

Appendix G

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1. SW QUADRANT – LOW ELEVATION SAGEBRUSH GRASSLAND

Developed by: Bob Welch, Peggy Lyon, Danguole Bockus, Jim Garner, Stu Krebs, Bruce Krickbaum, Jim Dollarshell.

Written Description of Unit: Low elevation sagebrush grassland areas in the SW Quadrant. This area, which runs from Mailbox Park to Third Park, up to Mesa Creek and down to Dry Creek Basin, is characterized by level terrain and moderately deep soils. The upper edge of this type grades into pinyon juniper/sagebrush woodland above it. The sagebrush in this area is not a seral stage in the pinyon juniper /sagebrush woodland, but rather a climax community. There is little to no pinyon juniper encroachment and significant portions of the area covered by sagebrush stands that are small and fragmented (clumpy in nature).

Likely Pre-suppression Fire Regime and Mosaic: Infrequent fire, generally fast and hot – or moderate to high intensity fires. These fire events are generally wind-driven events that are small to moderate in size (5-200 acre patches). When fires occurred, the extent could be limited by the stand or patch size. Fires often start in adjacent pinyon juniper shrubland. Some insect and/or drought caused mortality in the sagebrush – primarily in the early seral stage. Prairie dogs can perpetuate early seral stages. There is potential for cheatgrass invasion or dominance, following disturbance – especially fire.

Desired Mosaic: Maintain existing stands, encourage regeneration, establish grass-forb understory and promote structural and age diversity. Management focus should emphasize improving condition within stands rather than on seral stages or patch size distribution.

Patch Size	Stage: SI Describe: Early grass and forb Yr range 0-10	Stage: SB (Early) Describe: Mix grass and mixed shrub Yr range 16-40	Stage: SB (Late) Describe: More mature shrub with some grass and forb Yr range 41+yrs.
% of Unit	5	15	80
Small Acre range 0-10 acres	30	M	M
Medium Acre range 11+ acres	70	M	M

2. SW QUADRANT – WUI LOW ELEVATION SAGEBRUSH GRASSLAND

Developed by: Eric Brantingham, Bob McKeever, Glenn Webb, John Moore,
Reviewed by Dan Huisjen

Written Description of Unit: Low elevation sagebrush grassland areas in the Southwest Quadrant. This area, which runs from Mailbox Park to Third Park, up to Mesa Creek and down to Dry Creek Basin, it is characterized by level terrain and moderately deep soils. The upper edge of this type grades into pinyon juniper/sagebrush woodland above it. The sagebrush in this area is not a seral stage in the pinyon juniper /sagebrush woodland, but rather a climax community. There is little to no pinyon juniper encroachment, with large portions of the area covered by sagebrush clumps that are small and fragmented.

Likely Pre-suppression Fire Regime and Mosaic: Infrequent, generally fast and hot, moderate to high intensity fires. These fire events are generally wind-driven events that are small to moderate in size (5-200 acre patches). When fires occurred, could be limited by patch size. Fires generally start in adjacent pinyon juniper shrubland. Some insect and/or drought can kill shrubs – primarily in the early seral stage. Prairie dogs can perpetuate early seral stages. There is potential for cheatgrass invasion or dominance, following disturbance – especially fire.

Desired Mosaic: Maintain existing stands, encourage regeneration, establish grass-forb understory and promote structural and age diversity. Management should focus on improving condition of stands rather than on seral stages or patch sizes. Opportunities to create small openings and early seral conditions should be evaluated carefully with the objective to interrupting the potential for a stand replacing events as the current community is fragmented.

Table 1
Southwest Quadrant
WUI LOW ELEVATION SAGEBRUSH GRASSLAND

Patch Size	Stage: SI Describe: Early grass and forb Yr range 0-10	Stage: SB (Early) Describe: Mix grass and mixed shrub Yr range 16-40	Stage: SB (Late) Describe: More mature shrub with some grass and forb Yr range 41+yrs.
% of Unit	25	35	40
Small Acre range 0-10 acres *	60	50	30
Medium Acre range 11+ acres	40	50	70

Large patch size is N/A

*** Note the WUI is based on the high end of the 10 acre patch size, unless the acreage drops below 5 acres.**

3. SW QUADRANT – SAGE GROUSE - LOW ELEVATION SAGEBRUSH

Developed by: Jim Garner, Craig Grother, John Moore, Ty Smith, Mark Caddy, Steve Monson, 2/25/05.

Written Description of Unit: Low elevation sagebrush areas in the SW Quadrant from Atkinson Mesa to Wrights Mesa. Unit currently mapped as potential sage grouse habitat. Sagebrush communities are dominated by Wyoming sage, interspersed with pinyon and juniper woodland. The PNV description for low elevation sagebrush and grasslands are based on the natural fire regime (Garner).

Likely Pre-suppression Fire Regime and Mosaic: Refer to HRV mosaic for low elevation sagebrush and grassland. Fire suppression and grazing practices create conditions favorable to P/J establishment & encroachment. Understory condition/cover influences the ability of P/J to establish and/or encroach into sagebrush parks.

Desired Mosaic: Desired conditions reflected in HRV Matrix Table. Current conditions of low elevation sagebrush probably more even-aged, homogenous, lower species diversity (especially understory) and higher tree cover than potential. Two prescriptions are suggested for this area to enhance sage grouse habitat: 1) remove P/J tree encroachment within the sage parks, and 2) improve vegetation condition through a change in livestock grazing practices, especially to avoid early season use. Any land treatments must consider the potential for cheatgrass. Treatment mosaics should not be designed with regular geometric patterns but use non-geometric, finger-like patterns. Emphasize the restoration, enhancement, and maintenance of wet meadows and grasslands within the sage parks. The desired condition for mature Wyoming sagebrush sites includes: 1) do not exceed 30-40% crown cover of sage, and 2) range condition is good to excellent.

Patch Size	<p>Stage: SI</p> <p>Describe:</p> <p>Early grass and forb</p> <p>Yr range 0-10</p>	<p>Stage: SB (Early)</p> <p>Describe: Mix grass and mixed shrub</p> <p>Yr range 16-40</p>	<p>Stage: SB (Late)</p> <p>Describe: More mature shrub with some grass and forb</p> <p>Yr range 41+yrs.</p>
% of Unit	5	15	80
Small Acre range 0-10 acres	30	M	M
Medium Acre range 11+ acres	70	M	M

4. SW QUADRANT – HIGH ELEVATION SAGEBRUSH – HRV/SAGE GROUSE

Developed by: Jim Garner, Craig Grother, John Moore, Ty Smith, Mark Caddy, Steve Monson, 2/25/05.

Written Description of Unit: High elevation sagebrush areas in the SW Quadrant located on the Sanborn Park, Howard Flats, and Iron Spring Mesa areas of the Plateau, and the Hamilton Mesa, Miramonte, Gurley Reservoir, and Beaver Mesa areas south of the San Miguel River. Most of the high elevation sagebrush parks in this area were converted to crop fields by homesteaders or were targeted by range improvement projects to increase forage production for cattle, and the existing stands of sagebrush are a result of secondary succession. Sage grouse habitat within the unit is currently mapped as occupied or vacant/unknown. The Dry Creek Basin area west of this unit also contains occupied habitat that is utilized by the same population of Gunnison sage grouse. Occupied habitat contains breeding leks, nesting and brood rearing habitat. Likely use in vacant/unknown areas is for nesting and brood rearing. The high elevation sagebrush type includes black sage, silver sage, and mountain sage coexisting and interspersed with Gambel oak, aspen, and ponderosa pine. Black sage dominates the sagebrush communities in the Hamilton Mesa, Miramonte, Gurley Reservoir, Beaver Mesa, and Iron Springs Mesa. Silver sage and mountain sage dominate sagebrush communities in the Sanborn Park and Howard Flats areas.

Likely Pre-suppression Fire Regime and Mosaic: Fire frequency occurs less often than the lower elevation sagebrush areas, and is influenced largely by the adjacent fuel types. The high elevation sagebrush community type is significantly different from low elevation sagebrush and grassland in species composition and response to disturbance or management activities. The sagebrush sites are far more productive because they occur on relatively deep soils that have good moisture throughout the growing season. These sites have the potential for high plant species diversity with good seed banks for natural regeneration and recovery. The recruitment of sagebrush back into a disturbed site is much faster than the low elevation sagebrush communities. The sites are much more resilient, recovering from fire, overgrazing, or other disturbances relatively quickly. Mountain and silver sage sites typically recover more quickly than the black sage types. Reestablishment of sagebrush can be successful with broadcast seeding. Perennial and biannual weeds need to be considered when planning land treatments. Annual weed problems and cheatgrass are less of a problem when compared to the low elevation sagebrush types.

Desired Mosaic: Management for sage grouse should focus on attainment of conditions described for the HRV. The primary emphasis should focus on range condition and proper management of livestock grazing to achieve good to excellent range condition. Manage for natural recovery after fire events unless

there was virtually no understory or seed source prior to the fire, or the site has a significant weed infestation. Recommend seeding large disturbances within the black sage type, primarily by broadcast seeding and chaining.

Due to the ecological differences between the sagebrush species occurring in this area, two matrix tables were developed.

Table 1

**High Elevation Sagebrush – HRV/Sage Grouse
Wyoming and Silver Sagebrush Types**

Patch Size ± 5% Range	Stage:SI Describe: Early grass and forb Yr range 0-10	Stage: SB (Mid) Describe: Mix grass and mixed shrub Yr range 11-30	Stage: SB (Late) Describe: More mature shrub with some grass and forb Yr range 30-60 yrs.
% of Unit	15	30	55
Small Acre range 0-20 acres	20	30	60
Medium Acre range 21- 300 acres	60	M	M
Large Acre range 300-500 acres	20	M	M

Table 2
High Elevation Sagebrush – HRV/Sage Grouse
Black Sage Type

Patch Size ± 5% Range		Stage:SI Describe: Early grass and forb Yr range 0-20	Stage: SB (Mid) Describe: Mix grass and mixed shrub Yr range 21- 59	Stage: SB (Late) Describe: More mature shrub with some grass and forb Yr range 60+ yrs.
% of Unit		5	15	70
HRV / Desire	Small 0-20 acres	20/20	M/seed if necessary	M
HRV / Desire	Med 21- 300 acres	60/0	50/M	M
HRV / Desire	Large 300- 500 acres	20/0	20/M	M

5. SW QUADRANT – MOUNTAIN SHRUB

Developed by: Amanda Clements, Allan Stahle, Bill Day, Craig Grother, Tim Garvey, Barry Johnston.

Written Description of Unit: “Ring of Fire”- From mountain shrubland class in RMLANDS.

Likely Presuppression Fire Regime and Mosaic - Based on Mesa Verde oak fire return interval 100-150 years (Floyd-Romme). Assume moderate size patches based on fire behavior. Fires tend to burn in a flashy manner and for a short duration, “single afternoon events” (one burning period), high intensity fire but because shrub fuel moistures are so responsive to humidity changes, tend not to smolder, or make numerous runs. Fires tend to burn patchily, underburning and fuel moisture drive this patchiness. This patchiness accumulates over time based on observations of fires burning in this vegetation type. Other natural disturbances like drought or heavy browse influence can enable pinyon pine invasion, these impacts are more significant at lower ecotone. Frost damages oak, and tent caterpillars and other insects also causes impacts to the oak. Combined frost and caterpillar impacts can be substantial in the oak type, R-2 Gunnison Service Center and C. Grother report areas of 100+ acres of caterpillar kill. In some areas repeated frosts have top killed oak. Smaller frost diebacks are more frequent, larger ones rarer however in most cases the effects are transitory and the vegetation rebounds . However during the periods of drought, frost damage and caterpillar infestations the oak is vulnerable to stand replacing fires. Heavy browsing can impact shrub species composition, and height structure—based on evidence from herbivore exclosures in region. Due to the abundance of fine fuels, fire in the oak can lead to hot fall fires. Fire behavior in the mountain shrub is most similar to Southeast Quadrant i.e. flashy crown fire behavior. The general orientation of the shrub stands in this quadrant is a belt of oak/shrub on steeper slopes, with a southeast facing aspect. The stands receive a significant amount of browsing/grazing from wildlife, which modifies the structure—keeping the shrubs hedged and suppressed to some extent. There is a question to whether stands used to have more serviceberry, mahogany, and a more open structure prior to heavy livestock grazing. Mechanical treatment through roller chopping appears to release serviceberry and mountain mahogany. Stands quickly for a matrix.

Desired Mosaic: Note that the % numbers shown below are guidelines, intended to be used within +/- 5 to 10%. They may not necessarily add up to 100% as shown.

Table 1
SW QUADRANT – MOUNTAIN SHRUB

Patch Size	Stage: early Describe: Grass-forb, shrub resprouts Yr range 0-4	Stage: early-mid Describe: High shrub stem density Yr range 4-15	Stage: mid Describe: mature shrub, self thin Yr range 15-50	Stage: later mid Describe: static, self maintaining shrubs, survival mode Yr range >50
% of unit	10-15	15	25	50
Small Acre Range 0-20	25	25	M	M
Medium Acre Range 20-300	60	60	M	M
Large Acre Range >300	15	15	M	M

6. SW QUADRANT – WUI MOUNTAIN SHRUB

Developed by: Amanda Clements, Allan Stahle, Bill Day, Craig Grother, Tim Garvey, Barry Johnston.

Written Description of Unit: “Ring of Fire”- From mountain shrubland class in RMLANDS.

Likely Presuppression Fire Regime and Mosaic - Floyd-Romme, Mesa Verde oak fire return interval 100-150 years. Assume moderate size patches based on fire behavior. Tends to burn flashy, short duration, “1 afternoon events”, high intensity fire but because shrub fuel moistures are so responsive to humidity changes, tend not to smolder, or make numerous runs. Fires tend to burn patchily, underburning and fuel moisture drive this patchiness. This based on observations of fires burning in this vegetation type. Other natural disturbances like drought or heavy browse influence might enable pinyon pine invasion, probably only an impact at lower ecotone. Frost damages oak, tent caterpillars and other insects also damage. Frost and caterpillar impacts substantial to oak, Grother 100 acres+ carterpillar kill. Repeated frosts have top killed oak. Smaller frost diebacks more frequent, larger ones rarer. Heavy browsing can impact shrub species composition, and height structure—based on assumptions, but also evidence from herbivore exclosures in region. Herbivore impacts probably could cause shrub to grass type conversion. Fire in this quadrant in oak—lots of fine fuels generally—lots of fuels in this type—lead to hot fall fires. Fire behavior similar to SE. Crown fire behavior, flashy. This belt of oak on steeper slopes, se facing in this quadrant. Gets lots of browsing/grazing from wildlife, which modifies structure—keeps shrubs hedged, suppressed to some extent. Did stands used to have more serviceberry, mahogany, and more open prior to heavy grazing? Rollerchopping seems to release serviceberry/mahogany. Numbers in part based on RMLands.

WUI Prescription-: The desired mosaic will be created in areas that have been prioritized based on density of development, aspect, slope, wind direction, and ignition potential. The mosaic will be located as close to structures/development as possible and may extend up to 2 mile away, depending on topography and primary wind direction. The desired mosaic tends to be made up of linear patches that are oriented perpendicular to the primary fire spread direction and consists mostly of medium size patches of earlier seral (grass/forb/shrub) located within a continuous matrix of early-mid to late/old growth mountain shrub.

Desired Mosaic: Note that the % numbers shown below are guidelines, intended to be used within +/- 5 to 10%. They may not necessarily add up to 100% as shown.

Table 1
SW QUADRANT – WUI MOUNTAIN SHRUB

	Stage: early Describe: Grass-forb, shrub resprouts Yr range 0-4	Stage:early-mid Describe: High shrub stem density Yr range 15-Apr	Stage: mid Describe: mature shrub, self thin
Patch Size			Yr range 15-50
% of unit	15-Oct	15	25
Small Acre Range 0-20	25	25	M
Medium Acre Range 20-300	60	60	M
Large Acre Range >300	15	15	M

7. SW QUADRANT - PJ /SAGEBRUSH WOODLAND

Developed by: Bob Welch, Peggy Lyon, Danguole Bockus, Jim Garner, Stu Krebs, Bruce Krickbaum, Jim Dollarshell.

Written Description of Unit: Low elevation pinyon juniper/sagebrush woodland areas in the Southwest Quadrant. This area includes Mailbox Park and Third Park, south of Nucla, and Naturita Canyon and Broad Canyon. This area has scattered, fairly dense patches of pinyon juniper, with large sagebrush areas.

Likely Pre-suppression Fire Regime and Mosaic: The area probably experienced a significant number of fire starts, but not many of the fires became large. This is important deer winter range and potential sage grouse habitat.

Desired Mosaic: Maintain existing stands, encourage regeneration, establish grass-forb understory and promote structural and age diversity.

Patch Size	Stage: Early grass Describe: Early grass and forb Yr range 0-10	Stage: Early Mid Shrub/Forb Describe: Yr range 10-50	Stage: Mid Shrub/Forb Describe: Yr range 50-100	Stage: Late Tree/Shrub/Grass Yr range 150-350yrs.	Stage: Old Growth – Tree Infilling Yr range 350+
% of Unit	5	10	25	25	35
Small Acre range 0-50 acres	70	25	25	M	M
Medium Acre range 51-500 acres	20	50	50	M	M
Large Acre range 501+ acres	10	25	25	M	M

8. SW QUADRANT – WUI Pinyon Juniper /Sagebrush Woodland

Developed by: Eric Brantingham, Bob McKeever, Glenn Webb, John Moore,
Reviewed by Dan Huisjen

Written Description of Unit: Low elevation pinyon juniper/sagebrush woodland areas in the Southwest Quadrant. This area includes Mailbox Park and Third Park, south of Nucla, and Naturita Canyon and Broad Canyon. This area has scattered, fairly dense patches of pinyon juniper, with large sagebrush areas.

Likely Pre-suppression Fire Regime and Mosaic: This area likely experienced a a large number of fire starts, but not many of the fires became large. This is important deer winter range and potential sage grouse habitat.

Desired Mosaic: Maintain existing stands, encourage regeneration, establish grass-forb understory and promote structural and age diversity. The emphasis for WUI treatments is to put small to medium patch perforations in early and early mid seral stages to interrupt large fire growth or that can be linked in the event that fire line construction is necessary.

**Table 1
SW QUADRANT – WUI PJ /SAGEBRUSH WOODLAND**

Patch Size	Stage: Early grass Describe: Early grass and forb Yr range 0-10	Stage: Early Mid Shrub/ Forb Describe: Yr range 10-50	Stage: Mid Shrub/Forb Describe: Yr range 50-100	Stage: Late Tree/Shrub/ Grass Yr range 150-350yrs.	Stage: Old Growth – Tree Infilling Yr range 350+
% of Unit	20	25	25	20	10
Small Acre range 0-25 acres	80	60	---	---	---
Medium Acre range 25-50 acres	20	40	---	---	---
Large Acre range >50+ acres 11+ acres	N/A	N/A	N/A	N/A	N/A

Table 2

SW QUADRANT – WUI PJ /SAGEBRUSH WOODLAND

Final

Patch Size	Stage: Early grass Describe: Early grass and forb Yr range 0-10	Stage: Early- Mid Shrub/ Forb Describe: Yr range 10-100	Stage: Mid Shrub/Forb Describe: Yr range 100+
% of Unit	20	25	25
Small Acre range 0-25 acres	80	60	
Medium Acre range 25-50 acres	20	40	

9. SW QUADRANT – HIGH ELEVATION PINYON-JUNIPER/SHRUBLAND

Developed by: Amanda Clements, Harley Metz, Steve Shrock, Art Stevens, Allan Stahle, Bill Day, Glenn Webb, Bill Baker.

Written Description of Unit: “Ring of Fire” - Combines RMLANDS Pinyon-juniper woodland and pinyon-juniper, oak, serviceberry woodland.

Likely Pre-suppression Fire Regime and Mosaic: High intensity fire, infrequent, >400 year return interval-(Karen Eisenhart). The presence of cheatgrass can be a complicating factor. Pinyon decline is widespread and is having an impact at the time of the preparation of this mosaic description. Eisenhart’s studies shows fire to be more common in higher elevation pinyon juniper (implies this end of pinyon juniper elevation range will be skewed toward earlier seral stages than lower elevation pinyon juniper). Romme et al RMLANDS vegetation classification splits out the pinyon juniper into three general classes. Eisenhart has 40% of sites>300 yrs around Nucla area, draft RMLANDS has about 10-25% in these old age classes, but this may reflect preliminary status of analysis and difference in methodology. Baker and Shinneman have not evaluated pinyon juniper age data by quadrant, but rather across the Plateau. The data indicates a longer fire rotation and more persistent old woodland than previously thought. Fire occurrence maps show more fire in this quadrant relative to the Plateau as a whole. Anecdotal information that lightning strikes in mid pinyon juniper zones are fires that tend gain the largest size. This mosaic description is based primarily on Eisenhart’s published data. There is some uncertainty regarding grasslands interspersed in the pinyon juniper woodland versus the true montane grasslands—the grasslands in this zone are adjoining or surrounded by shrub or oak— as distinguished from the RMLANDS montane grassland which refer to open parks up on top of the Plateau. Because of these differences the grass forb percentage was increased from 1% to 5% to reflect inclusions that are natural grasslands interspersed through this vegetation type.

Patch sizes—The fire occurrence map provided a likely natural distribution of patch sizes, even Burn Canyon fire, especially pinyon juniper portion, the ponderosa portion may not have burned as extensively except for disturbance due post European settlement as an effect of increased homogeneity. With pinyon decline the successional impacts are variable, with succession advanced in some areas and set back in others. Small patches are also created by drought, decline, bark beetles, as well as single-few tree fires. Patch sizes are based on typical small, mid and large disturbances. It is not uncommon for 100 acre fires to go out after the burning period or wind event has ended. Fires greater than 100 acres exhibit the more intense fire behavior, rates of spread and resistance to control. It is recommended that patch sizes should initially be based on fire size distribution for quadrant, with consideration for some reduction of size to reflect the less common fire size associated with Burn Canyon acreage.

Desired Mosaic: Note that the % numbers shown below are guidelines, intended to be used within +/- 5 to 10%. They may not necessarily add up to 100% as shown.

Table 1
SW QUADRANT – HIGH ELEVATION PINYON-JUNIPER/SHRUBLAND

Patch Size	Stage: early Describe: Grass-forb Yr range 0-10	Stage:early- mid Describe: Shrub/grass Yr range 10-50	Stage: mid Describe: Shrub/ tree infilling Yr range 50-150	Stage: later mid Describe: Tree SE, touching canopies Yr range 150-350	Stage: late Describe: Yr range 250-400	Stage: old Describe: Yr range 350-600+
% of unit	5	10	15	25	25	25
Small Acre Range <1-5 acres	5-10	5-10	<5	M	M	M
Medium Acre Range >5-100 acres	20-35	25-35	30	M	M	M
Large Acre Range >100 acres	60-70	60-70	70	M	M	M

10. SW QUADRANT – WUI-HIGH ELEVATION PINYON-JUNIPER/SHRUBLAND

Developed by: Eric Brantingham, Bob McKeever, Glenn Webb, John Moore, Reviewed by Dan Huisjen

Written Description of Unit: “Ring of Fire” - Combines RMLANDS Pinyon-juniper woodland and pinyon-juniper oak serviceberry woodland.

Likely Pre-suppression Fire Regime and Mosaic: High intensity fire, infrequent, >400 year return interval-(Karen Eisenhart). The presence of cheatgrass can be a complicating factor. Pinyon decline is widespread and is having an impact at the time of the preparation of this mosaic description. Eisenhart’s studies shows fire to be more common in higher elevation pinyon juniper (implies this end of pinyon juniper elevation range will be skewed toward earlier seral stages than lower elevation pinyon juniper). Romme et al RMLANDS vegetation classification splits out the pinyon juniper into three general classes. Eisenhart has 40% of sites >300 yrs around Nucla area, draft RMLANDS has about 10-25% in these old age classes, but this may reflect preliminary status of analysis and difference in methodology. Baker and Shinneman have not evaluated pinyon juniper age data by quadrant, but rather across the Plateau. The data indicates a longer fire rotation and more persistent old woodland than previously thought. Fire occurrence maps show more fire in this quadrant relative to the Plateau as a whole. Anecdotal information that lightning strikes in mid pinyon juniper zones are the fires that tend gain the largest size. This mosaic description is based primarily on Eisenhart’s published data. There is some uncertainty regarding grasslands interspersed in the pinyon juniper woodland versus the true montane grasslands—the grasslands in this zone are adjoining or surrounded by shrub or oak— as distinguished from the RMLANDS montane grassland which refer to open parks up on top of the Plateau. Because of these differences the grass forb percentage was increased from 1% to 5% to reflect inclusions that are natural grasslands interspersed through this vegetation type.

Patch sizes— The fire occurrence map provided a likely natural distribution of patch sizes, even Burn Canyon fire, especially pinyon juniper portion, the ponderosa portion may not have burned as extensively except for disturbance due post European settlement as an effect of increased homogeneity. With pinyon decline, the successional impacts are variable, with succession advanced in some areas and set back in others. Small patches are also created by drought, decline, bark beetles, as well as single-few tree fires. Patch sizes are based on typical small, mid and large disturbances. It is not uncommon for 100 acre fires to go out after the burning period or wind event has ended. Fires greater than 100 acres exhibit the more intense fire behavior, rates of spread and resistance to control. It is recommended that patch sizes should initially be based on fire size distribution for quadrant, with consideration for some reduction of size to reflect the less common fire size associated with Burn Canyon acreage.

WUI Prescription – “Ring of Fire” ignition zone. Characterized by high intensity fires. Generally, medium and relatively large patch sizes are the most desirable outside of large private land ownership blocks where aesthetics may limit treatment size. Many small patches in this type would not be particularly useful for interrupting fire behavior contributing to large fire growth. In addition small patches would create significant maintenance cost. However, it is recognized that small patches are more desirable near residences. The recommendation is to mimic the prescriptions successfully used near the Log Hill WUI in the Southeast Quadrant. This prescription would be applicable in areas such as the Ute, Dry Park, and Mountain View WUI zones. The desired mosaic will be created in areas that have been prioritized based on density of development, aspect, slope, wind direction, and ignition potential. The mosaic will be located as close to structures/development as possible and may extend up to two mile away, depending on topography and primary wind direction. The desired mosaic will be made up of linear patches that are oriented perpendicular to the primary fire spread direction, and consists of numerous small to medium size patches of grass/forb and grass/forb/shrub/young pinyon juniper located within a matrix of pinyon juniper /decadent sage and late/old growth pinyon juniper. In addition, portions of the two middle seral stages will be managed as a savannah type to both reduce fire intensity and maintain aesthetics and screening near subdivisions.

Desired Mosaic: Note that the % numbers shown below are guidelines, intended to be used within +/- 5 to 10%. They may not necessarily add up to 100% as shown.

Table 1

SW QUADRANT – WUI HIGH ELEVATION PINYON-JUNIPER/SHRUBLAND

Patch Size	Stage: early Describe: Grass-forb some shrub component est. Yr range 0- 10	Stage:early- mid Describe: Shrub/grass w/ PJ regeneration Yr range 10- 50	Stage: mid Describe: Shrub/ tree infilling Yr range 50-150	Stage: later mid Describe: Tree SE, touching canopies Yr range 150-350 +
% of unit	25	25	20	30
Small Acre Range <1-10 acres	10	10	30	M
Medium Acre Range >10-25 acres	60	60	40	M
Large Acre Range >25+ acres	30	30	30	M

11. SW QUADRANT – PONDEROSA/OAK WOODLAND

Developed by: Amanda Clements, Harley Metz, Steve Shrock, Art Stevens, Allan Stahle, Bill Day, Glenn Webb, Bill Baker.

Written Description of Unit: “Ring of Fire” - Combines RMLANDS Pine- oak, Pinyon-juniper woodland and pinyon-juniper, oak, serviceberry woodland.

Likely Presuppression Fire Regime and Mosaic – This is an area of high fire activity, with a complex fuel mix. Fire starts are more frequent on the west side of the Plateau, and total area burned per decade appears to be greater on the west side on the Plateau in general and southwest side in particular. Most fire starts are in upper pinyon juniper zone moving upward into the pine oak type. Oak has always persisted in combination with the pine. The pine stands were probably characterized by a "typical" ponderosa pine fire regime prior to 1880, i.e., frequent (10-30 year intervals) low-severity fires that maintained a dominant pine canopy (though it was a fairly open canopy) and an understory of low Gambel oak and herbs. Ponderosa pine thrives under a disturbance regime of frequent fires, but doesn't do so well with longer fire intervals because the longer fire intervals usually result in more severe fires when they occur. Oak, on the other hand, can thrive under both long and short fire intervals; it is suppressed by the pine on the west side of the Plateau but has little competition on the east side. Pine competition and fire probably kept oak in check. Livestock grazing is speculated to have reduced low intensity fires and disrupted early/late season cool fires. Frequent low intensity fire may suppress oak, based on local prescribed burn experience. The mix of fire-maintained opening and mixed intensity fire regimes probably resulted in a diverse mosaic as fire sequences burned around some areas and other areas burned. Fire intervals would be such that they sustained both ponderosa and oak. Oak site production seems to be related to soil characteristics. Disturbance from logging has probably contributed to amount of oak in current day stands. The evidence of pine stumps left in the Southwest quadrant indicates that the pine trees were fairly large diameter for Colorado. Historically, prior to widespread livestock grazing, the area probably had more grass production to carry fire, resulting more frequent, cooler fires. Oak increases flammability on patches of the landscape based on its ability to propagate fire into the crowns of ponderosa pine—and could be triggered by spring hard frosts. Oak and pine can occur in spatially separated mosaics on the landscape with oak dominating small patches, pine others. Moisture in southwest quadrant improves regeneration of pine compared with the southeast quadrant. Discrete small stands (e.g. 40+ acres) are uncommon - very fine scale pattern occurs instead. Because of dispersion of vegetation, and the heterogeneity of fuels the pine oak and the adjacent pinyon juniper and mountain shrub type it is probably not going to get large fire/patch events (> 10,000 ha.) that would be characteristic of other topography. This mosaic is based on RMLANDS estimates of seral stages and patch size.

Desired Mosaic: Note that the % numbers shown below are guidelines, intended to be used within +/- 5 to 10%. They may not necessarily add up to 100% as shown.

Table 1
SW QUADRANT – PONDEROSA/OAK WOODLAND

Patch Size	Stage: early Describe: Shrub resprouts, grass-forb, seedling pine Yr range 0-10	Stage:early -mid Describe: High shrub stem density, pole pines within canopy Yr range 10-40	Stage: mid Describe: Mature shrub, emerging pole pines, growth release Yr range 40-80	Stage: later mid Describe: Trees begin to dominate some areas, blackjacks Yr range 80-150	Stage: Late- Describe: Mature pine but denser growth, trees initiating underneath Yr range 250-400	Stage: late-fire maintained open canopy Describe: Yellowbark trees, widely spaced, more understory Yr range 350-600+
% of unit	5-10	10-15	10-15	60-80% transitions in patches, intermingled,		
				30	40	10
Small Acre Range <20	25	25	15	M	M	M
Medium Acre Range 20-500	65	65	75	M	M	M
Large Acre Range >500	10	10	10	M	M	M

12. SW QUADRANT – WUI PONDEROSA/OAK WOODLAND

Developed by: Eric Brantingham, Bob McKeever, Glenn Webb, John Moore,
Reviewed by Dan Huisjen

Written Description of Unit: “Ring of Fire” - Combines RMLANDS Pinyon-juniper woodland and pinyon-juniper oak serviceberry woodland with Pine /Oak.

Likely Presuppression Fire Regime and Mosaic - This is an area of high fire activity, with a complex fuel mix. Fire starts are more frequent on the west side of the Plateau, and total area burned per decade appears to be greater on the west side on the Plateau in general and southwest side in particular. Most fire starts are in upper pinyon juniper zone moving upward into the pine oak type. Oak has always persisted in combination with the pine. The pine stands were probably characterized by a "typical" ponderosa pine fire regime prior to 1880, i.e., frequent (10-30 year intervals) low-severity fires that maintained a dominant pine canopy (though it was a fairly open canopy) and an understory of low Gambel oak and herbs. Ponderosa pine thrives under a disturbance regime of frequent fires, but doesn't do so well with longer fire intervals because the longer fire intervals usually result in more severe fires when they occur. Oak, on the other hand, can thrive under both long and short fire intervals; it is suppressed by the pine on the west side of the Plateau but has little competition on the east side. Pine competition and fire probably kept oak in check. Historically, prior to widespread livestock grazing, the area probably had more grass production to carry fire, resulting more frequent, cooler fires. Oak increases flammability on patches of the landscape based on its ability to propagate fire into the crowns of ponderosa pine—and could be triggered by spring hard frosts. This mosaic is based on RMLANDS estimates of seral stages and patch size.

WUI Prescription – The desired mosaic for ponderosa pine consists of open grown ponderosa pine with clumps of denser trees with interlocking crowns (<.5 acre), primarily for Aberts squirrel habitat. Some of the stands will be very open and there will be occasional patches of grass/forb dominated openings. This mosaic is very similar to that created for ponderosa pine stands throughout the entire planning area. Priority areas will be determined based on density of development, aspect, slope, wind direction, and ignition potential. The mosaic is located as close to structures/development as possible and may extend up to 2 mile away, depending on topography and primary wind direction. Orientation of patches is not of concern since all seral stages should only support a low intensity surface fire. The denser clumps should be located no closer than 200 yards from structures.

Desired Mosaic: Note that the % numbers shown below are guidelines, intended to be used within +/- 5 to 10%. They may not necessarily add up to 100% as shown.

Table 1
SW QUADRANT – WUI PONDEROSA/OAK WOODLAND

Patch Size	Stage: early Describe: Shrub resprouts, grass-forb, seedling pine Yr range 0-30	Stage: early-mid Describe: High shrub stem density, pole pines within canopy emerging pole pines Yr range 30-100 (4B)	Stage: late mid Describe: Mature shrub, pole pines, mature pine, with high density Yr range 100-175	Stage: late/OG Describe: Trees dominate with clumpy areas, blackjacks, Mature pine Yellowbark trees, widely spaced, more understory Yr range 180+
% of unit	10	35	35	20
Small Acre Range 1-5	25	M	M	M
Medium Acre Range 5-50	65	M	M	M
Large Acre Range >50+	10	M	M	M

13. SW QUADRANT - ASPEN CLIMAX

Developed by: Dan Huisjen, Craig Grother, Eric Brantingham, Tim Garvey, Mac Fellin, Ron Turley, Peter Barth, John Moore.

Written Description of Unit: Pure aspen stands (climax) in the SW Quadrant. These are generally in a narrow band running across the mid-high elevations of the Plateau from NW to SE. The upper edge of this type grades into the spruce/fir/aspen mosaic above it and the boundary of the ecotone between these two may not be identifiable during some seral stages and should be determined by soil type.

Likely Pre-suppression Fire Regime and Mosaic: Infrequent, generally low to moderate intensity (3-4' flame length) with rare high intensity fires capable of killing portions of these stands. These fire events are generally small to moderate in size due to the typical moisture present in the soils and in the understory fuels at this elevation. The lower stand edge would be influenced by fires burning up slope from below (starting in the ponderosa pine/oak and even lower in the pinyon/juniper vegetation types). Most insect and disease occurs in later seral stages.

Desired Mosaic: Larger patches in the later seral stages and small patches in the younger seral stages. Stands tend to grow together (aggregate) over time.

14. SW QUADRANT – WUI- ASPEN CLIMAX

Developed by: Dan Huisjen, Eric Brantingham, Glenn Webb. Reviewed by John Moore.

WUI- Use existing SW Quadrant HRV Mosaic as below.

WUI Rationale: The assumption is that this is true, persistent, self-regenerating aspen climax type with no conifer encroachment. Pure aspen provides adequate protection for WUI in most conditions. At HRV mosaic, pure aspen will not burn unless fire behavior indices are well above normal to very high above normal. This would generally be a rare event. In the case of elevated fire behavior indices, the surrounding fuel types would be exhibiting extreme fire behavior creating a fire environment which may jeopardize fire fighter safety. This could lead to stand replacing fire events moving vertically through the aspen band from fire in the lower elevation pine/oak communities. Typically, due to landform orientation, fire would not move laterally through the aspen band. There is difficulty, in some cases, in determining true aspen from seral aspen and soils are a suggested point for determining type. For the purposes of WUI, the aspen type needs to be monitored for conifer invasion. While it may appear to be somewhat contradictory to the definition of an aspen PNVG, the objective will be to maintain the aspen climax and take invading conifer out of the stand.

Written Description of Unit: Pure aspen stands (climax) in the SW Quadrant. These stands are generally in a narrow band running across the mid-high elevations of the Plateau from northwest to southeast. The upper edge of this type grades into the spruce/fir/aspen mosaic above it and the ecotone boundary between these two may not be identifiable during some seral stages. In the SW Quadrant, these community types occur along the Divide Road, and along power lines dropping through the “aspen band”. In general, fire in the true aspen type and in the aspen band is a rare event. However, the aspen band can and will burn in a severe fire season.

Likely Pre-suppression Fire Regime and Mosaic: Infrequent, generally low to moderate intensity with rare high intensity (3-4' flame length) fires capable of killing portions of these stands. These fire events are generally small to moderate in size due to the typical moisture present in the soils and in the understory fuels at this elevation. The lower stand edge would be influenced by fires burning up slope from below (starting in the ponderosa pine/oak and even lower in the pinyon/juniper vegetation types). Most insect and disease occurs in later seral stages.

Desired Mosaic: Larger patches in the later seral stages and small patches in the younger seral stages. Stands tend to grow together (aggregate) over time.

Table 1
SW QUADRANT – WUI- ASPEN CLIMAX

Patch Size	Stage:SI Describe: Sapling Aspen Yr range 0-10	Stage: SE (Early) Describe: Pole Aspen with some mortality Yr range 10-50	Stage: SE (Late) Describe: Larger Diameter Aspen with additional mortality Yr range 50-80	Stage:UR Describe: Original trees begin to die with new sprouts growing in the resulting openings Yr range 80-120	Stage:SM Describe: Original trees are gone with a shifting mosaic as small groups of trees die and are replaced by another generation Yr range 120+
% of Unit	2-5	10	10	15	60
Small Acre range <5 acres	60	35	30	10	M
Medium Acre range 5-1000 acres	35	50	60	60	M
Large Acre range 1000- 3000 acres	5	15	10	30	M

15. SW QUADRANT - SPRUCE/ FIR/ ASPEN

Developed by: Dan Huisjen, Craig Grother, Eric Brantingham, Tim Garvey, Mac Fellin, Ron Turley, Peter Barth, and John Moore.

Written Description of Unit: Spruce/fir and Spruce/fir/aspens stands in the Southwest Quadrant. The stands are generally linear bands on an elevational gradient oriented along the top and adjacent contours of the Plateau at the higher elevations of the Plateau. These stands are generally in a narrow band running across the mid-high elevations of the Plateau from northwest to southeast axis. At the lower elevations spruce/fir/aspens grades into the aspen climax community type. It may be difficult to determine the exact ecotone boundary between these two during some seral stages.

Likely Pre-suppression Fire Regime and Mosaic: Fires were generally small to medium in size and occurring infrequently in the understory reinitiation (UR) and shifting mosaic (SM) stages as fuels accumulate and become available during long-term drought. Fire orientation is upward through the vegetation type due to landscape position, slope and prevailing wind. Most fires burn across the narrow distance of the vegetation type and are subsequently small to moderate in size as they move across the narrow band of the type to the top of the Plateau or to less flammable fuel types. Most of the fire disturbance comes from fire events initiated in communities in lower elevations below the spruce/fir/aspens zone. Infrequent disturbance is related to fire, but there is more chronic influence from disease and insects. Disease disturbances operate generally on a small to medium patch size creating a more fine scale mosaic than the infrequent fire events. Windthrow from wind events is typically small in scale and localized.

Desired Mosaic: Mosaic is small to medium patch sizes in the early seral stages and coalesces into larger patch sizes in the SE (stem exclusion) and then into 'matrix' in the understory reinitiation (UR) stage. Typically few stands reach the SM (shifting mosaic) stage, except those stands that are 'hidden' from disturbance either topographically or uphill from aspen stands. Stem initiation (SI) ranges from 0-20%, depending on extent of disturbance and may reach very near to 0% during some periods of time.

16. SW QUADRANT – WUI- SPRUCE/ FIR/ ASPEN

Developed by: Dan Huisjen, Eric Brantingham, Glenn Webb, reviewed by John Moore.

WUI Objective: Reduce and or eliminate fuel continuity both vertically and horizontally in the latter two seral stages through fuels reduction. Maintain stands to less than 200 years of age. Conduct ground fuel and aerial fuels reduction. Utilize thinning from below. Utilize selected commercial thinning to reduce crown continuity. Manage for small early seral patches to interrupt large fire growth. Due to the potential for long range spotting, buffer distances will need to be larger (800'+) to promote firefighter safety. At the latter two seral stages management options for fuels reduction become limiting. In the late-mid seral stage stands would benefit from maintenance and management treatments to set the maturing seral stages back. In the late/ old growth stage the stands are very vulnerable to wildfire. There is little opportunity for management work in the late-old growth stage due to the cost and scale of the necessary treatments

Written Description of Unit: Spruce/fir and Spruce/fir/aspen stands in the SW Quadrant. The stands are linear in nature oriented from northwest to southeast at the highest elevations of the Plateau. These are generally in a narrow band running horizontally across the mid-high elevations of the Plateau. At the lower elevations spruce/fir/aspen grades into the aspen climax. It may be difficult to determine the exact ecotone boundary between these two types during some seral stages.

Likely Pre-suppression Fire Regime and Mosaic: Fires were generally small to medium in size and occurring infrequently in the understory reinitiation (UR) and shifting mosaic (SM) stages as fuels accumulate and become available during long-term drought. Fire orientation is upward through the vegetation type due to landscape position, slope and prevailing winds. Most fires burn across the narrow distance of the vegetation and are subsequently small to moderate in size as they move across it to the top of the Plateau and lose momentum. Most of the disturbance is driven from fire events in the plant communities located below. The infrequent disturbance is fire, but more regular, chronic disturbance influence is from disease and insects. Insect and disease disturbance generally operates on a small to medium patch size and on fine scale. Windthrow blow-down is typically small and localized.

Desired Mosaic: The desired mosaic is small to medium patch sizes in the early seral stages that coalesces into larger patch sizes in the stem exclusion (SE) and then into 'matrix' in the understory reinitiation (UR) stage. Most stands do not reach the shifting mosaic (SM), except those stands that are 'hidden' from disturbance either topographically or uphill from aspen stands. Stem initiation

(SI) ranges from 0-20%, depending on extent of disturbance and may reach very near to 0% during some periods of time.

Table 1
SW QUADRANT – WUI SPRUCE/ FIR/ ASPEN

Patch Size	Stage:SI Early Describe: Grass forb, aspen saplings evident Yr range 0-20	Stage: SE Early-Mid Describe: Aspen with significant understory conifer, aspen mortality at older ages Yr range 20-150	Stage: UR Late-mid Describe: Dominated by spruce/fir with limited aspen. High amount of Aspen mortality. Older trees with CWD recruitment. Some conifer regeneration in the understory Yr range 150-250	Stage:SM Late, O/G significant dead and down CWD Describe: Spruce dominated with limited fir, small scale <.25 acre mortality and regeneration, gap dynamics, limited aspen except in seral gaps/patches Yr range +250
% of Unit *	20	40	30	10
Small Acre range 1-10 acres	80	20	M	M
Medium Acre range 10-50 acres	20	55	M	M
Large Acre range 50+ acres	N/A	40	M	M

* +- 5-10% of Unit

17. SW QUADRANT – CANADA LYNX

Developed by: Craig Grother, John Moore, 3/15/05.

Written Description of Unit: Suitable lynx habitat includes stands of spruce/fir, mixed spruce/fir/aspen, and aspen forest on the crest of the Uncompahgre Plateau. Lynx habitat and Lynx Analysis Units (LAU) have been mapped and designated by the US Forest Service in coordination with the US Fish and Wildlife Service according to established criteria. The boundary of the SW Quadrant bisects suitable habitat and LAU's that extend into the SE Quadrant. The desired mosaic and the associated management standards and guidelines for lynx would be applicable to all suitable habitat on the Uncompahgre Plateau. Canada lynx have been reintroduced into southern Colorado and a reproducing population is becoming established. Individual lynx have been documented to occur on the Uncompahgre Plateau.

Likely Pre-suppression Fire Regime and Mosaic: Refer to the HRV Mosaic for a description of the likely pre-suppression fire regime and mosaic. Timber and fuels management and fire suppression within suitable habitat are the primary influences on habitat quality and connectivity. Winter activities such as snow plowing, grooming, and snowmobiling create pathways for other predators to utilize deep snow environments and compete with lynx for limited prey (primarily snowshoe hares).

Desired Mosaic: With one minor exception, the desired mosaic for Canada lynx is reflected in the HRV Matrix. That change is a decrease from 10% of the Unit in SI to 5%, and a corresponding increase from 10% to 15% of the Unit in SM. Management should focus on the attainment of the patch sizes, age distribution, and connectivity described in the Matrix and the Lynx Conservation Assessment and Strategy (LCAS). Existing conditions do not reflect the HRV. The early stages of Stand Establishment and late stages of multi-storied Spruce/Fir dominated forest of the Stem Exclusion stage provide winter forage habitat. Insects and/or timber and fuels management activities that affect conifer regeneration and tree crown form that provide vertical structure have degraded habitat quality within many sites currently in this age class. The later stages of succession that are dominated by mature and old growth Spruce/Fir forest (UR and SM, 150 – 250+ years) provide denning habitat. The current availability of old growth Spruce/Fir forest habitat is very limiting on the Plateau due to past timber management activities. Salvage logging and fuels management activities have also degraded habitat quality within the UR and SM stages. Maintaining a minimum of 10% denning habitat on the landscape would meet the habitat standards and guidelines of the LCAS. The description of Canada Lynx habitat for the Southwest Quadrant is applicable for the other similar community types found on the Uncompahgre Plateau LCASs.

Table I
Southwest Quadrant
Canada Lynx Habitat

Patch Size	Stage:SI Describe: Sapling Aspen with seedling conifer Yr range 0-20	Stage: SE Describe: Aspen with significant understory conifer, aspen mortality at older ages Yr range 20-150	Stage: UR Describe: Dominated by spruce/fir with limited aspen. Some conifer regeneration in the understory Yr range 150-250	Stage:SM Describe: Spruce dominated with limited fir, small scale <.25 acre mortality and regen. Yr range +250
% of Unit	5	35	45	15
Small Acre range 1-50 acres	30	10	M	70
Medium Acre range 50-1000 acres	60	50	M	30
Large Acre range 1000-5000 acres	10	40	M	---