

Appendix B. Vegetation Conditions and Management Practices

This appendix describes the current (2011) and desired structural future conditions for the 14 major PNVTs on the forests and provides a graphic representation of age classes and an expanded description of old growth. It also describes the management practices that may be used to obtain those conditions.

Vegetation Conditions

PNVTs

The Apache-Sitgreaves NFs can be divided into 14 major PNVTs (potential natural vegetation types) (see table below). PNVTs are coarse-scale groupings of ecosystem types that share similar geography, vegetation, and historic ecosystem disturbances such as fire, drought, and grazing by native species. PNVTs represent the vegetation type and characteristics that would occur when natural disturbance regimes and biological processes prevail. It is important not to confuse PNVTs with existing vegetation types. The PNVT mapping (located in the Apache-Sitgreaves NFs' GIS database) was derived from the forests' terrestrial ecosystem survey mapping. This mapping is intended to be used for mid- and landscape-scale planning. It is important to validate the PNVTs at the project and activity level.

NFS acres by PNVT

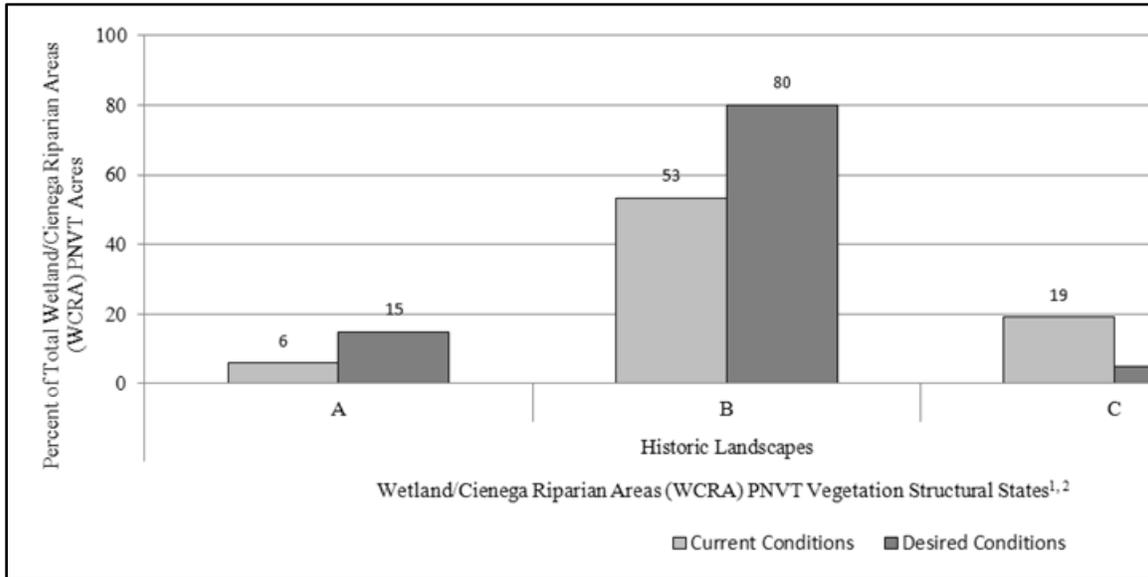
PNVT ¹	Size (acres)
Wetland/cienega riparian areas	17,900
Montane willow riparian forest	4,808
Cottonwood-willow riparian forest	15,876
Mixed broadleaf deciduous riparian forest	9,657
Ponderosa pine forest	602,206
Dry mixed conifer forest	147,885
Wet mixed conifer forest	177,995
Spruce-fir forest	17,667
Madrean pine-oak woodland	394,927
Piñon-juniper woodland	222,166
Semi-desert grassland	106,952
Great Basin grassland	185,523
Montane/subalpine grasslands	51,559
Interior chaparral	55,981

¹Water, urban, and quarry account for 4,250 acres. Total Apache-Sitgreaves NFs land is 2,015,352 acres.

The following charts describe the current (based on data derived in 2011) and desired future conditions for each of the forests' PNVTs at a landscape scale¹. This information will be useful to measure progress toward desired conditions over time.

¹ Percentages shown on the graphs for each structural state are rounded to the nearest whole number. Consequently, in some cases, the total percentage for all structural states may add up to slightly more than 100.

Wetland/Cienega Riparian Areas



1. Wetland/Cienega Riparian Areas (WCRA) PNVT Vegetation Structural States. At 17,900 acres or approximately 0.9 percent of the forests, this PNVT ranks 10th in order of size out of the 14 PNVTs on the ASNFs.

State A - Herbaceous vegetation regeneration, recently burned, sparsely vegetated; with < 10 percent tree or shrub canopy cover; early successional development

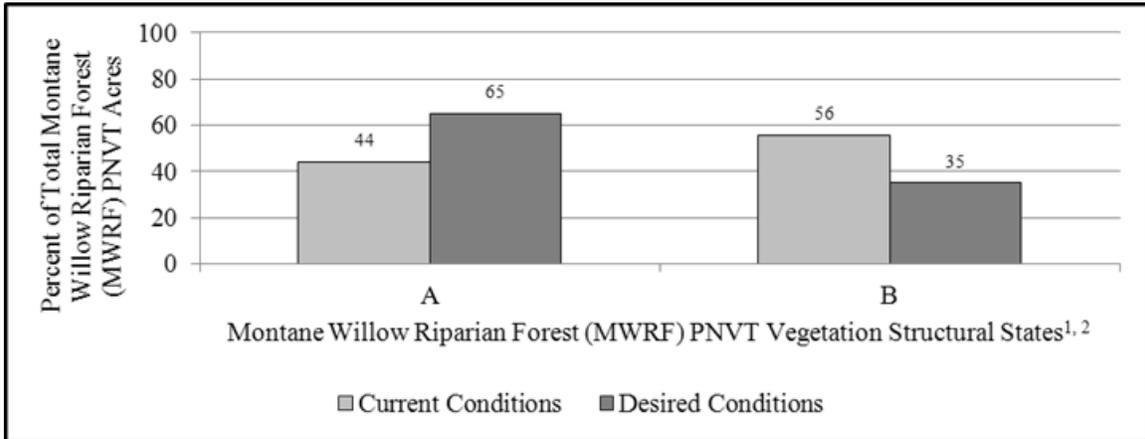
State B - Perennial herbaceous vegetation, with < 10 percent tree or shrub canopy cover; mid successional development

State C - Shrubs, and seedling and sapling size (< 5" diameter) trees with open (< 30 percent) or closed (≥ 30) canopy cover, with perennial herbaceous vegetation understory; mid successional development

State D - Shrubs, small size (5–9.9" diameter), medium size (10–19.9" diameter), and large to very large size (> 20" diameter) trees with open (< 30 percent) or closed (≥ 30) canopy cover, with herbaceous vegetation understory; late successional development; not part of the historic conditions or within historic range of variability, found on contemporary landscapes only.

2. WCRA PNVT has a 36 percent or low departure rating from desired conditions (DC) and historical range of variability (HRV) making it the 7th and 9th most departed PNVT on the ASNFs for DC and HRV, respectively. Desired conditions were provided by the Regional Office, and HRV was derived from LANDFIRE (2003).

Montane Willow Riparian Forest



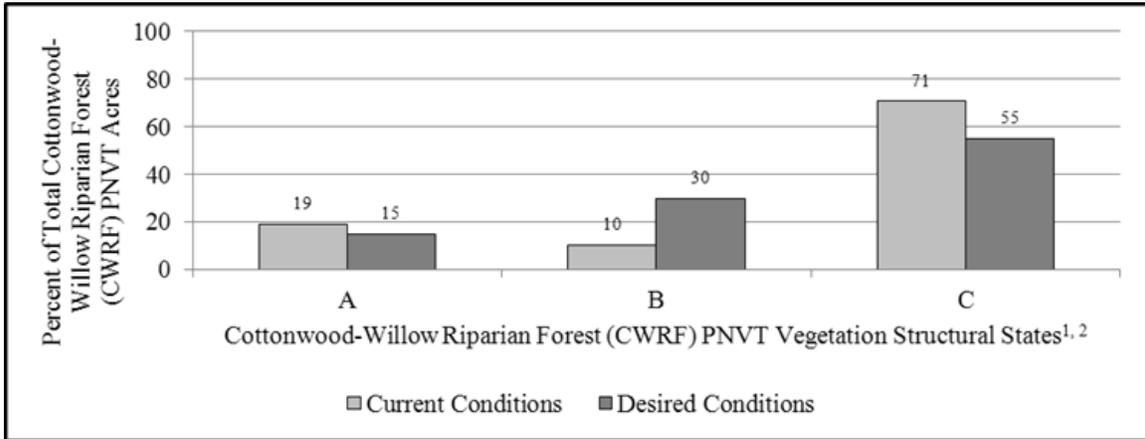
1. Montane Willow Riparian Forest (MWRFP) PNT Vegetation Structural States. At 4,808 acres or approximately 0.2 percent of the forests, this PNT is the smallest on the ASNFs.

State A - Herbaceous vegetation regeneration, recently burned, and shrubs, and seedling and sapling size (< 5" diameter) trees with open (< 30 percent) canopy cover; early successional development.

State B - Shrubs, seedling and sapling, small size (5–9.9" diameter) trees with closed (\geq 30 percent) canopy cover, and medium size (10–19.9" diameter), and large to very large (> 20" diameter) size trees with open or closed canopy cover; mid- to late-successional development.

2. MWRFP PNT has a 21 percent or low departure rating from desired conditions (DC) and reference condition making it the 10th and 12th most departed PNT on the ASNFs from DC and reference condition, respectively. Desired conditions were provided by the Regional Office, and reference condition was derived from LANDFIRE (2007e).

Cottonwood-Willow Riparian Forest



1. Cottonwood-Willow Riparian Forest (CWRW) PNVNT Vegetation Structural States. At 15,876 acres or approximately 0.8 percent of the forests, this PNVNT ranks 12th in order of size out of the 14 PNVNTs on the ASNFs.

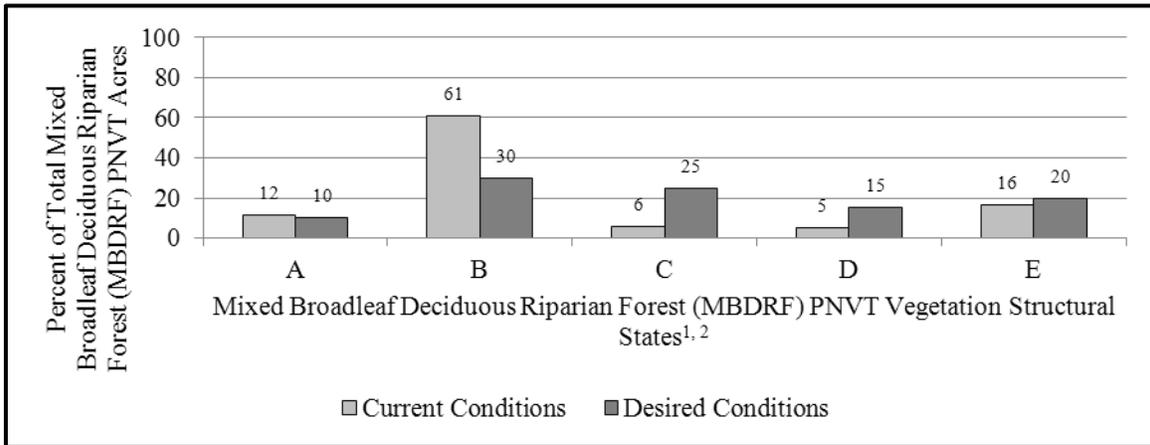
State A - Herbaceous vegetation dominated with shrubs, seedling and sapling size (< 5" diameter) trees with open (< 30 percent) or closed (≥ 30 percent) canopy cover; early successional development.

State B - Tall shrubs and small size (5–9.9" diameter) trees with open or closed canopy cover; mid successional development.

State C - Medium size (10–19.9" diameter) and large to very large (> 20" diameter) size trees with open or closed canopy cover; late successional development.

2. CWRW PNVNT has a 20 percent or no departure rating from desired conditions (DC) and reference condition making it the 11th and 13th most departed PNVNT on the ASNFs from DC and reference condition, respectively. Desired conditions were provided by the Regional Office, and reference condition was derived from LANDFIRE (2007d).

Mixed Broadleaf Deciduous Riparian Forest



1. Mixed Broadleaf Deciduous Riparian Forest (MBDRF) PNVT Vegetation Structural States. At 9,657 acres or approximately 0.5 percent of the forests, this PNVT ranks 13th in order of size out of the 14 PNVTs on the ASNFs.

State A - Herbaceous vegetation regeneration, recently burned, sparsely vegetated; with < 10 percent tree or shrub canopy cover; early successional development

State B - Shrubs, seedling and sapling size (< 5" diameter), small size (5–9.9" diameter), and medium size (10–19.9" diameter) trees with closed (> 30 percent) canopy cover; mid-successional development.

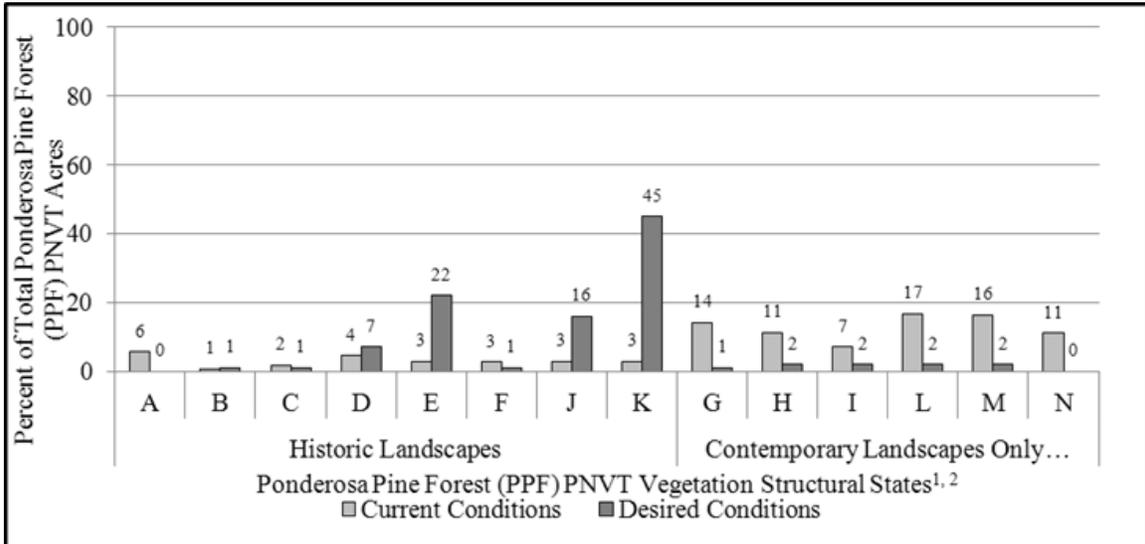
State C - Shrubs, seedling and sapling, and small size trees with open (< 30 percent) canopy cover; mid-successional development.

State D - Shrubs, medium size, and large to very large size (> 20" diameter) trees with open canopy cover; late successional development.

State E - Shrubs, and large to very large size trees with closed canopy cover; late successional development.

2. MBDRF PNVT has a 33 percent or low departure rating from desired conditions (DC) and reference condition making it the 8th and 9th most departed PNVT on the ASNFs from DC and reference condition, respectively. Desired conditions were provided by the Regional Office, and reference condition was derived from LANDFIRE (2007d).

Ponderosa Pine Forest



1. Ponderosa Pine Forest (PPF) PNVNT Vegetation Structural States. At 602,206 acres or approximately 30 percent of the forests, this PNVNT is the largest on the ASNFs.

State A - Recently burned, grass, forb and shrub types with < 10 percent tree canopy cover; early successional development.

State B - Seedling and sapling size (< 5" diameter) trees with open (< 30 percent) canopy cover; all tree types; early successional development.

State C - Small size (5–9.9" diameter) trees, with open canopy cover; all tree types; mid-successional development.

State D - Medium size (10–19.9" diameter) trees, single storied, with open canopy cover; all tree types; late successional development .

State E - Large to very large size (≥ 20 " diameter) trees, single storied, with open canopy cover; all tree types; late successional development.

State F - Seedling and sapling size trees with closed (≥ 30 percent) canopy cover; all tree types; early successional development.

State G - Small size trees, with closed canopy cover; all tree types; mid-successional development; not part of the reference condition, found on contemporary landscapes only.

State H - Medium size trees, single storied, with closed canopy cover; all shade tree types; late successional development; not part of the reference condition, found on contemporary landscapes only.

State I - Large to very large size trees, single storied, with closed canopy cover; all tree types; late successional development; not part of the reference condition, found on contemporary landscapes only.

State J - Medium size trees, multistoried, with open canopy cover; all tree types; late successional development.

State K - Large to very large size trees, multistoried, with open canopy cover; all tree types; late successional development.

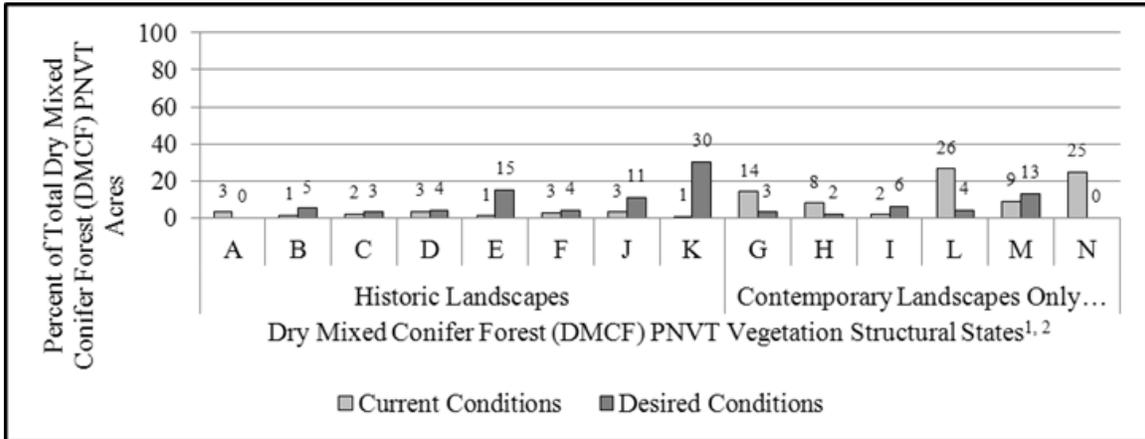
State L - Medium size trees, multistoried, with closed canopy cover; all tree types; late successional development; not part of the reference condition, found on contemporary landscapes only.

State M - Large to very large size trees, multistoried, with closed canopy cover; tree types; late successional development; not part of the reference condition, found on contemporary landscapes only.

State N - Recently burned, grass, forb and shrub types with < 10 percent tree canopy cover; uncharacteristic early successional development due to fire; not part of the reference condition, found on contemporary landscapes only.

2. PPF PNVT has a 77 percent or high departure rating from desired conditions (DC) and a 94 percent or severe departure rating from reference condition making it the 2nd and 1st most departed PNVT on the ASNFs from DC and reference condition, respectively. Desired conditions were provided by the Regional Office, and reference condition was derived from the Nature Conservancy (Smith, 2006a).

Dry Mixed Conifer Forest



1. Dry Mixed Conifer Forest (DMCF) PNVT Vegetation Structural States. At 147,885 acres or approximately 7 percent of the forests, this PNVT ranks 6th in order of size out of the 14 PNVTs on the ASNFs.

State A - Recently burned, grass, forb and shrub types with < 10 percent tree canopy cover; early successional development.

State B - Seedling and sapling size (< 5" diameter) trees with open (< 30 percent) canopy cover; all tree types; early successional development.

State C - Small size (5–9.9" diameter) trees, with open canopy cover; all tree types; mid-successional development.

State D - Medium size (10–19.9" diameter) trees, single storied, with open canopy cover; all tree types; late successional development.

State E - Large to very large size (≥ 20 " diameter) trees, single storied, with open canopy cover; all tree types; late successional development.

State F - Seedling and sapling size trees with closed (≥ 30 percent) canopy cover; all tree types; early successional development.

State G - Small size trees, with closed canopy cover; all tree types; mid-successional development; not part of the reference condition, found on contemporary landscapes only.

State H - Medium size trees, single storied, with closed canopy cover; all shade tree types; late successional development; not part of the reference condition, found on contemporary landscapes only.

State I - Large to very large size trees, single storied, with closed canopy cover; all tree types; late successional development; not part of the reference condition, found on contemporary landscapes only.

State J - Medium size trees, multistoried, with open canopy cover; all tree types; late successional development.

State K - Large to very large size trees, multistoried, with open canopy cover; all tree types; late successional development.

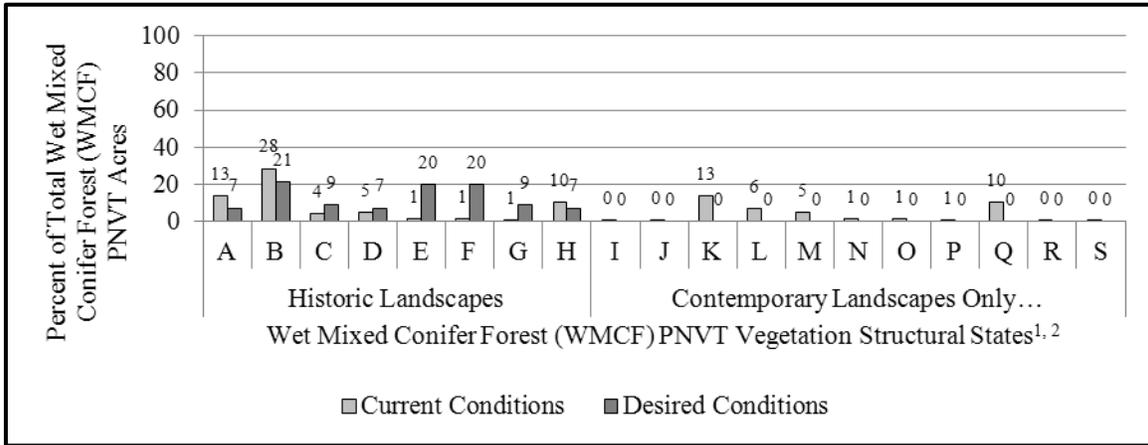
State L - Medium size trees, multistoried, with closed canopy cover; all tree types; late successional development; not part of the reference condition, found on contemporary landscapes only.

State M - Large to very large size trees, multistoried, with closed canopy cover; tree types; late successional development; not part of the reference condition, found on contemporary landscapes only.

State N - Recently burned, grass, forb and shrub types with < 10 percent tree canopy cover; uncharacteristic early successional development due to fire; not part of the reference condition, found on contemporary landscapes only.

2. DMCN PNVN has a 67 percent or high departure rating from desired conditions (DC) and a 77 percent or high departure rating from reference condition making it tied with Great Basin grassland for the 3rd most departed PNVN from DC and 3rd most departed PNVN from reference condition on the ASNFs. Desired conditions were provided by the Regional Office, and reference condition was derived from LANDFIRE (2007a).

Wet Mixed Conifer Forest



1. Wet Mixed Conifer Forest (WMCF) PNVT Vegetation Structural States. At 177,995 acres or approximately 9 percent of the forests, this PNVT ranks 5th in order of size out of the 14 PNVTs on the ASNFs.

State A - Recently burned, grass, forb and shrub types, with < 10 percent tree canopy cover; early successional development with aspen regeneration.

State B - Seedling and sapling (< 5" diameter), small (5–9.9" diameter), medium (10–19.9" diameter), large to very large (≥ 20" diameter) size trees, with open (> 10 percent and ≤ 30 percent) or closed (> 30 percent) canopy cover, consisting of all aspen, deciduous tree mix, and evergreen-deciduous mix tree types; with a plurality of shade intolerant tree types.

State C - Seedling and sapling, and small size trees, with open or closed canopy cover; with a plurality of shade tolerant tree types.

State D - Medium size trees, single or multistoried, with open or closed canopy cover; with a plurality of mixed shade tolerant tree types; with aspen regeneration.

State E - Large to very large size trees, single storied, with closed canopy cover; with a plurality of shade tolerant tree types; with aspen regeneration.

State F - Large to very large size trees, multistoried, with closed canopy cover; with a plurality of mixed shade tolerant tree types; with aspen regeneration.

State G - Seedling and sapling, and small size trees, with open canopy cover; shade intolerant tree types; with aspen regeneration.

State H - Medium size trees, single or multistoried, with open or closed canopy cover; with a plurality of mixed shade tolerant tree types.

State I - Large to very large size trees, single storied, with open canopy cover; with a plurality of shade tolerant tree types; not part of the reference condition, found on contemporary landscapes only.

State J - Large to very large size trees, multistoried, with open canopy cover; with a plurality of shade tolerant tree types; not part of the reference condition, found on contemporary landscapes only.

State K - Recently burned, grass, forb and shrub types, with < 10 percent tree canopy cover; early successional development; this state exists with elk and no aspen regeneration; not part of the reference condition, found on contemporary landscapes only.

State L - Seedling and sapling, and small size trees, with closed canopy cover; with a plurality of mixed shade tolerant tree types; this state exists with elk and no aspen regeneration; not part of the reference condition, found on contemporary landscapes only.

State M - Medium size trees, single or multistoried, with open or closed canopy cover; with a plurality of mixed shade tolerant tree types; this state exists with elk and no aspen regeneration; not part of the reference condition, found on contemporary landscapes only.

State N - Large to very large size trees, single storied, with open canopy cover; with a plurality of shade tolerant tree types; this state exists with elk and no aspen regeneration; not part of the reference condition, found on contemporary landscapes only.

State O - Large to very large size trees, multistoried, with closed canopy cover; with a plurality of mixed shade tolerant tree types; state exists with elk and no aspen regeneration; not part of the reference condition, found on contemporary landscapes only.

State P - Seedling and sapling, and small size trees, with open canopy cover; with a plurality of shade tolerant tree types; this state exists with elk and no aspen regeneration; not part of the reference condition, found on contemporary landscapes only.

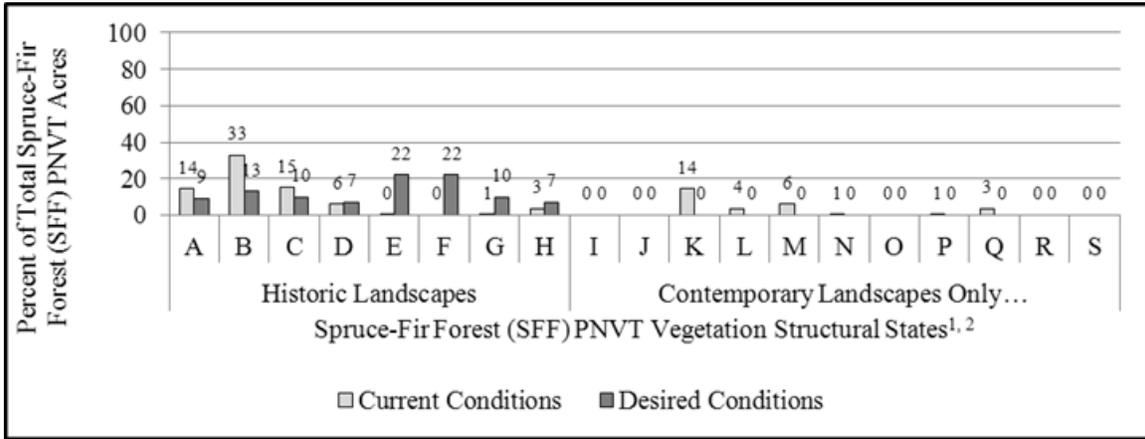
State Q - Medium size trees, single or multistoried, with open or closed canopy cover; with a plurality of shade tolerant tree types; this state exists with elk and no aspen regeneration; not part of the reference condition, found on contemporary landscapes only.

State R - Large to very large size trees, single storied, with open canopy cover; with a plurality of mixed shade tolerant tree types; this state exists with elk and no aspen regeneration; not part of the reference condition, found on contemporary landscapes only.

State S - Large to very large size trees, multistoried, with open canopy cover; with a plurality of shade tolerant tree types; this state exists with elk and no aspen regeneration; not part of the reference condition, found on contemporary landscapes only.

2. WMCF PNVT has a 54 percent or moderate departure rating from desired conditions (DC) and a 61 percent or high departure rating from reference condition making it tied with montane/subalpine grasslands for the 7th most departed PNVT for DC and 7th most departed PNVT from reference condition on the ASNFs. Desired conditions were provided by the Regional Office, and reference condition was derived from the Nature Conservancy (Smith, 2006b).

Spruce-Fir Forest



1. Spruce-Fir Forest (SFF) PNVT Vegetation Structural States. At 17,667 acres or approximately 0.9 percent of the forests, this PNVT ranks 11th in order of size out of the 14 PNVTs on the ASNFs.

State A - Recently burned, grass, forb and shrub types, with < 10 percent tree canopy cover; early successional development with aspen regeneration.

State B - Seedling and sapling (< 5" diameter), small (5–9.9" diameter), medium (10–19.9" diameter), large to very large (≥ 20" diameter) size trees, with open (> 10 percent and ≤ 30 percent) or closed (> 30 percent) canopy cover, consisting of all aspen, deciduous tree mix, and evergreen-deciduous mix tree types; with a plurality of shade intolerant tree types.

State C - Seedling and sapling, and small size trees, with open or closed canopy cover; with a plurality of shade tolerant tree types.

State D - Medium size trees, single or multistoried, with open or closed canopy cover; with a plurality of mixed shade tolerant tree types; with aspen regeneration.

State E - Large to very large size trees, single storied, with closed canopy cover; with a plurality of shade tolerant tree types; with aspen regeneration.

State F - Large to very large size trees, multistoried, with closed canopy cover; with a plurality of mixed shade tolerant tree types; with aspen regeneration.

State G - Seedling and sapling, and small size trees, with open canopy cover; shade intolerant tree types; with aspen regeneration.

State H - Medium size trees, single or multistoried, with open or closed canopy cover; with a plurality of mixed shade tolerant tree types.

State I - Large to very large size trees, single storied, with open canopy cover; with a plurality of shade tolerant tree types; not part of the reference condition, found on contemporary landscapes only.

State J - Large to very large size trees, multistoried, with open canopy cover; with a plurality of shade tolerant tree types; not part of the reference condition, found on contemporary landscapes only.

State K - Recently burned, grass, forb and shrub types, with < 10 percent tree canopy cover; early successional development; this state exists with elk and no aspen regeneration; not part of the reference condition, found on contemporary landscapes only.

State L - Seedling and sapling, and small size trees, with closed canopy cover; with a plurality of mixed shade tolerant tree types; this state exists with elk and no aspen regeneration; not part of the reference condition, found on contemporary landscapes only.

State M - Medium size trees, single or multistoried, with open or closed canopy cover; with a plurality of mixed shade tolerant tree types; this state exists with elk and no aspen regeneration; not part of the reference condition, found on contemporary landscapes only.

State N - Large to very large size trees, single storied, with open canopy cover; with a plurality of shade tolerant tree types; this state exists with elk and no aspen regeneration; not part of the reference condition, found on contemporary landscapes only.

State O - Large to very large size trees, multistoried, with closed canopy cover; with a plurality of mixed shade tolerant tree types; state exists with elk and no aspen regeneration; not part of the reference condition, found on contemporary landscapes only.

State P - Seedling and sapling, and small size trees, with open canopy cover; with a plurality of shade tolerant tree types; this state exists with elk and no aspen regeneration; not part of the reference condition, found on contemporary landscapes only.

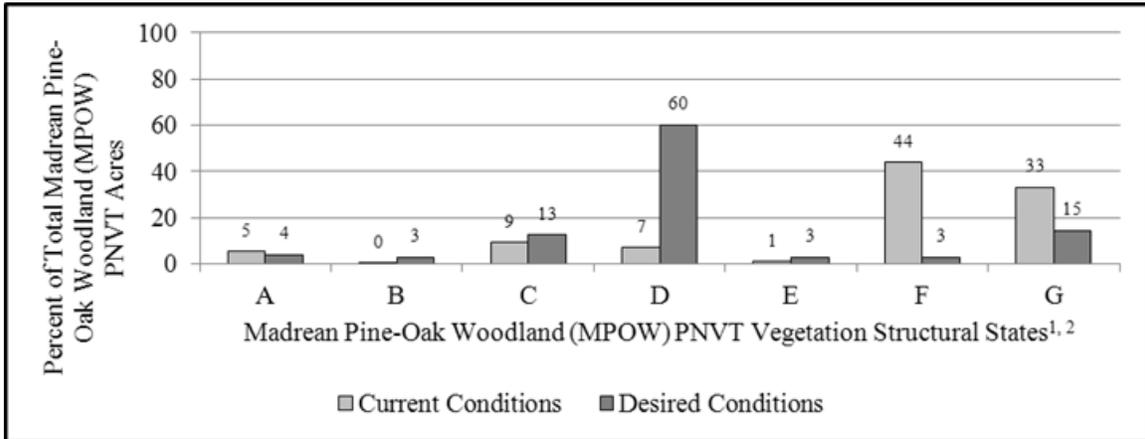
State Q - Medium size trees, single or multistoried, with open or closed canopy cover; with a plurality of shade tolerant tree types; this state exists with elk and no aspen regeneration; not part of the reference condition, found on contemporary landscapes only.

State R - Large to very large size trees, single storied, with open canopy cover; with a plurality of mixed shade tolerant tree types; this state exists with elk and no aspen regeneration; not part of the reference condition, found on contemporary landscapes only.

State S - Large to very large size trees, multistoried, with open canopy cover; with a plurality of shade tolerant tree types; this state exists with elk and no aspen regeneration; not part of the reference condition, found on contemporary landscapes only.

2. SFF PNVT has a 59 percent or moderate departure rating from desired conditions (DC) and a 62 percent or high departure rating from reference condition making it the 6th most departed PNVT on the ASNFs from both DC and reference condition. Desired conditions were provided by the Regional Office, and reference conditions were derived from the Nature Conservancy (Smith, 2006c).

Madrean Pine-Oak Woodland



1. Madrean Pine-Oak Woodland (MPOW) PNVT Vegetation Structural States. At 394,927 acres or approximately 20 percent of the forests, this PNVT ranks 2nd in order of size out of the 14 PNVTs on the ASNFs.

State A - Recently burned, grass, forb and shrub types with < 10 percent tree canopy cover; early successional development.

State B - Seedling and sapling size (< 5" diameter) trees with open (< 30 percent) canopy cover; all tree types; early successional development.

State C - Small size (5–9.9" diameter) trees, with open canopy cover; all tree types; mid-successional development.

State D - Medium and large to very large size (≥ 10 " diameter) trees, with open canopy cover; all tree types; late successional development.

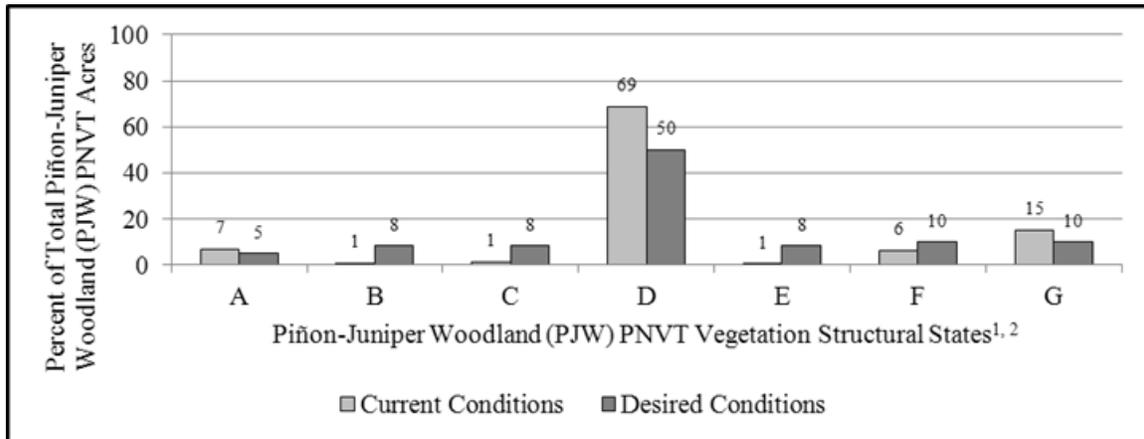
State E - Seedling and sapling size trees with closed (≥ 30 percent) canopy cover; all tree types; early successional development.

State F - Small size trees, with closed canopy cover; all tree types; mid-successional development.

State G - Medium and large to very large size trees, with closed canopy cover; all tree types; late successional development.

2. MPOW PNVT has a 61 percent or high departure rating from desired conditions (DC) and a 72 percent or high departure rating from reference condition making it the 4th most departed PNVT on the ASNFs from both DC and reference condition. Desired conditions were provided by the Regional Office, and reference condition was derived from the Nature Conservancy (Schussman and Gori, 2006).

Piñon-Juniper Woodland



1. Piñon-Juniper Woodland (PJW) PNVT Vegetation Structural States. At 222,166 acres or approximately 11 percent of the forests, this PNVT ranks 3rd in order of size out of the 14 PNVTs on the ASNFs.

State A - Recently burned, grass, forb and shrub types with < 10 percent tree canopy cover; early successional development.

State B - Seedling and sapling size (< 5" diameter) trees with open (< 30 percent) canopy cover; all tree types; early successional development.

State C - Small size (5–9.9" diameter) trees, with open canopy cover; all tree types; mid-successional development.

State D - Medium and large to very large size (≥ 10 " diameter) trees, with open canopy cover; all tree types; late successional development.

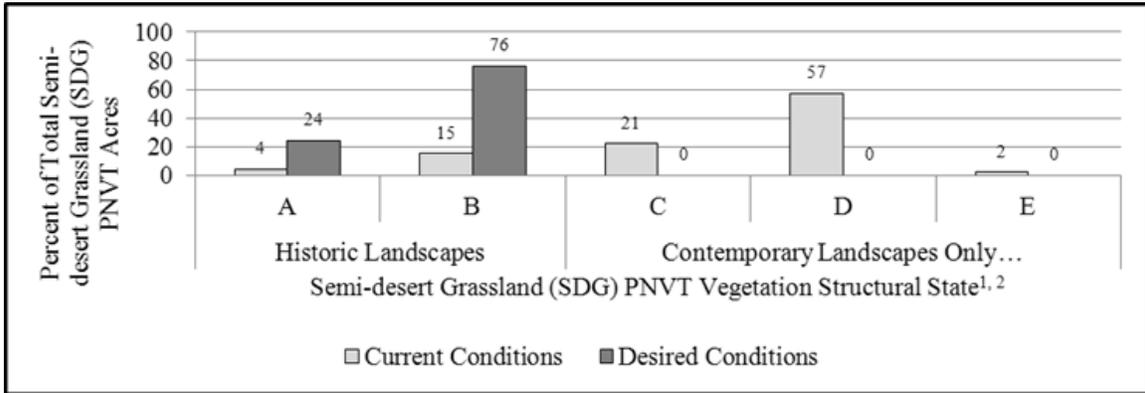
State E - Seedling and sapling size trees with closed (≥ 30 percent) canopy cover; all tree types; early successional development.

State F - Small size trees, with closed canopy cover; all tree types; mid-successional development.

State G - Medium and large to very large size trees, with closed canopy cover; all tree types; late successional development.

2. PJW PNVT has a 28 percent or low departure rating from desired conditions (DC) and reference condition making it the 10th and 11th most departed PNVT on the ASNFs from DC and reference condition, respectively. Desired conditions were provided by the Regional Office, and reference condition was derived from LANDFIRE (2005).

Semi-desert Grassland



1. Semi-desert Grassland (SDG) PNVT Vegetation Structural States. At 106,952 acres or approximately 5 percent of the forests, this PNVT ranks 7th in order of size out of the 14 PNVTs on the ASNFs.

State A - Herbaceous vegetation regeneration, recently burned, sparsely vegetated; with < 10 percent tree or shrub canopy cover; early successional development.

State B - Perennial herbaceous vegetation, with < 10 percent tree or shrub canopy cover; mid-successional development.

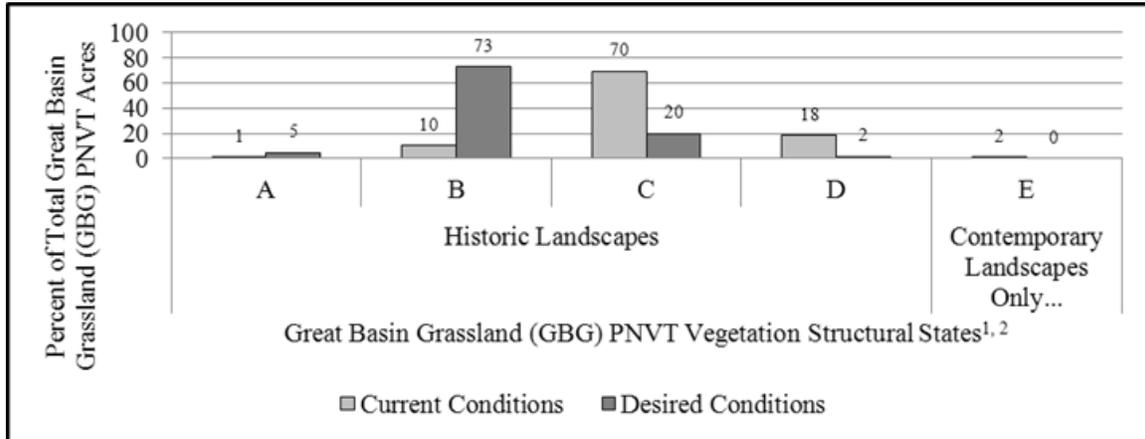
State C - Perennial herbaceous vegetation with shrubs, seedling, and sapling size (< 5" diameter), small size (5–9.9" diameter), and medium size (10–19.9" diameter) trees with open (< 30 percent) canopy cover; late successional development; not part of the reference condition, found on contemporary landscapes only.

State D - Shrubs, seedling and sapling, small, medium, and large to very large size (> 20" diameter) trees with closed (≥ 30 percent) canopy cover, and large to very large size trees with open canopy cover with perennial herbaceous vegetation understory, mid-successional development; not part of the reference condition, found on contemporary landscapes only.

State E - Various noxious weeds and invasive nonnative plants makeup a significant portion of the herbaceous vegetation composition; not part of the reference condition, found on contemporary landscapes only.

2. SDG PNVT has a 79 percent or high departure rating from desired conditions (DC) and reference condition making it the 1st and 2nd most departed PNVT on the ASNFs from DC and reference condition, respectively. Desired conditions were provided by the Regional Office, and reference condition was derived from the Nature Conservancy (Schussman, 2006a).

Great Basin Grassland



1. Great Basin Grassland (GBG) PNV T Vegetation Structural States. At 185,523 acres or approximately 9 percent of the forests, this PNV T ranks 4th in order of size out of the 14 PNV Ts on the ASNFs.

State A - Herbaceous vegetation regeneration, recently burned, sparsely vegetated; with < 10 percent tree or shrub canopy cover; early successional development.

State B - Open perennial herbaceous vegetation, with < 10 percent tree or shrub canopy cover; mid-successional development.

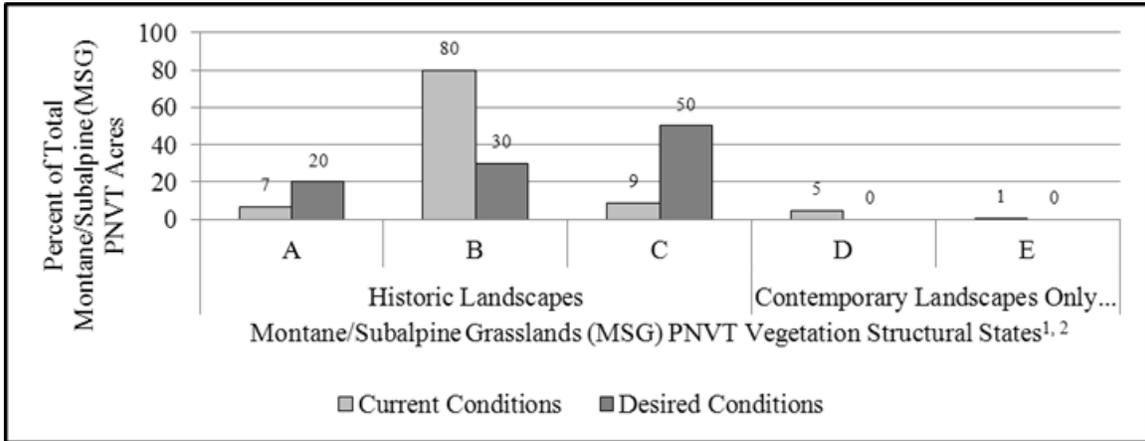
State C - Perennial herbaceous vegetation with shrubs, seedling and sapling size (< 5" diameter), small size (5–9.9" diameter), and medium size (10–19.9" diameter) trees with open (< 30 percent) canopy cover; late successional development.

State D - Shrubs, seedling, and sapling, small, medium, and large to very large size (> 20" diameter) trees with closed (≥ 30 percent) canopy cover, and large to very large size trees with open canopy cover with perennial herbaceous vegetation understory, mid-successional development.

State E - Various noxious weeds and invasive nonnative plants makeup a significant portion of the herbaceous vegetation composition; not part of the reference condition, found on contemporary landscapes only.

2. GBG PNV T has a 67 percent or high departure rating from desired conditions (DC) and reference condition making it tied with dry mixed conifer forest for the 3rd most departed PNV T from DC and 5th most departed PNV T from reference condition on the ASNFs. Desired conditions were provided by the Regional Office, and reference condition was derived from LANDFIRE (2007b).

Montane/Subalpine Grasslands



1. Montane/Subalpine Grasslands (MSG) PNVT Vegetation Structural States. At 51,559 acres or approximately 3 percent of the forests, this PNVT ranks 9th in order of size out of the 14 PNVTs on the ASNFs.

State A - Herbaceous vegetation regeneration, recently burned, sparsely vegetated; with < 10 percent tree or shrub canopy cover; early successional development.

State B - Perennial herbaceous vegetation, with < 10 percent tree or shrub canopy cover; mid-successional development.

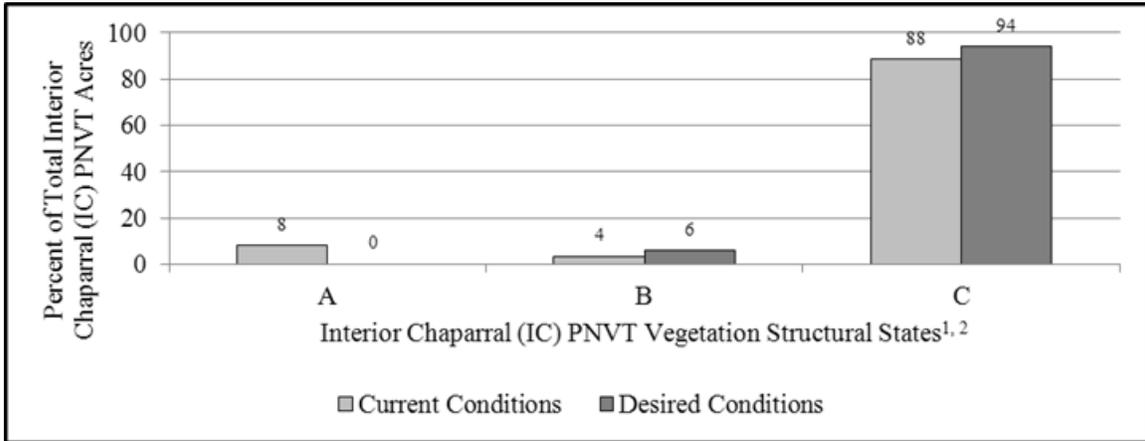
State C - Perennial herbaceous vegetation, with < 10 percent tree or shrub canopy cover; late successional development.

State D - Shrubs, seedling, and sapling size (< 5" diameter), small size (5–9.9" diameter), medium size (10–19.9" diameter), and large to very large size (> 20" diameter) trees with open (< 30 percent) or closed (≥ 30) canopy cover, with perennial herbaceous vegetation understory; not part of the reference condition, found on contemporary landscapes only.

State E - Various noxious weeds and invasive nonnative plants makeup a significant portion of the herbaceous vegetation composition; not part of the reference condition, found on contemporary landscapes only.

2. MSG PNVT has a 54 percent or moderate departure rating from desired conditions (DC) and reference condition making it tied with wet mixed conifer forest for the 7th most departed PNVT from DC and 8th most departed PNVT from reference condition on the ASNFs. Desired conditions were provided by the Regional Office, and reference condition was derived from LANDFIRE (2007c).

Interior Chaparral



1. Interior Chaparral (IC) PNV T Vegetation Structural States. At 55,981 acres or approximately 3 percent of the forests, this PNV T ranks 8th in order of size out of the 14 PNV Ts on the ASNFs.

State A - Herbaceous vegetation regeneration, recently burned, sparsely vegetated; with < 10 percent shrub or tree canopy cover; early successional development.

State B - Open perennial herbaceous vegetation, with shrubs, seedling, and sapling size (< 5" diameter) and small size (5–9.9" diameter) trees with open (< 30 percent canopy cover; mid successional development.

State C - Shrubs, seedling, and sapling, small, medium size (10–19.9" diameter), and large to very large size (> 20" diameter) trees with closed (≥ 30) canopy cover, and medium and large to very large size (> 20" diameter) trees with open canopy cover and no herbaceous vegetation understory; late successional development.

2. IC PNV T has an 8 percent or no departure rating from desired conditions (DC) and reference condition making it the least departed PNV T on the ASNFs from both DC and reference condition. Desired conditions were provided by the Regional Office, and reference condition was derived from the Nature Conservancy (Schussman, 2006).

Age Classes Typically Occurring on the Apache-Sitgreaves NFs

The figure on the following page provides a graphic representation of ponderosa pine age classes. The four age classes range from 1, the youngest, to 4, the oldest; the four crown vigor classes, from A, the most vigorous, to D, the poorest. Bole diameter is highly dependent upon growing conditions rather than age. However, in general, class 1 represents trees approximately 4 to 9 inches d.b.h. and 15 to 40 years old, class 2 is approximately 9 to 15 inches d.b.h. and 40 to 75 years, class 3 is 15 to 22 inches d.b.h. and 75 to 130 years, and class 4 is greater than 22 inches d.b.h. and greater than 130 years old.

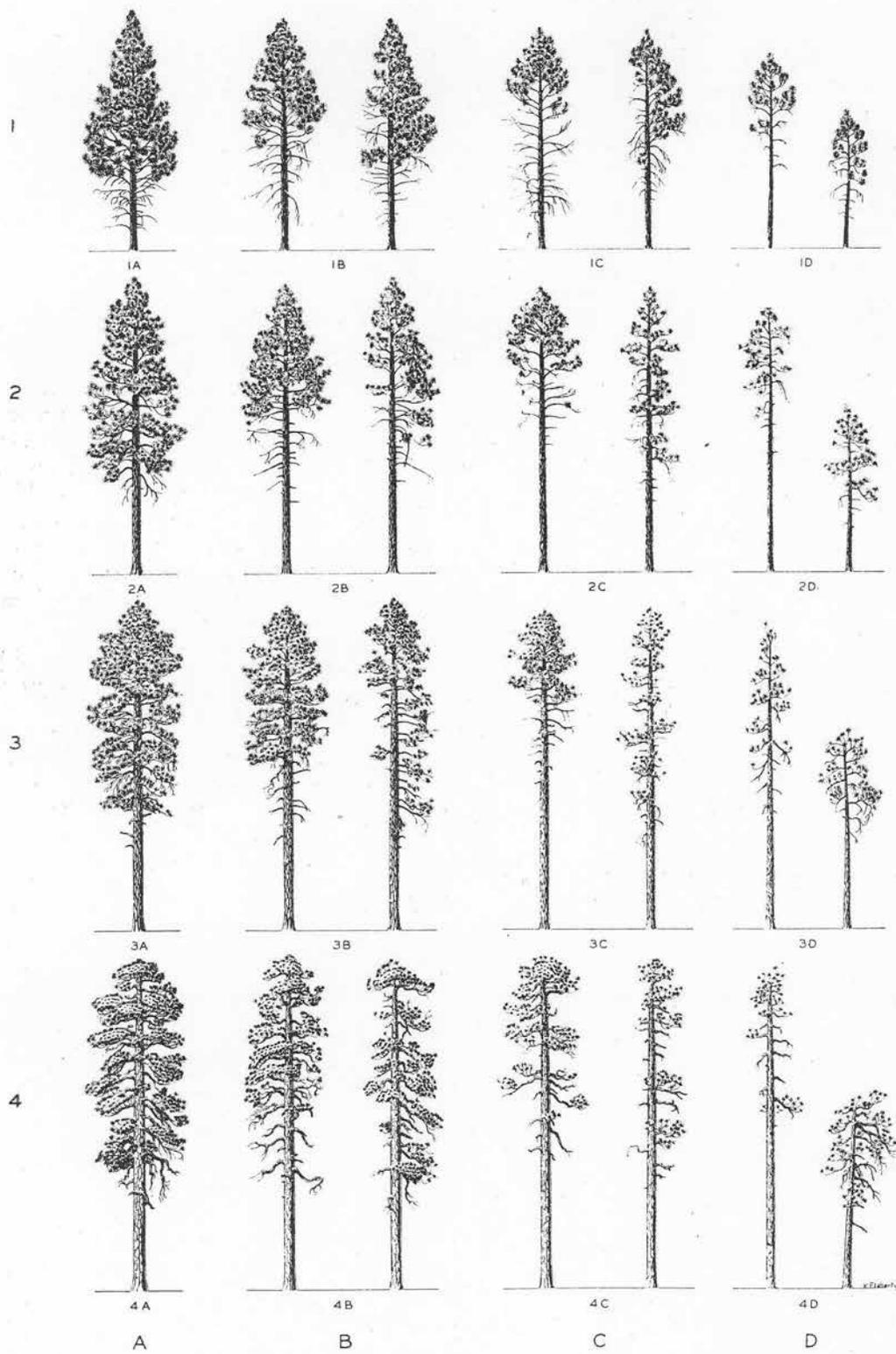


Figure 13. Keen's tree classification for ponderosa pine

Old Growth in the Southwestern Region of the Forest Service

“Old growth” refers to specific habitat components that occur in forests and woodlands: old trees, dead trees (snags), downed wood (coarse woody debris), and structure diversity (Franklin and Spies, 1991; Helms, ed.; 1998; Kaufmann et al., 2007). These important habitat features may occur in small areas, with only a few components, or over larger areas as stands or forests where old growth is concentrated (Kaufmann et al., 2007). In the Southwest, old growth is considered “transitional” (Oliver and Larson, 1996), given that the location of old growth shifts on the landscape over time as a result of succession and disturbance (tree growth and mortality). Some species, notably certain plants, require “old forest” communities that may or may not have old growth components but have escaped significant disturbance for lengths of time necessary to provide the suitable stability and environment.

There is an inverse relationship between the frequency of fire and the contiguity of old growth features (WSDNR, 2005). In frequent fire, all-aged systems (e.g., ponderosa pine, dry mixed conifer, some piñon-juniper types) old growth components can occur individually or in small areas from 0.1 to 1-plus acres (Cooper, 1961; White, 1985), separated spatially from other old growth. In infrequent fire systems (e.g., mixed conifer-aspens, spruce-fir, some piñon-juniper types), old growth components are often concentrated in larger patches, sometimes forming “old growth forest” over tens or hundreds of acres.

“Old growth trees” are old and sometimes large (Kaufmann et al., 2007). It is the decadence (dead tops, dead wood) or structure diversity (flattened crowns, branch characteristics), often associated with old age, that provide essential habitat elements. “Old” is relative to the trees species (Swetnam and Brown, 1992): about 200 years in ponderosa pine (Kaufmann, 1996), 100 years in aspen. “Large” is also relative to tree species, but it can be roughly divided into two diameter groups: large trees in woodlands and large trees in forests. Large trees in woodlands are approximately 10 inches in diameter and greater (i.e., greater than 25 cm) (Weisz et al., 2011) and are made up of piñon, juniper, oak, and other “dwarf” tree species where diameter is measured at the root collar (d.r.c.). Large trees in forests are approximately 20 inches and greater (i.e., greater than 50 cm) and are made up of species that dominate montane and subalpine zones, and they are measured at “breast height” (d.b.h.). Large trees are valued for their longevity in providing old growth habitat and for their added ability in enhancing structure diversity.

The structure diversity component includes both vertical and horizontal diversity. Vertical diversity is often assessed based on the number of canopy layers. Tree age data is sometimes used as an inference of canopy number (i.e., storiedness) and vice versa. Horizontal diversity can be evaluated with metrics using canopy cover and tree stem aggregation statistics, either within or among old growth sites. Structure diversity in old growth is relatively high, but as with the other old growth components, guidelines for structure and age diversity are specific to the PNVT.

Snags are standing dead or partially dead trees that are greater than about 6 feet in height (greater than 2 meters) (Helms, ed., 1998). Depending on the species of wildlife, snag diameter varies upward from 5 inches in diameter (greater than 12 cm) (Ganey, 1999; Harris, 1999; Harrod et al., 1998; Lyon, 1977; McClelland and Frissell, 1975). Management guidelines for the retention and development of snags vary by PNVT and diameter class (Hutto et al., 1993; Thomas et al., 1979). Snags created by fire may not meet habitat criteria for some wildlife and are often subject to

separate retention guidelines (Hutto, 2008). Snags created by fire sometimes fall before they soften and decompose, when they would normally become useful as snag habitat.

Coarse woody debris is any woody material on the ground greater than 3 inches (8 cm) at the largest cross section (Brewer, 2008). Like snag guidelines, coarse woody debris guidelines are specific to PNV and diameter class (Graham et al., 1994).

Vegetation Management Practices

The following table lists various treatment options for use under the uneven-aged and even-aged management systems, as well as intermediate treatments that can be used within either system.

These vegetation management practices are general guidelines. The treatment option chosen for each forest or woodland type and circumstance is determined by a certified silviculturist using guidance in this appendix, a review of applicable technical and scientific literature, and practical experience. Using this knowledge, the silviculturist determines if the practice is relevant to the specific vegetation and site condition. Additional practices may be dictated by other resource goals, particularly in riparian areas.

Forest Service Manual (FSM) 2478.03 (Silvicultural Examinations, Prescriptions, and Evaluations – Policy) requires, in part, that a prescription, detailing the methods, techniques, and timing of silvicultural activities, be prepared prior to initiating any silvicultural treatment on NFS lands.

FSM 5142.1 (Developing Prescribed Fire Burn Plans) requires that a site specific prescribed fire plan be prepared and approved by a qualified line officer for each prescribed fire in advance of ignition. The prescribed fire plan includes a description of the structure and composition of the vegetation and fuel characteristics and includes resource objective statements that are used to develop the prescribed fire prescription.

Fuels specialists and silviculturists, along with other resource specialists, work together closely to ensure land management objectives are met. Joint silviculture prescriptions and burn plans may be produced.

Standard Vegetation Management Practices for Site-specific Project Planning and Implementation

Standard Management Practices for Certain Composition, Structure, and Function Attributes, Other Than Deferral										
DESIRED VEGETATION SPECIES COMPOSITION	Gambel oak, Evergreen oak species, quaking aspen, chaparral species, cottonwood, willow, alder, etc.	Ponderosa pine, Rocky Mountain Douglas-fir, blue spruce, Engelmann spruce, southwestern white pine, white fir, subalpine fir, quaking aspen, pine-oak species, Chihuahuah pine, Rocky Mountain juniper, piñon pine, alligator juniper, Utah juniper, one-seed juniper, cottonwood, willow, Arizona cypress, mesquite, etc. <i>NOTE: Methods and practices listed below will vary by tree species, and those used <u>must</u> be appropriate for the known SILVICS of the desired species.</i>							All Forest and Persistent Woodland Types	Grassland, Meadow, and Savanna Woodland Types
STRUCTURE	DESIRED ONE-AGED, SINGLE-STORIED STAND (One-age class comprises ≥ 90% of total stand BA for most of the rotation. Age difference between oldest & youngest tree in a class is less than 20% of the rotation)				DESIRED TWO-AGED, TWO-STORIED STAND (Two age classes, each > 10% BA most of the rotation)	DESIRED UNEVEN-AGED, MULTI-STORIED STAND (3 or more age classes)			ANY DESIRED ONE-, TWO-, or MULTI-STORIED STAND	DESIRED OPEN (Grassland/meadow < 10% woody canopy cover; savanna woodland 10-30% canopy cover)
FUNCTION	Coppice Regeneration Method (vegetation regeneration function)	Clearcutting Regeneration Method (no trees function for seed/shelter)	Seed Tree Regeneration Method (some trees function for seed only)	Shelterwood Regeneration Method (some trees function for seed/shelter)	Irregular Shelterwood Regeneration Method (function for continuous tree cover)	Single-Tree Regeneration Method (function for continuous tree cover)	Group-Selection Regeneration Method (group size = 2-4 acres)	Irregular Group-Shelterwood Regeneration Method	Intermediate Treatment Methods (tree cover kept between stand formation and regeneration=manage existing stand for desired conditions)	No or Few Trees (eliminate tree encroachment; maintain as predominantly herbaceous vegetation)
SILVICULTURAL MANAGEMENT PRACTICES ² (options listed are not in any particular order or preference)	<u>Activity</u> Coppice Coppice w/Reserves Prescribed Fire Protection from heavy ungulate browsing Plant hardwood cuttings in riparian sites Protect regeneration from animal damage	<u>Activity</u> ≤ 5% tree cover post harvest: Patch cut Strip cut Stand cut Prescribed Fire Tree Planting 6-10% tree cover post harvest: Patch cut w/Reserves Strip cut w/Reserves Stand cut w/Reserves Prescribed Fire Tree Planting Protect regeneration from animal damage	<u>Activity</u> Preparatory Seed 1-10% tree cover post harvest: Final Removal Final removal w/Reserves Limited Prescribed Fire Fill-in Tree Planting Protect regeneration from animal damage	<u>Activity</u> Preparatory Seed Group Seed Strip Seed Removal Group Removal Strip Removal Final Removal Final Removal w/Reserves Limited Prescribed Fire Fill-in Tree Planting Protect regeneration from animal damage	<u>Activity</u> Preparatory Seed Removal Final Removal Final Removal w/Reserves ----- Coppice Regeneration Method: Coppice w/Standards (understory must regenerate vegetatively by suckers/sprouts) Over-browsing protection	<u>Activity</u> Single Tree (Individual Tree) Selection Limited Prescribed Fire	<u>Activity</u> Group Selection Group Selection w/Reserves Limited Prescribed Fire Tree Planting Protect regeneration from animal damage	<u>Activity</u> Seed Removal Final Removal Final Removal w/Reserves Limited Prescribed Fire Fill-in Tree Planting Protect regeneration from animal damage	<u>Activity</u> Improvement cuts Free Thinning Low Thinning Liberation Cleaning Weeding Thinning Commercial and Noncommercial Mortality Salvage Sanitation Salvage Prescribed Fire	<u>Activity</u> Grassland Restoration and/or maintenance tree/shrub Cuts Tree Pushing, Chaining Prescribed Fire Careful grazing management for herbaceous vegetation recovery, especially post-fire Intensive animal browsing to maintain herbaceous vegetation cover Herbicide treatments

²Daniel et al.,1979. "Principles of Silviculture." McGraw-Hill, New York. / Smith, D.M. 1986. "The Practice of Silviculture." John C. Wiley & Sons, New York, / Helms, J.A., (ed.). 1998. "The Dictionary of Forestry." The Society of American Foresters.

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