXXX	Thin from below to an average basal area of 30 square feet per acre (range 20 to 40).
0	Commercial thin via conventional tractor or mechanized system	157	5	4220	XXXX	Thin all trees within 60 feet of aspen.
0	Group selection via conventional tractor or mechanized system	121	7, 9	4152	XXXX	Create openings ½ to 1 ½ acres in size. Focus openings in area where regeneration is present.
0	Small tree thin (4-8.9” dbh)	~1,548	All	4521	GSRV	Biomass production if applicable. Target density for 4-8.9” dbh trees is 25 tpa of PP. TPA of 10 of WF or LP where preferred species is not present. **This treatment will be in conjunction with harvest and as funding is available.**
0	Whole tree yard or yard tops with last log	1,548	All	1120	XXXX	Remove activity fuels to landing.

Yr.	Activity	Act. Units	Units	FACTS CODE	Funding	Treatment Description
0	Treat stumps with an EPA labeled borax product to exclude annosus inoculation	1,548	All	8120	XXXX	Apply an EPA labeled borax product as a preventative measure (within 24 hours of cutting) to all cut conifer stumps greater than 18 inches in diameter (with the exception of Douglas-fir, incense-cedar, and juniper). This guidance applies when cutting live trees or trees that have been dead a year or less.
0	Pile landing slash	1,548	All	1153	XXXX	Biomass production if applicable
1-2	Burn landing piles	1,548	All	1130	BDBD	Biomass production if applicable
1-2	Invasive plant survey and treatment		All		CWKV	
3	Small tree thin (0.1-8.9”dbh)		Areas not treated in conjunction with harvest	4521	SSCC or other	Biomass production if applicable. Target density for 0.1-8.9” dbh trees is 25 tpa of PP. TPA of 10 of WF or LP where preferred species is not present. **This treatment is for areas not treated in conjunction with the harvest due to lack of funding.**
3	Lop and scatter thinning slash to less than or equal to 18 inches depth or pile slash		Areas not treated in conjunction with harvest	1150/1153	SSCC or other	This slash treatment is for slash generated from the small tree thinning not done in conjunction with harvest.
4-10	Underburn	1,548	All	1113	WFHF	Reduce surface fuels and remaining ladder fuels. Target density for 0-4” dbh trees is 15-20 tpa, primarily PP.
25-30	Possible mechanical thinning entry	1,548	All	4220	XXXX	Commercial and/or non-commercial thinning to reduce ladder and canopy fuels prior to Rx fire. Re-evaluate skip locations.
25-30	Underburn	1,548	All	1113	WFHF	Maintenance burn to reduce accumulated surface and ladder fuels. Ideally 10-15 years after the first Rx burn.

Monitoring Plan:

1. Presale forester, marking crew foreperson, or zone silviculturist will review any marking that may occur.

2. The zone silviculturist will work closely with the sale administrator to ensure prescription objectives are being met.
3. Zone silviculturist will review results post-harvest and review any subsequent PCT prescription.

Literature Cited

Cochran, P.H.; Geist, J.M.; Clemens, D.L.; Clausnitzer, R.R.; Powell, D.C. 1994. Suggested stocking levels for forest stands in northeastern Oregon and southeastern Washington. Res. Note PNW-RN-513. Portland, OR

Simpson, M. 2007. Forested Plant Associations of the Oregon East Cascades. U.S. Department of Agriculture, Forest Service, Pacific Northwest Region. R6-NR-ECOL-TP-03-2007.

USDA Forest Service. 1989. Fremont National Forest Land and Resource Management Plan.

USDA Forest Service. 2012. Black Hills Project Environmental Assessment. U.S. Department of Agriculture, Forest Service, Pacific Northwest Region.

Approval

Prepared by: */s/Paul Cheng* 2016-07-10

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Silvicultural Prescription
Southeast Zone, Fremont-Winema National Forest

Planning Project ID: Black Hills EA
Timber Sale/Project Implementation ID: Spot Stewardship/Sale number 16012
Existing Stand(s): 1, 2, 3, 6, 10, 11 (PP)

I. ABIOTIC DATA

Unit	Acres	Aspect:	Elevation:	Slope (average):	Soil: Suitable
1	719	Varies, flat	5000-5200	0-35 (4)	84/82
2	183	S, N, varies	4900-5100	0-35 (5)	84/28
3	316	Flat	4900-5000	0-15 (4)	82/28/84
6	235	S, varies	5000-5250	0-35 (9)	87/84

II. BIOTIC DATA

Plant Association and corresponding unit(s):	GBA:	SI:	Lower/Upper Mgt (SDI):
CPS210 (1, 2, 3)	111	84	76/114
CPS219 (6)	120	84	75/113

UNIT	SPP.	BA/AC (stdev)	T/AC Dia	#	SDI	%CC	Structure	Successional
1	PP/LP	142 (62)	0-5	115	237		YFMS/OFMS	Young/ Mature
			5-10	117				
			10-15	49				
			15-20	16				
			20-30	8				
			30+	2				
			Total	306				
2	PP/LP	155 (70)	0-5	82	254		YFMS/OFMS	Young/ Mature
			5-10	115				
			10-15	53				
			15-20	15				
			20-30	11				
			30+	2				
			Total	279				
3	PP/LP	119 (62)	0-5	93	208		YFMS/OFMS	Young/ Mature
			5-10	114				
			10-15	48				
			15-20	17				
			20-30	3				
			30+	0				
			Total	276				

UNIT	SPP.	BA/AC (stdev)	T/AC Dia	#	SDI	%CC	Structure	Successional
6	PP/LP	163 (59)	0-5	92	261		YFMS/OFMS	Young/ Mature
			5-10	91				
			10-15	51				
			15-20	23				
			20-30	13				
			30+	2				
			Total	271				

% Species

//////////////	PP	WF	LP	IC	ASPEN	JUN
By BA	50-70	0-trace	30-50	0	0-trace	0-trace

Marking and Layout:

Objective is to reduce crowding and ladder fuels around large ponderosa pine, reduce density of ponderosa pine to improve vigor, reduce density of fire-intolerant species such as lodgepole pine, and enhance aspen stands and meadows for habitat diversity. Spacing should be non-uniform.

Retain 10-15% of each treatment unit in unthinned patches (skips) to provide for mule deer cover and habitat diversity across the landscape. Unthinned patches would be irregular in shape and range in size from 1/8 to 2 acres. Appropriate areas for skips include patches of denser forest, sites that offer habitat diversity, such as snags and concentrations of woody debris, rocky outcrops, and moist or wet microsites. Skips should be dispersed across the unit.

(5 percent of skips will be laid out. The remaining 10 percent can be obtained through DxP.)

Perform these in order (subsequent items do not override any item preceding it unless explicitly specified):

1. Retain ALL trees greater than 20.9 inches dbh, five needle pines (western white pine, whitebark pine, and sugar pine), incense-cedar, and snags.
2. Remove all trees within 60 feet of an aspen clump (at least 5 live aspen trees at least 5 feet tall within 30 feet of each other) or mountain mahogany clump (at least 5 live mountain mahogany stems at least 3 feet tall within 30 feet of each other). Distance is measured from edge of clump.
3. Within 100 feet of meadow edge, thin to 10 square feet per acre. Retain all mature ponderosa pine in this area.
4. Remove all lodgepole pine and white fir within 35 feet of healthy ponderosa pine trees greater than 20.9 inches dbh. Distance is measured from face of tree.
5. Thin from below the unit. The remaining unit should average 50 square feet per acre, range of 40 to 60 square feet per acre. Leave clumps of 2 to 6 ponderosa pine trees throughout unit. A clump is a grouping of at least two trees spaced no more than 20 feet from each other.

Leave trees in order of preference: mature ponderosa pine (reddish-orange bark, wide plates, and deep wide fissures), younger ponderosa pine, white fir, and lodgepole pine.

90% of residual trees will be well formed trees (good trees). The remaining 10% will be trees with decay, crooks, or forks for wildlife purposes and future snags.

Silvicultural Prescription
Southeast Zone, Fremont-Winema National Forest

Planning Project ID: Black Hills EA
Timber Sale/Project Implementation ID: Spot Stewardship/Sale number 16012
Existing Stand(s): 4, 12 (LP)

III. ABIOTIC DATA

Unit	Acres	Aspect:	Elevation:	Slope (average):	Soil: Suitable
4	21	Flat	5000	0-13 (1)	28

IV. BIOTIC DATA

Plant Association and corresponding unit(s):	GBA:	SI:	Lower/Upper Mgt (SDI):
CLS214 (4)	80	63	113/170

UNIT	SPP.	BA/AC (stdev)	T/AC Dia	#	SDI	%CC	Structure	Successional
4	LP/PP	164 (105)	0-5	91	264		YFMS	Young
			5-10	87				
			10-15	54				
			15-20	47				
			20-30	8				
			30+	0				
			Total	287				

% Species

//////////////	PP	WF	LP	IC	ASPEN	JUN
By BA	10-20	0	80-90	0	0	0

Marking and Layout:

Objective is to reduce crowding around large ponderosa pine, release understory ponderosa pine from lodgepole pine overstory, reduce susceptibility of lodgepole pine to mountain pine beetle, and enhance meadow habitat by removing conifer encroachment. Focus on removing lodgepole pine in the vicinity of ponderosa pine. Spacing should be non-uniform.

In unit 4: Retain 10-15% of each treatment unit in unthinned patches (skips) to provide for mule deer cover and habitat diversity across the landscape. Unthinned patches would be irregular in shape and range in size from 1/8 to 2 acres. Appropriate areas for skips include patches of denser forest, sites that offer habitat diversity, such as snags and concentrations of woody debris, rocky outcrops, and moist or wet microsites. Skips should be dispersed across the unit.

(5 percent of skips will be laid out. The remaining 10 percent can be obtained through designation by prescription.)

Perform these in order (subsequent items do not override any item preceding it unless explicitly specified):

1. Retain ALL trees greater than 20.9 inches dbh, mature ponderosa pine, five needle pines (western white pine, whitebark pine, and sugar pine), incense-cedar, and snags.

2. Remove all trees within 60 feet of an aspen clump (at least 5 live aspen trees at least 5 feet tall within 30 feet of each other) or mountain mahogany clump (at least 5 live mountain mahogany stems at least 3 feet tall within 30 feet of each other). Distance is measured from edge of clump.
3. Unit 4: Within 50 feet of meadow edge, thin to 10 square feet per acre.
4. Unit 12: Within 30 feet of meadow edge, remove all lodgepole pine. Thin ponderosa pine to 10 square feet per acre.
5. Remove all lodgepole pine and white fir within 35 feet of healthy ponderosa pine trees greater than 20.9 inches dbh. Distance is measured from face of tree.
6. Thin from below the remaining unit. The remaining unit should average 70 square feet per acre, range of 60 to 90 square feet per acre. Leave clumps of 2 to 9 ponderosa pine trees throughout unit. A clump is a grouping of at least two trees spaced no more than 20 feet from each other.

Leave trees in order of preference: ponderosa pine, lodgepole pine.

90% of residual trees will be well formed trees (good trees). The remaining 10% will be trees with decay, crooks, or forks for wildlife purposes and future snags.

Silvicultural Prescription
Southeast Zone, Fremont-Winema National Forest

Planning Project ID: Black Hills EA
Timber Sale/Project Implementation ID: Spot Stewardship/Sale number 16012
Existing Stand(s): 5, 7, 9 (formerly LP in 1) (LP)

V. ABIOTIC DATA

Unit	Acres	Aspect:	Elevation:	Slope (average):	Soil: Suitable
5, 7	~235	Flat	5000	0-16 (2)	83/84
9	~40	Flat	5100	0-5	82

VI. BIOTIC DATA

Plant Association and corresponding unit(s):	GBA:	SI:	Lower/Upper Mgt (SDI):
CLM311 (5)	107	75	113/170
CLM211 (9)	124	60	113/170

UNIT	SPP.	BA/AC (stdev)	T/AC Dia	#	SDI	%CC	Structure	Successional
5, 7	LP	173 (90)	0-5	152	287		SECC/UR	Young
			5-10	106				
			10-15	60				
			15-20	38				
			20-30	9				
			30+	0				
			Total	366				
9	LP	125 (65)	0-5	258	232		UR	Young
			5-10	157				
			10-15	50				
			15-20	16				
			20-30	1				
			30+	0				
			Total	481				

% Species

//////////////	PP	WF	LP	IC	ASPEN	JUN
By BA	0-5	0	90-100	0	0-10	0

Marking and Layout:

Objective is to create a multi-age lodgepole pine stand through openings. This structural diversity will provide for future old growth long-term while still allowing the stand to function as old growth in the short-term. Reduce conifer encroachment on aspen stands and meadows to enhance habitat diversity. Culture around large ponderosa pine where existing. Focus group selections in areas where regeneration is present.

The unthinned matrix will meet retention requirements. No need to add any unthinned patches (skips).

Perform these in order:

1. Retain ALL trees greater than 20.9 inches dbh, mature ponderosa pine, five needle pines (western white pine, whitebark pine, and sugar pine), incense-cedar, and snags.
2. Remove all trees within 60 feet of an aspen clump (at least 5 live aspen trees at least 5 feet tall within 30 feet of each other) or mountain mahogany clump (at least 5 live mountain mahogany stems at least 3 feet tall within 30 feet of each other). Distance is measured from edge of clump.
3. Within 100 feet of meadow edge, thin to 10 square feet per acre. Prefer ponderosa pine for retention. Retain the largest and healthiest trees.
4. Create openings ranging in size from ½ to 1 ½ acres. Try to locate openings away from aspen, meadows, and unit boundary. Try to locate openings where regeneration is present. Remove all trees, except ponderosa pine, in openings.
    a. Unit 5 and 7: The openings plus clearing around aspen should approximate 50 percent of the unit. Adjust the amount of openings based on amount of aspen.
    b. Unit 9: 50 percent of the area will be openings.

Definitions
Aspen clump – at least 5 live aspen trees at least 5 feet tall within 30 feet of each other. Distance from clump is measured from edge of clump.

Clump – a grouping of at least 2 trees spaced no more than 20 feet from each other.

Dsh – diameter at stump height – diameter of a tree measured outside bark 4 inches above the ground on the uphill side of the tree.

Healthy tree – relative to neighboring trees, healthy trees have fuller, darker green crowns and straighter stems without broken, dead or forked tops and free of insect damage or mistletoe.

Mature ponderosa pine – ponderosa pine with reddish-orange bark, wide plates, and deep wide fissures.

Mountain mahogany clump – at least 5 live mountain mahogany stems at least 3 feet tall within 30 feet of each other. Distance from clump is measured from edge of clump.

Distances are measured slope distance to face of the tree at the stump.

A basal area factor of 10 will be used to determine stocking compliance.

All live trees within the subdivision meeting A2 specifications plus incense-cedar, western white pine, and sugar pine trees greater than 7 inches dbh count towards residual basal area. Existing openings, understocked portions, and overstocked portions due to trees required for retention or cutting will not factor into stocking compliance.

Designation by prescription for subdivisions 1, 2, 3, 6, 10, and 11

End result: Stand density will be reduced and mean diameter will increase. Large ponderosa pine trees will have increased growing space and reduced fuels surrounding them. Leave trees will be the best trees available by species preference and will be predominately ponderosa pine. Lodgepole pine will be reduced significantly. Conifer encroachment on aspen, mountain mahogany, and meadows will be reduced. Spacing of trees should be non-uniform. There should be unthinned patches for mule deer cover and habitat diversity across the landscape.

Retain 10 percent of each subdivision in unthinned patches. Unthinned patches will be irregular in shape and range in size from 1/8 to 2 acres. Appropriate areas for unthinned patches include patches of denser forest, sites that offer habitat diversity, such as snags and concentrations of woody debris, rocky outcrops, and moist or wet microsites. Unthinned patches should be dispersed across the subdivision.

Residual stocking objectives (perform these in order; subsequent items do not override any item preceding it unless explicitly specified):

1. Retain ALL trees greater than 26.9 inches dsh, western white pine, sugar pine, incense-cedar, and snags.
2. Thin all trees within 60 feet of edge of an aspen clump or mountain mahogany clump.
3. Within Special Treatment Areas and 100 feet of boundaries shown on Contract Area Map, thin to 10 square feet per acre and retain all mature ponderosa pine. This is not an area average.
4. Thin all lodgepole pine and white fir within 35 feet of the face of a ponderosa pine tree with a live crown ratio greater than 30 percent and greater than 26.9 inches dsh.
5. Thin the subdivision to an average of 50 square feet per acre, range of 40 to 60 square feet per acre. Leave clumps of 2 to 6 ponderosa pine trees throughout subdivision. 50 percent of trees should be in clumps.

Tree selection objectives:

- In order, the following species preference takes priority over preferred tree characteristics:
    1. mature ponderosa pine
    2. ponderosa pine
    3. white fir
    4. lodgepole pine
- Leave trees should be the largest and healthiest trees. The irregular spatial arrangement resulting from selecting the best available trees for retention is desired.
- When possible, do not leave trees with one-sided crowns. When two or more trees have developed one-sided crowns due to proximity, either cut or retain all to meet the desired stocking level.
- 90 percent of residual trees will be well formed trees (good trees). The remaining 10 percent will be trees with decay, crooks, or forks for wildlife purposes and future snags.

Designation by prescription for subdivisions 4 and 12

End result: Reduce crowding around large ponderosa pine, release understory ponderosa pine from lodgepole pine overstory, reduce density of lodgepole pine, and enhance meadow habitat by removing conifer encroachment. Focus on removing lodgepole pine in the vicinity of ponderosa pine. Spacing should be non-uniform.

In subdivision 4: Retain 10 percent of subdivision in unthinned patches. Unthinned patches will be irregular in shape and range in size from 1/8 to 1/2 acres. Appropriate areas for unthinned patches include patches of denser forest, sites that offer habitat diversity, such as snags and concentrations of woody debris, rocky outcrops, and moist or wet microsites. Unthinned patches should be dispersed across the subdivision.

Residual stocking objectives (perform these in order; subsequent items do not override any item preceding it unless explicitly specified):

1. Retain ALL trees greater than 26.9 inches dsh, mature ponderosa pine, western white pine, sugar pine, incense-cedar, and snags.
2. Thin all trees within 60 feet of edge of an aspen clump or mountain mahogany clump.
3. In subdivision 4, within 50 feet of boundaries shown on Contract Area Map, thin to 10 square feet per acre. This is not an area average.
4. In subdivision 12, within 30 feet of boundaries shown on Contract Area Map, thin all lodgepole pine. Thin to 10 square feet per acre. This is not an area average.
5. Thin all lodgepole pine and white fir within 35 feet of the face of a ponderosa pine tree with a live crown ratio greater than 30 percent and greater than 26.9 inches dsh.
6. Thin the subdivision to an average of 70 square feet per acre, range of 60 to 90 square feet per acre. Leave clumps of 2 to 9 ponderosa pine trees throughout subdivision.

Tree selection objectives:

- In order, the following species preference takes priority over preferred tree characteristics:
    1. ponderosa pine
    2. lodgepole pine
- Leave trees should be the largest and healthiest trees. The irregular spatial arrangement resulting from selecting the best available trees for retention is desired.
- When possible, do not leave trees with one-sided crowns. When two or more trees have developed one-sided crowns due to proximity, either cut or retain all to meet the desired stocking level.
- 90 percent of residual trees will be well formed trees (good trees). The remaining 10 percent will be trees with decay, crooks, or forks for wildlife purposes and future snags.

Designation by prescription for subdivisions 5, 7, and 9

End result: Create a multi-age lodgepole stand by creating openings. Reduce conifer encroachment on aspen stands and meadows to enhance habitat diversity.

Residual stocking objectives (perform these in order; subsequent items do not override any item preceding it unless explicitly specified):

1. Retain ALL trees greater than 26.9 inches dsh, mature ponderosa pine, western white pine, sugar pine, incense-cedar, and snags.
2. Thin all trees within Special Treatment Areas as shown on Contract Area Map. Special Treatment Areas are designated on the ground with orange paint and red Special Treatment Area tags.
3. For subdivision 7 and 9: Thin all trees, except ponderosa pine, within 132 feet of face of double-banded blue painted tree, including the painted tree. Locations of these painted trees are shown on Contract Area Map.
4. Within 100 feet of boundaries shown on Contract Area Map, thin to 10 square feet per acre. Prefer ponderosa pine for retention. Retain the largest and healthiest trees. This is not an area average.

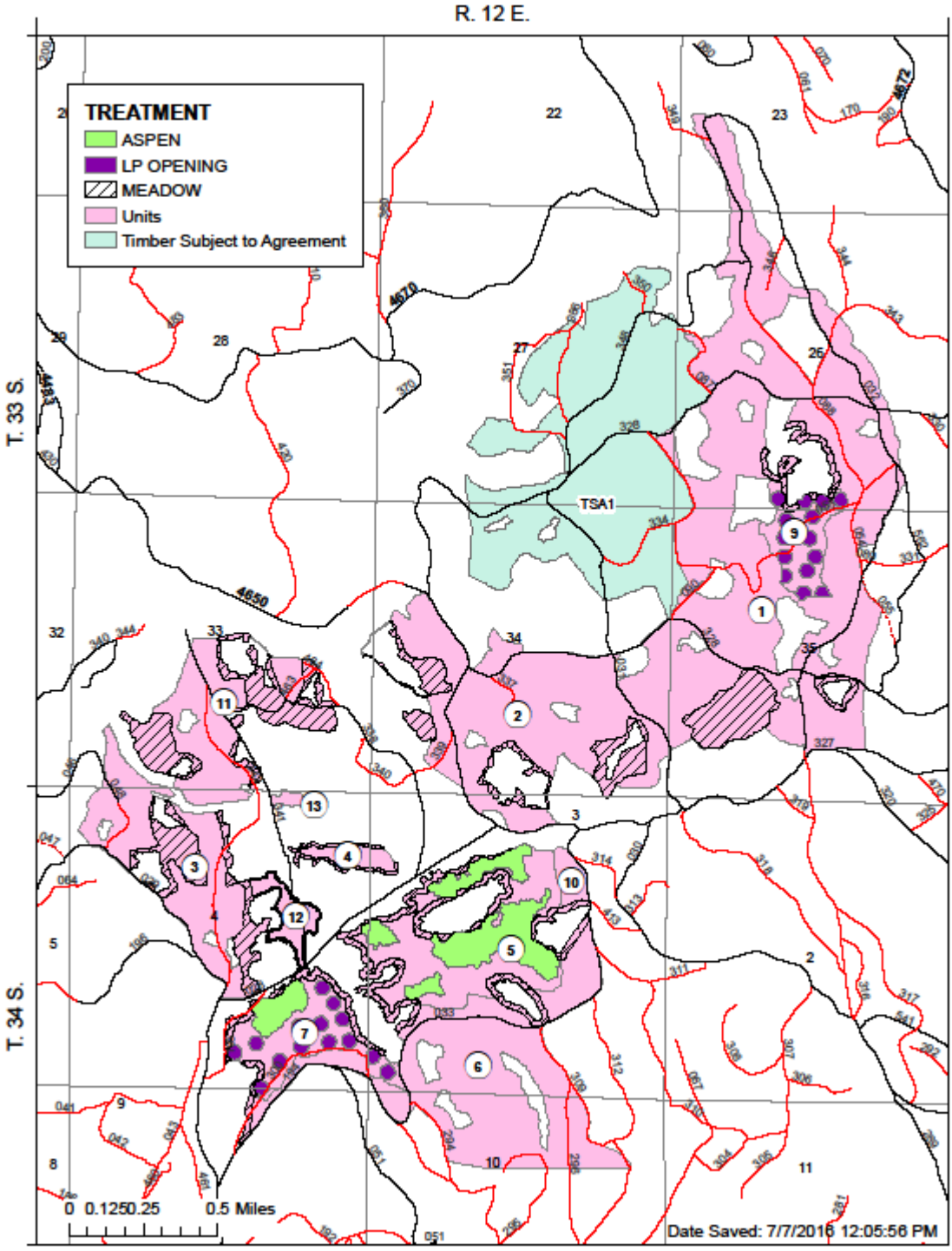
Designation by prescription for subdivision 13

End result: Reduce conifer encroachment on meadows by reducing density of conifers significantly. Spacing should be non-uniform.

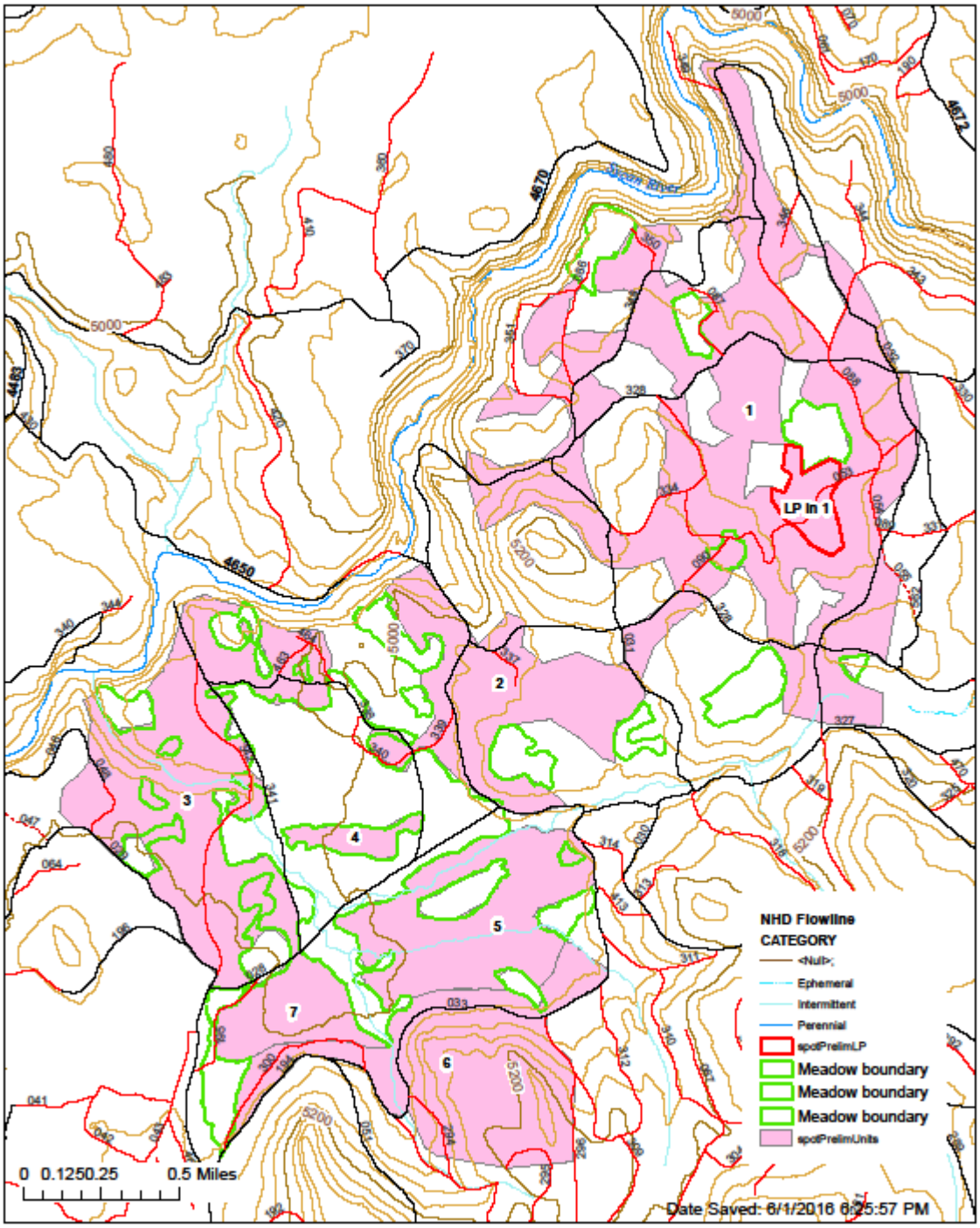
Residual stocking objectives (perform these in order; subsequent items do not override any item preceding it unless explicitly specified):

1. Retain ALL trees greater than 26.9 inches dsh, mature ponderosa pine, western white pine, sugar pine, incense-cedar, and snags.
2. Thin all lodgepole pine.
3. Thin to an average of 30 square feet per acre, range of 20 to 40 square feet per acre. Retain the largest and healthiest trees.

Map of preliminary units for Spot Stewardship (2016-07-07).



Map of preliminary units for Spot Stewardship (2016-06-01).



General Inspection Instructions during Implementation

Variable plot sampling and walkthroughs should be used to inspect cutting to determine compliance with specifications.

Pre-harvest monitoring points should be established to help in identifying trees that should be retained. Without pre-harvest monitoring points, it can be difficult to determine whether or not the preferred trees were retained. For example, the retention of a forked ponderosa pine tree next to a cut ponderosa pine stump. We do not know if the cut ponderosa pine tree was the better tree to retain or not if we do not know the condition of the tree prior to being cut. Designation by prescription allows some latitude in the selection of leave trees but clear guidelines as specified in the designation should not be violated. For example, a white fir tree will never incur a ponderosa pine tree to be cut. However, slight differences, such as a small difference in amount of live crown ratio between trees can result in different interpretations on which tree to retain. Instances of minor differences will be common and the trees retained will be acceptable. However, obvious differences like a big difference in mistletoe infection (lightly-infected versus heavily-infected) or live crown ratio (20 percent versus 40 percent) between two trees does not allow much room for interpretation. Little to no latitude should be given for instances where it is very clear which tree is preferred according to the prescription's guidelines.

Installation of pre-harvest monitoring points is highly recommended but not essential. The condition of a tree cannot be determined once it is cut and removed but the remaining stump of the tree can somewhat inform you on which trees should have been retained. It is highly recommended to evaluate tree selection during harvest to ensure compliance with the prescription if pre-harvest monitoring points are not installed.

Post-harvest monitoring should revisit the pre-harvest monitoring points if they were done. In the case they are not, post-harvest monitoring should at a minimum consist of recording basal area by species and evaluating tree selection based on residual trees and cut stumps.

For assessment of residual basal area and tree selection:

- Install a series of plots. Plots shall be located throughout the treatment areas to obtain a representative sample of the work. A minimum of one plot per ten acres for each subdivision will be done or a minimum of ten plots, whichever is greater. Meeting a 30 percent sampling error (confidence interval expressed as a percentage of the sample mean) at the 95 percent confidence level is suggested.
- Mark inspection plots on the ground by monumenting the plot center.
- Use a basal area factor of 10 at each plot to determine residual basal area.
- Record residual basal area and species.
- Record "acceptable" or "unacceptable" for each residual tree. Acceptability will be based on tree retention criteria. Walkthroughs assessing tree selection can be used to assess compliance with specifications.
- Record all violations of required tree retention. An observation in the general area of the plot will be made as well as any observations during walkthroughs.
- Compute average basal area for the subdivision in two ways. Provide both results to project silviculturist.
    - (1) For stocking compliance: Existing openings, understocking portions, and overstocked portions due to trees required for retention or cutting will not factor into stocking compliance.
    - (2) For silviculture only: All plots will be used in computing the average basal area for the subdivision.