CHAPTER 2. EXISTING VEGETATION – FOREST SCALE

Grand Mesa

Current Vegetation

Vegetation mapping for the Grand Mesa, Uncompahgre and Gunnison (GMUG) National Forests is generated primarily from aerial photo interpretation, with periodic updates resulting from field verification, management activities and natural disturbances (i.e., wildfires). Vegetation is classified by cover type. Cover type is determined by the dominant cover or species present at the time of classification. As a result, cover type classifications are more simplified than conditions that actually occur on the ground. (For example: Spruce/fir cover type includes areas where Englemann spruce and/or subalpine fir tree species are the majority of the vegetation. Aspen tree species may or may not be present as subdominant species.)

Current vegetation cover type composition on NFS lands within the Grand Mesa Geographic Area is shown in Figure 1. Vegetation is currently dominated by aspen, spruce and subalpine fir forests. A map of current vegetation is shown in Figure 2.

Figure 1. Composition of Current Vegetation Cover Types on NFS lands within the Grand Mesa Geographic Area

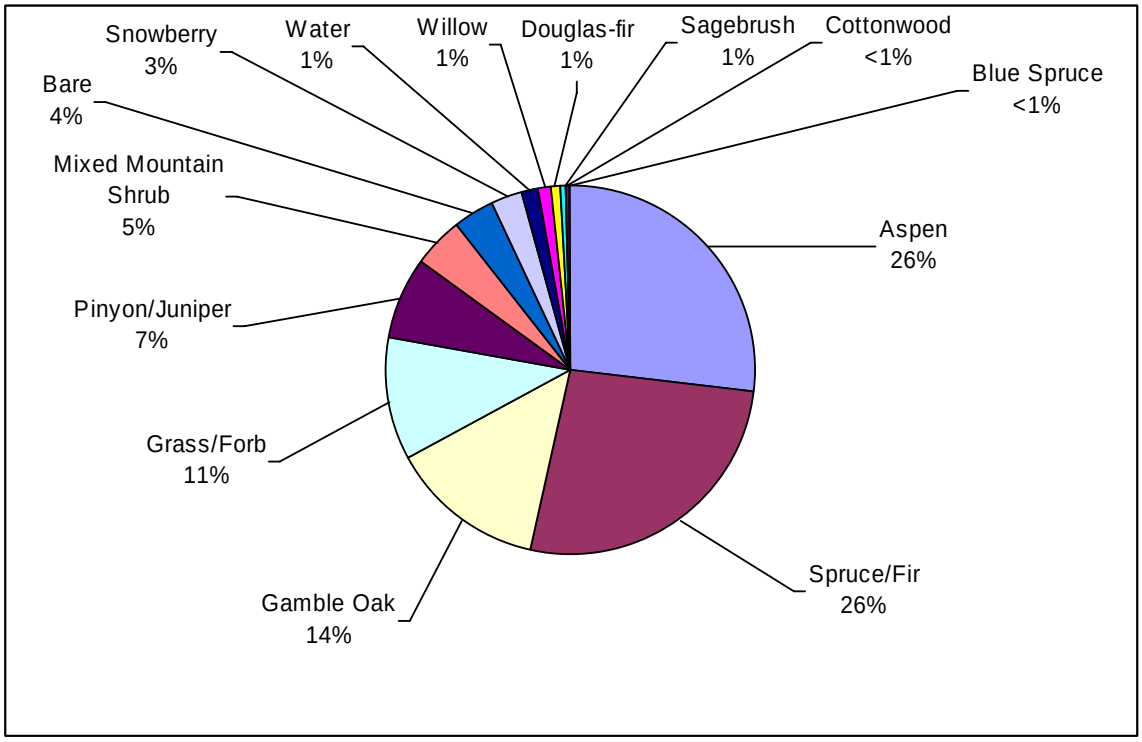
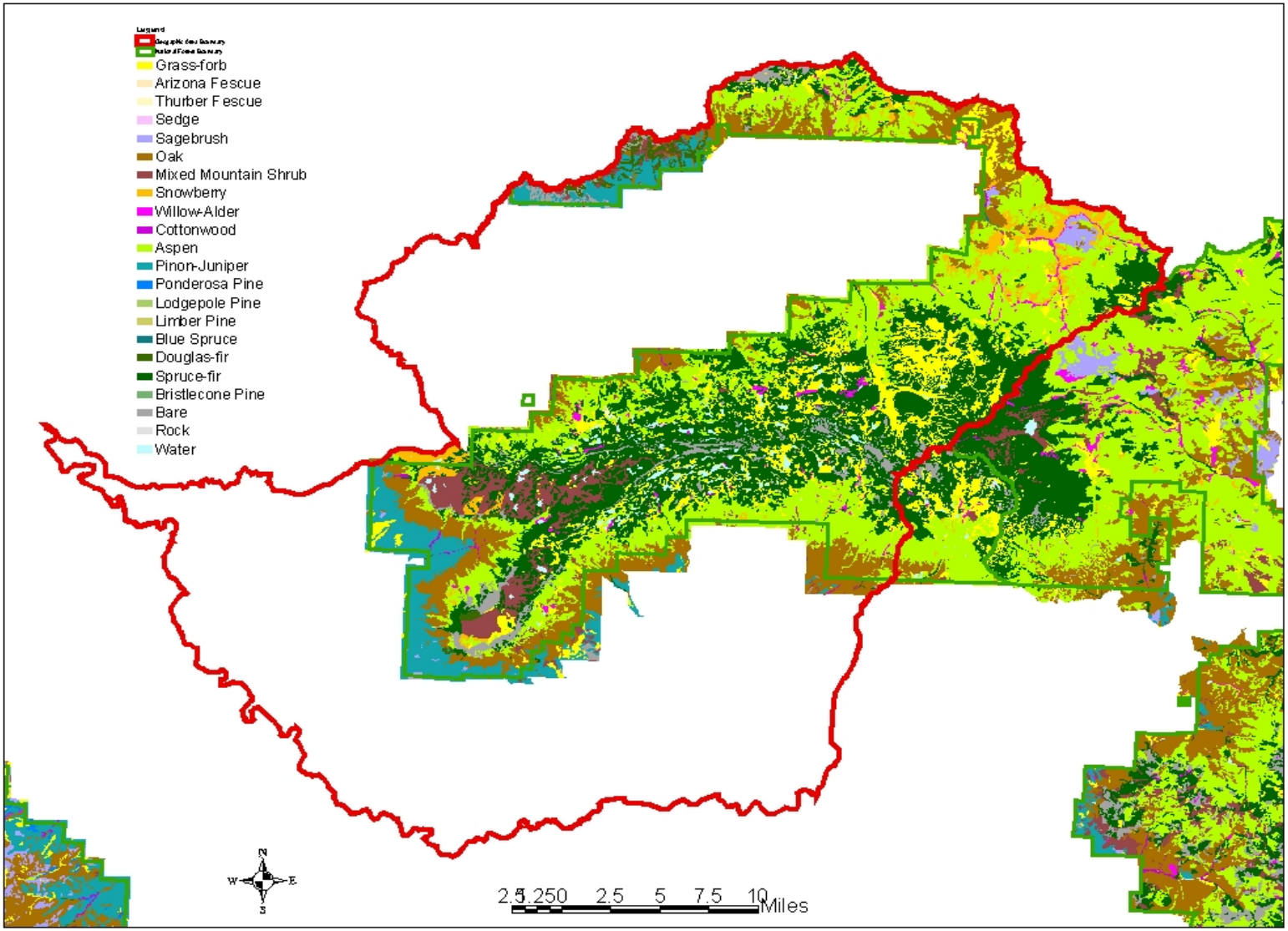


Figure 2. Map of Current Vegetation, Grand Mesa Geographic Area



Habitat Structural Stages

Vegetation is also characterized by structure. Structure is described by habitat structural stages. Habitat structural stages are defined by size class, tree diameter, and canopy closure (or canopy density measured as crown cover percent). Table 1 displays habitat structural stage definitions (Hoover and Wills, 1987).

Table 1. Habitat Structural Stage Definitions

Habitat Structural Stage	Size Class	Diameter	Crown Cover Percent
1T[1]/1M[2]	Grass-Forb	Not applicable	0 – 10%
2T[1]/2S[3]	Shrub-Seedling	< 1 inch	0 - 10%
3A	Sapling-Pole	1 – 9 inches	11 – 40%
3B	Sapling-Pole	1 – 9 inches	41 - 70%
3C	Sapling-Pole	1 – 9 inches	71 - 100%
4A	Mature	9+ inches	11 – 40%
4B	Mature	9+ inches	41 - 70%
4C	Mature	9+ inches	71 - 100%

1 Opening in tree cover type created by some type of disturbance
2 Natural meadow
3 Shrub cover type

Habitat structural stages can be used as indicators for:

- *Wildlife habitat* - Different wildlife species have different habitat requirements. For example, species that require large diameter trees in dense stand conditions find habitat in areas with 4B and 4C habitat structural stages.

- *Potential risk for future fire, insect and/or pathogen activity* - Trees growing in dense *stands* can be stressed by competition for water, nutrients and sunlight, making them more susceptible to insect attack.

- *Time since disturbances (fire, harvest, etc.) affected an area*. Age of vegetation is not directly linked to habitat structural stage; however, relative stages of succession can be *implied*. Early stages of succession are shown as habitat structural stages 1 or 2; later successional stages are usually in habitat structural stages 4A/ 4B/4C. Sometimes structural stages 3A/3B/3C may be the same age as 4A/4B/4C.

Current habitat structural stages for NFS lands within the Grand Mesa Geographic Areas are shown in Figure 3. Please note, on Figure 3 natural meadows in grass-forb cover types are shown as structural stage 1M, and shrub cover types are shown as structural stage 2S.

Figure 3. Current Habitat Structural Stages, Grand Mesa Geographic Area

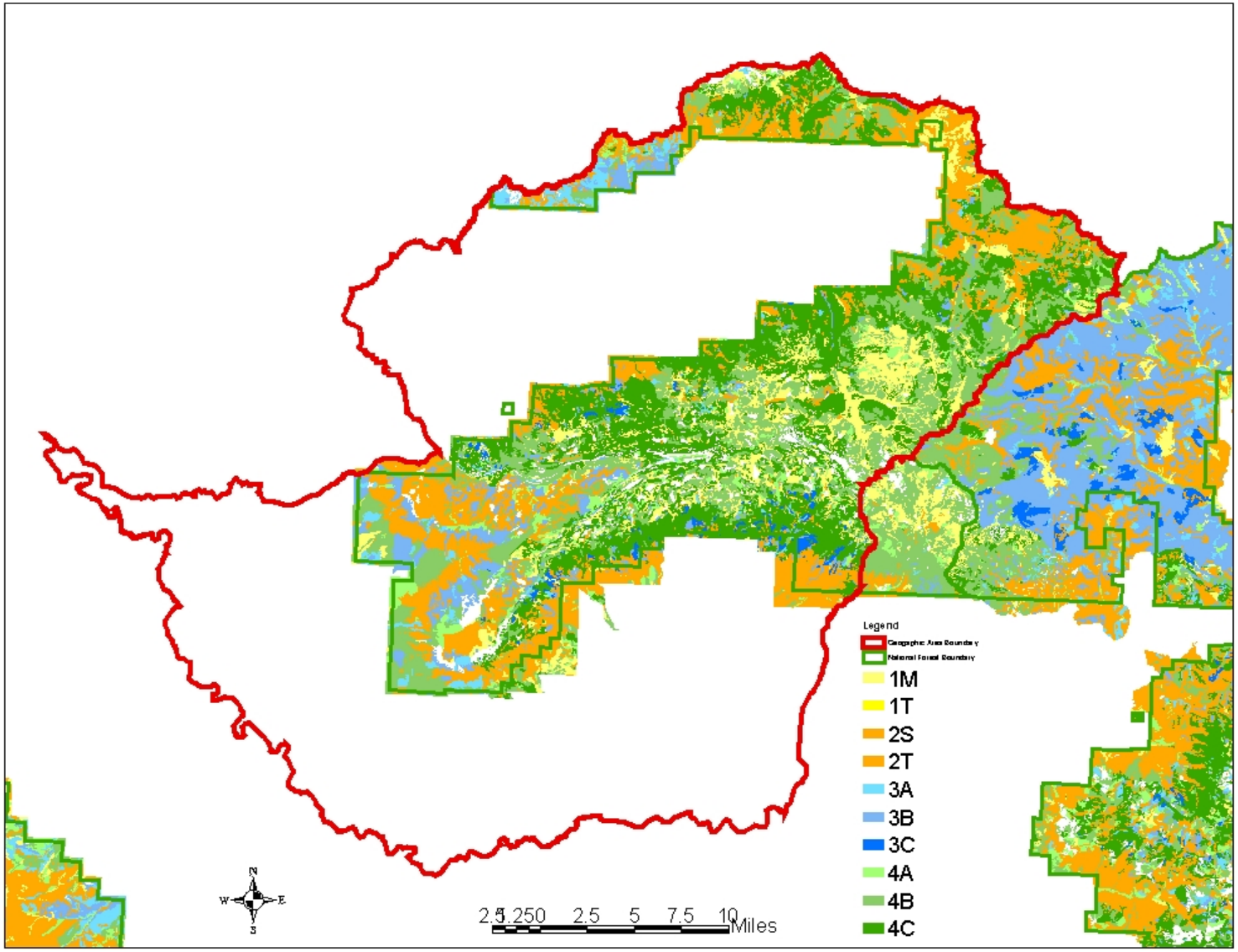
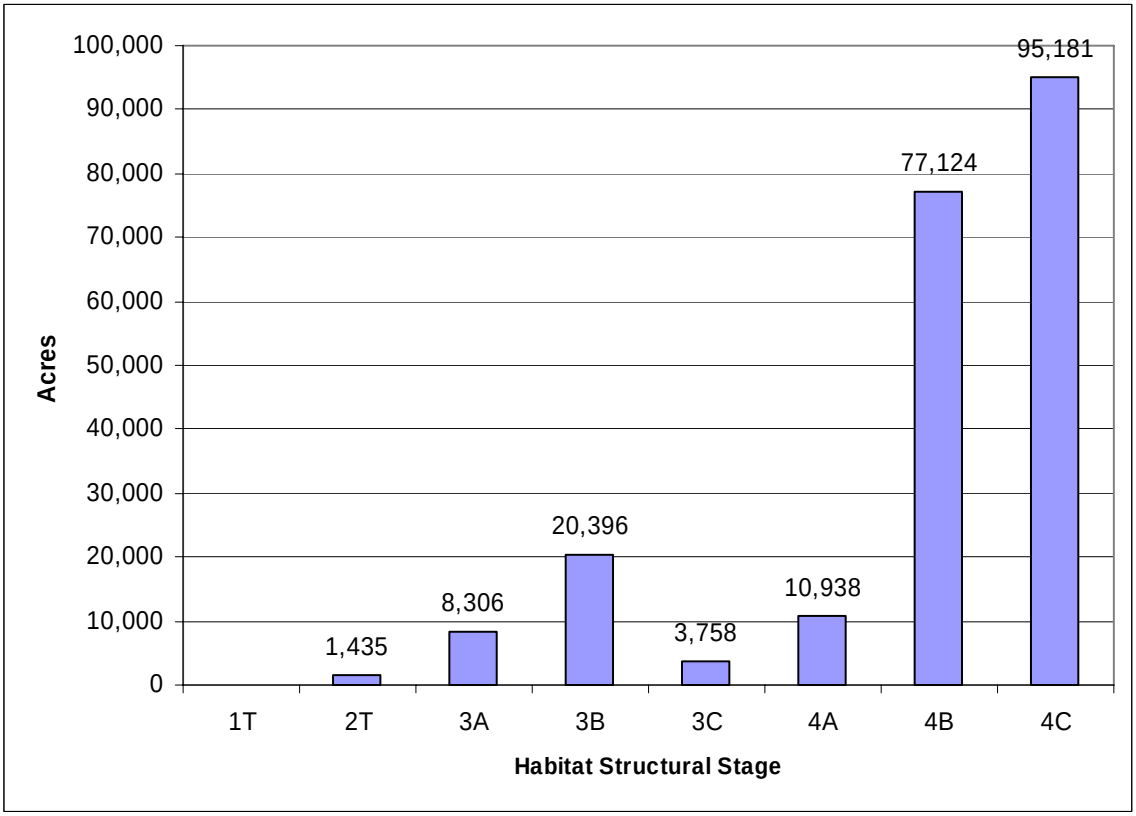


Figure 4 displays the distribution of habitat structural stages for the forest and woodland cover types (spruce-fir, aspen, Douglas-fir, ponderosa pine, cottonwood, pinyon-juniper) on NFS portion of the Grand Mesa Geographic Area. Note: Natural meadows and shrublands are not included in the chart below.

Figure 4. Habitat Structural Stage Distribution of Forest and Woodland Cover Types, Grand Mesa Geographic Area



This information can also be summarized by looking at the distribution of size classes (Figure 5) and densities or canopy closure (Figure 6) of forest and woodland cover types on NFS lands within the Geographic Area. Again, natural meadows and shrublands are not included in the data shown in Figures 5 and 6.

Figure 5. Size Class Distributions of Forest and Woodland Cover Types

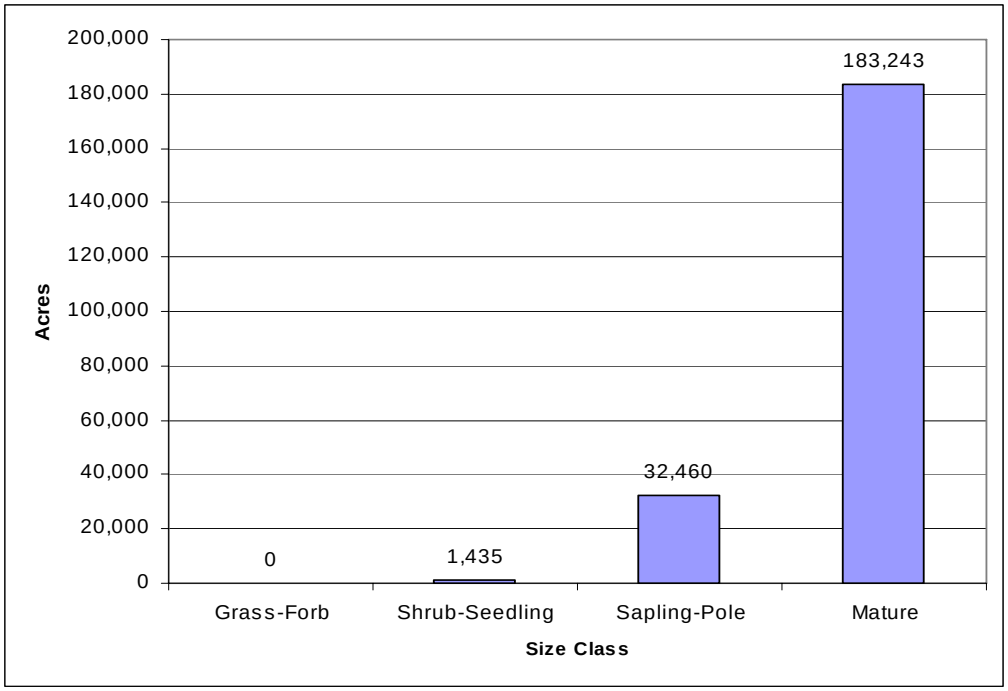
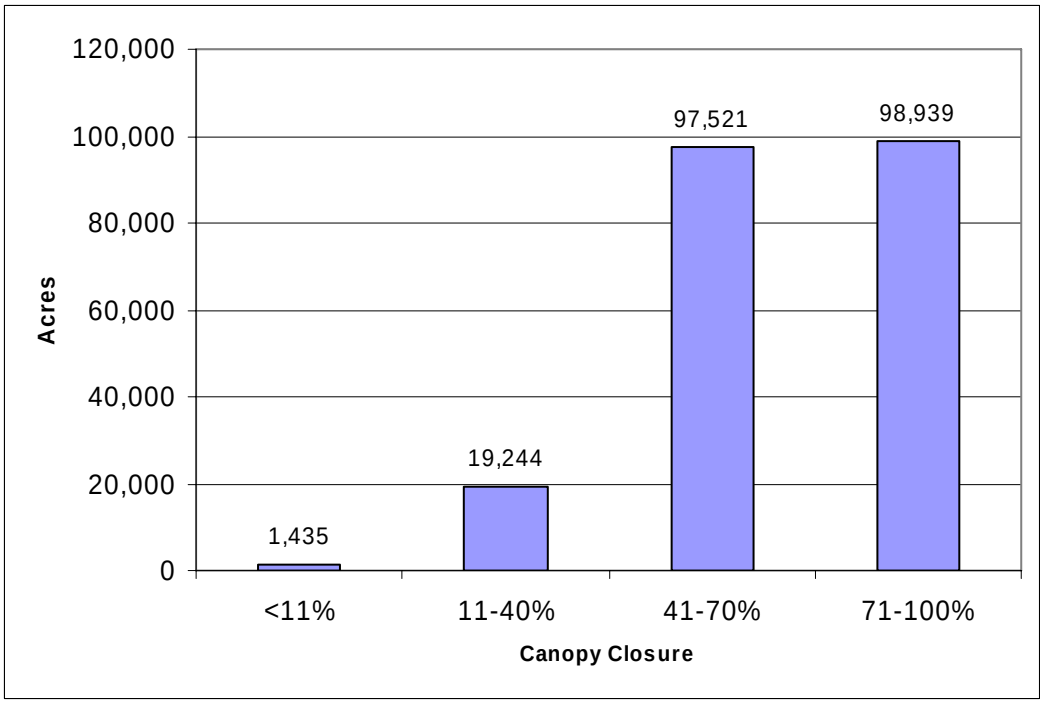


Figure 6. Canopy Closure Distributions in Forest and Woodland Cover Types



Characterization of Current Vegetation Conditions

Additional information on current conditions of different cover types is summarized in Table 2. (Also see timber, range and fire management sections.)

Table 2. Current Vegetation Characterization for NFS lands on Grand Mesa Geographic Area

Cover Type[1]	Composition of GA[1]	Age Distribution[2]	Habitat Structural Stages[1]	Canopy Conditions[1]	Past Activities (1955 – 2003)[3]	Effects of Roads/Trails[4]
Spruce-fir (Englemann spruce – subalpine fir)	93,300 acres 26%. (58% without aspen in species mix, 42% with aspen in the species mix)	Ranges from 10 to 210 years. Most spruce-fir is between 100-160 yr. old	1%-3A 5%-3B 1%-3C 7%-4A 41%-4B **46%-4C**	34% - single-storied 71% - multi-storied 97% - continuous canopies	12% of type has been affected by timber harvest	83% of type is within ½ mile of a road or trail. Includes: 82 miles roads 101 miles trails
Aspen	94,500 acres 26%. (60% pure aspen, 39% with spruce-fir in species mix, 1% with other tree species in mix)	Ranges from 16 to 131 years. Most aspen is between 80-120 yr. old.	2%-2T 2%-3A 10%-3B 3%-3C 1%-4A 28%-4B **54%-4C**	27% - single-storied 73% - multi-storied 98% - continuous canopies	2% of type has been affected by timber harvest	83% of type is within ½ mile of a road or trail. Includes: 68 mile roads 147 miles trails
Mixed Conifer (Douglas-fir, Blue Spruce)	3,500 acres 1%.	Age data not available.	26%-3A 25%-3B **28%-4A** 19%-4B 2%-4C	21% - single-storied 79% - multi-storied 99% - continuous canopies	None recorded..	21% of type is within ½ mile of a road or trail. Includes: 1 mile road 0 miles trails
Pinyon-Juniper	25,400 acres 7%	Age data not available	20%-3A 20%-3B 8%-4A **48%-4B** 3%-4C	56% - single-storied 44% - multi-storied 100% - continuous canopies	3% of type has been mechanically treated, 2% has been prescribed burned to improve habitat for big game.	32% of type is within ½ mile of a road or trail. Includes: 10 miles roads 8 miles trails
Cottonwood	500 acres <1%	No age data available.	17%-3B **40%-4A** 33%-4B 9%-4C	16% - single-storied 84% - multi-storied 100% - continuous canopies	None recorded.	80% of these types are within ½ mile of a road or trail. Includes: <1 miles roads 1 miles trails

Cover Type[1]	Composition of GA[1]	Age Distribution[2]	Habitat Structural Stages[1]	Canopy Conditions[1]	Past Activities (1955 – 2003)[3]	Effects of Roads/Trails[4]
Gamble Oak – Mixed Mountain Shrub	64,600 acres 19%	No age data available.	100% 2S 52% large (>6.5') 38% med. (2.5-6.4') 10% small (<2.5')	21% - single-storied 79% - multi-storied 92% - >40% cover 8% - <= 40% cover	19% of these types have been treated with prescribed fire to improve habitat for big game.	69% of these types are within ½ mile of a road or trail. Includes: 75 miles roads 98 miles trails
Snowberry	10,600 acres 3%	No age data available	100% 2S 88% med. (2.5-6.4') 12% small (<2.5')	6% - single-storied 94% - multi-storied 94% - >40% cover 6% - <= 40% cover	2% of these types have been treated with prescribed fire to improve habitat for big game.	78% of these types are within ½ mile of a road or trail. Includes: 22 miles roads 22 miles trails
Sagebrush	2,400 acres 1%.	No age data available.	100% 2S 21% med. (2.5-6.4') 79% small (<2.5')	15% - single-storied 85% - multi-storied 78% - >40% cover 22% - <= 40% cover	None recorded in this period.	71% of type is within ½ mile of a road or trail. Includes: 5 miles roads 2 miles trails
Willow	3,600 acres 1%	No age data available	100% 2S 33% large (>6.5') 59% med. (2.5-6.4') 8% small (<2.5')	7% - single-storied 93% - multi-storied 72% - >40% cover 28% - <= 40% cover	None recorded.	94% of these types are within ½ mile of a road or trail. Includes: 11 miles roads 8 miles trails
Grass/Forb	48,600 acres 11%	No age data available.	100% 1M	Not applicable	1% of this type has been treated with prescribed fire to improve habitat for big game.	64% of these types are within ½ mile of a road or trail. Includes: 90 miles roads 95 miles trails.

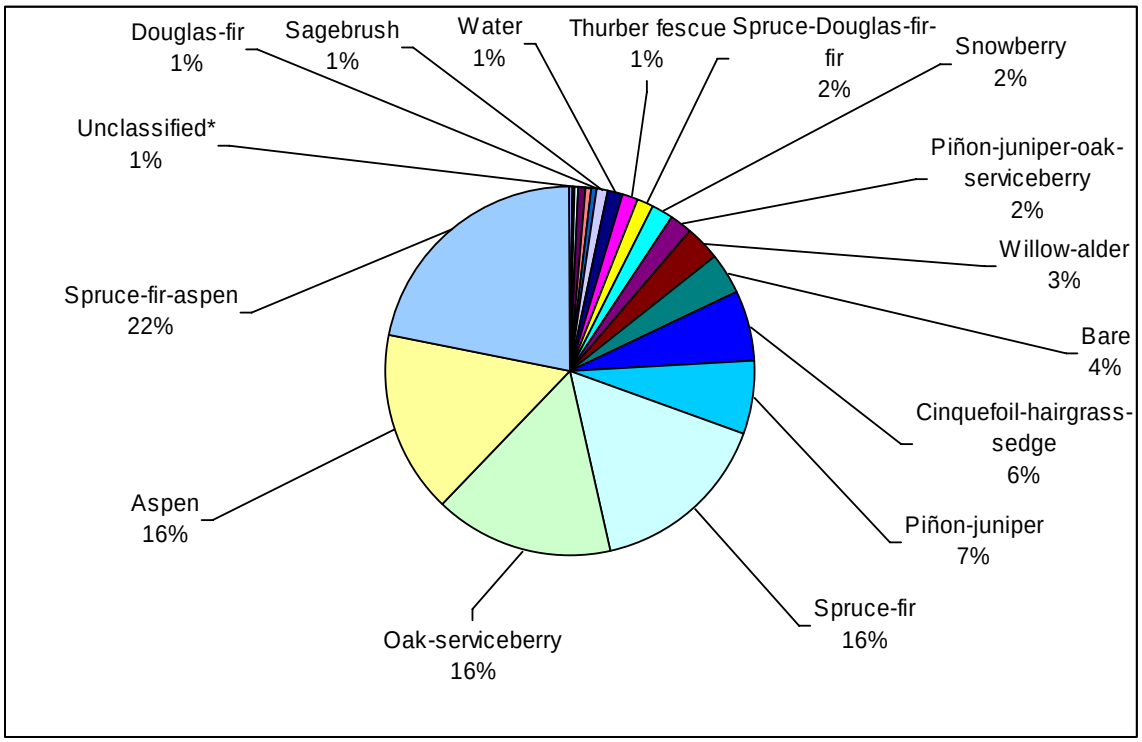
1 Common Vegetation Unit/R2VEG database
2 Stand exam data for Grand Mesa Geographic Area.
3 RMACT database
4 INFRA transportation data related to R2VEG data. Includes all inventoried roads and trail, not just routes open to public use.

Comparison of Current Conditions to Historic Conditions

Environmental factors such as soils, slope, aspect, climate, and elevation determine the plant communities that potentially can grow on a given area. The stable plant community that establishes in the absence of any disturbances (i.e., fire, insect/pathogen mortality, windthrow, drought, harvest) is called the climax plant community. The area where a given climax plant community can grow is classified as a Potential Natural Vegetation (PNV) type, and is named for the climax plant community. For example, spruce-fir forests are the climax plant community at elevations from 10,000 to 12,000 feet, in the subalpine climatic zone (30-40 inches of precipitation annually, 50-70 frost free days, 30-40ºF mean annual air temperature) (Johnston et al. 2001). Areas where spruce-fir is the climax plant community are classified as the spruce-fir PNV type.

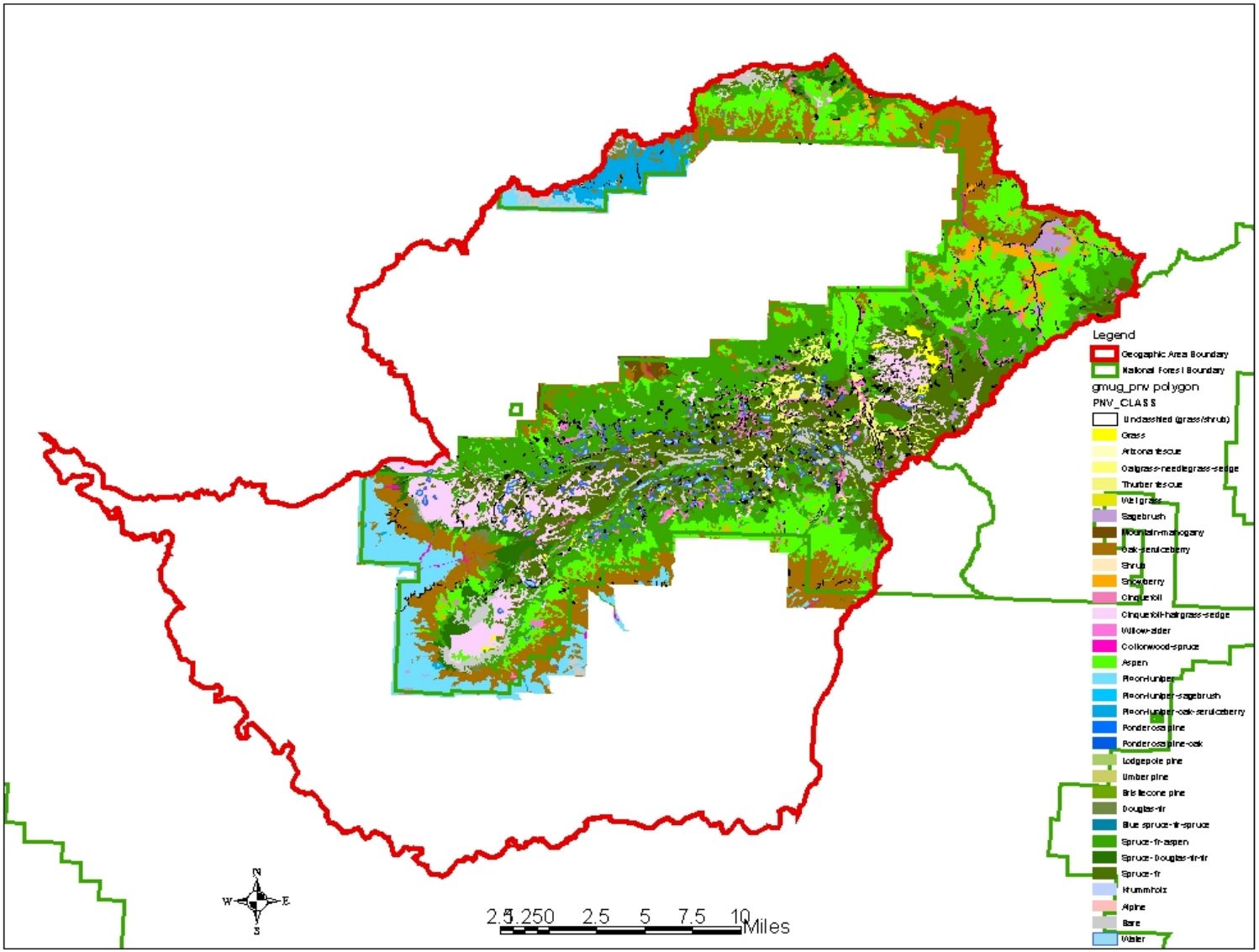
Draft PNV type classification has been completed for this Geographic Area. The PNV type composition on NFS lands within the Grand Mesa Geographic Area is shown in Figure 7. (PNV types with <0.1 percent composition are not included in Figure 7.) A map of PNV for the Grand Mesa GA is shown in Figure 8.

Figure 7. Composition of Potential Natural Vegetation Types on NFS lands within the Grand Mesa Geographic Area



* Unclassified, grass/forb or shrub types where the PNV type has not yet been assigned.

Figure 8. Potential Natural Vegetation on NFS portion of Grand Mesa Geographic Area



Historically, for any given PNV type, natural disturbances (i.e., fires, insect outbreaks) occurred at characteristic intervals and intensities, called regimes. When a disturbance was intense enough to change the existing plant community (e.g., some or all of the overstory was killed), the remaining vegetation followed a natural progression, or succession, of plant communities that changed over time. If no further disturbances occurred, an area eventually returned to the climax plant community. However, if multiple disturbances occurred on the same area earlier seral plant communities would be perpetuated on a site for extended periods. The natural disturbance regimes and succession cycles resulted in shifting mixtures (or ranges) of different seral plant communities (or stages) within any given PNV type at any point in time.

The Vegetation Dynamics Development Tool (VDDT) (Beukema et al. 2003) was used to model the expected range in seral conditions that would have existed under historic disturbance regimes for forest, woodland and shrub PNV types. The results displayed in the following tables are conditions that would have been distributed across an entire PNV type on the Geographic Area. Results are scale dependant. For example, if a large fire burned an entire watershed, all of a given PNV type in that watershed could be set back to an early seral condition. However, when the watershed is considered as part of the Geographic Area, the mixture of seral conditions for that PNV type would be within the expected ranges. Both situations would have occurred naturally.

The next sections include comparisons of current conditions to historic conditions for the most common PNV types on the Grand Mesa Geographic Area, to see where differences occur. This information can be used to identify future management opportunities.

Spruce-Fir PNV Type

The spruce-fir PNV type is mapped on 16 percent of the Grand Mesa Geographic Area. The climax community in this PNV type includes Englemann spruce and supalpine fir as the overstory species. This type occurs at the highest elevations (above 9,200 feet) on the Grand Mesa Geographic Area (Kulakowski and Veblen Draft 2004). The spruce-fir PNV type includes just over half (54 percent) of what is currently classified as spruce-fir cover type.

Table 3 describes the seral stages and the timeline for succession in the spruce-fir PNV type. This table also displays a comparison of the modeled historic range of seral conditions to the current seral conditions (as percentages) within the spruce-fir PNV type.

Table 3. Succession (Seral Stages) in Spruce-Fir PNV Type

	Early	**Early-Mid**	**Late-Mid**	**Late**
Seral Stage Descriptions*	Initially grass/forb, low shrub with spruce seedlings eventually becoming established. Fir seedling establishment lags by several decades. May last 50 to-200 years, depending on the time it takes trees to become established.	Dense pole-sized spruce, grass and forb understory, lasting up to 150 years	Mature spruce overstory with fir and spruce trees growing in the understory. May persist 150 to 300 years.	Variable density of mature conifer, multiple age and size classes. New trees can become established in gaps in canopy. Lasts until next stand replacing disturbance
VDDT Modeled Range of Seral Conditions	27-32%	20-24%	12-13%	31-40%
Current Seral Conditions	8%	40%	52% (Limited age data makes it difficult to differentiate between late-mid and late seral conditions.)	

*Kulakowski and Veblen, Draft 2004

Currently much of the spruce-fir PNV type is in mid-seral conditions (includes both early-mid and late-mid), and a small amount is in early seral conditions. Most of the stands in the spruce-fir PNV type originated in the mid to late 1800s (Kulakowski and Veblen, Draft 2004) making them 120 to 150 years old. The stand ages are a result of extensive fires on the Grand Mesa Geographic Area in the mid to late 1800s (Kulakowski and Veblen, Draft 2004, Sudworth 1900). The current conditions expressed in the spruce-fir PNV type demonstrate the effect of large scale disturbances setting large areas to the same seral condition. Not enough time has passed since the last major disturbance (the late 1800s) to allow a full range of seral conditions to develop in this PNV type.

The historic fire regime for the spruce-fir PNV type was long return interval (> 200 years), stand replacing fires, which could cover areas from 1,000 to 10,000 acres (Peet 1981 as cited in Neely et al. 2001) mixed with infrequent low-intensity surface fires that affected much smaller areas. Fire return intervals tended to be longer at higher elevations and in moist depressions and valley bottoms, up to 500 years (Romme et al. 1999). Recent fires have been very infrequent and very small in this PNV type. The majority of fires in this type on the Grand Mesa Geographic Area have been human caused (see Fire Management Section).

A variety of insect and pathogen agents affect spruce-fir forests (see Forest Health section). Spruce beetle outbreaks have occurred several times in the past century, affecting portions of this PNV type. In the late 1940s, portions of the Lands End and Flowing Park areas were affected. Salvage harvest operations occurred in these areas in the late 1940s and early 1950s, affecting approximately 1,900 acres. These areas are currently in early-mid conditions. In October 1997, between 8,000-12,000 acres of spruce-fir were affected by blowdown during a large wind event. Affected areas are scattered throughout the central portion of the Geographic Area. Salvage harvests have

treated approximately 700 acres of blowdown to reduce spruce beetle build ups. Subalpine fir mortality has also affected approximately 17,400 acres, reducing the amount of subalpine fir in the species mix. Stand density has been reduced in the areas affected by this more recent mortality (windthrow, spruce beetle mortality, subalpine fir mortality, salvage harvest) but seral condition has not been set back. These areas are in the late-mid seral conditions.

Additional timber harvest in this PNV type includes some early thinning (pre 1960s, approximately 500 acres) in the western portion of the Geographic Area, and shelterwood harvests (1980s to present, approximately 4,100 acres) have been done in more central areas of the Geographic Area (near Neversweat, Big Creek, Atkinson and Anderson reservoirs). Shelterwood harvest practices reduced the density of stands but did not alter the seral condition, and these are still in the late-mid seral condition.

Spruce-Fir-Aspen PNV Type

The spruce-fir-aspen PNV type is mapped on 22 percent of the Grand Mesa. The climax community in this PNV type includes Englemann spruce and subalpine fir as the dominant overstory species with aspen occurring in all seral stages. The spruce-fir-aspen PNV type is comprised of the remaining 46 percent of the current spruce-fir cover type, and approximately 37 percent of the current aspen cover type.

Table 4 describes the seral stages and timeline for succession in the spruce-fir-aspen PNV type. This table also displays a comparison of the modeled historic range of seral conditions to the current seral conditions (as percentages) within the spruce-fir-aspen PNV type.

Table 4. Succession (Seral Stages) in Spruce-Fir-Aspen PNV Type

	Early	**Early-Mid**	**Late-Mid**	**Late**
Seral Stage Descriptions*	New stand of aspen seedlings/suckers with grass and forb understory lasting 30-50 years	Dense pole-sized aspen, grass and forb understory, lasting up to 100 years	Mature aspen overstory with conifer trees growing in the understory. May take 100 to 200 years for conifers to dominate stand.	Mature conifer, scattered mature aspen in overstory. New trees can become established in gaps in canopy. Lasts until next stand replacing disturbance
VDDT Modeled Range of Seral Conditions	13-19%	22-29%	13-16%	35-49%
Current Seral Conditions	5%	63%	32% (Limited age data makes it difficult to differentiate between late-mid and late seral conditions.)	

*Romme et al. 2003

This PNV type is generally below the spruce-fir PNV type in elevation. Approximately 45 percent of the spruce-fir-aspen PNV type currently is dominated by aspen in the overstory, and 50 percent currently has more conifers in the overstory. As evidenced by

the percentages in the table above, most of this PNV type is in mid seral conditions (includes both early-mid and late-mid). Current conditions are the result of large scale fires that burned through this area in the 1850s and again in 1878 to 1879 (Kulakowski and Veblen Draft 2004, Sudworth 1900). The large amount of area in the early-mid seral condition is due to a pulse of aspen regeneration that occurred following these fires. The majority of these stands are in the 80 to 100 year old range. As with the previous PNV type, the current conditions expressed in the spruce-fir-aspen PNV type demonstrate the effect of large scale disturbances setting large areas to the same seral condition. The time since the last major disturbance has not been sufficient to allow a full range of seral conditions to develop in this PNV type.

The fire regime in the spruce-fir-aspen PNV type is similar to that described above for the spruce-fir PNV type (long return interval stand replacing fires affecting large areas, mixed with infrequent low-intensity fires affecting small areas). Recent fires have been infrequent and very small in this PNV type. Most fires have been human caused in this PNV type, as well.

The spruce-fir-aspen PNV type is also host to the same insect and pathogen organisms as the spruce-fir PNV type, as well as aspen insects/pathogens. Recent insect and disease activity includes subalpine fir mortality (17,000 acres affected), with lesser amounts of spruce beetle and aspen fungi mortality. Areas affected remain in mid seral conditions for extended periods of time.

Aspen clearcutting (mid 1980s to present) has occurred on approximately 1,900 acres of this PNV type scattered in the Waterdog, Horse Mountain, Oak Creek and Owens Creek areas. Shelterwood harvests in spruce-fir during the same period have occurred on approximately 3,000 acres, mostly in the Eggleston Lake and Hay Park Reservoirs areas. The aspen clearcuts are identified as the early seral conditions in the table above. Shelterwood harvests did not alter the seral stage. These areas are included in the late seral conditions dominated by spruce and fir.

Aspen PNV Type

In the aspen PNV type, pure aspen is the climax plant community, with no conifer species present. The aspen PNV type is mapped on 16 percent of the Grand Mesa Geographic Area. Approximately 60 percent of what is currently shown as the aspen cover type is included in the aspen PNV type.

Table 5 depicts the seral stages and timeline for this PNV type as well as a comparison of the modeled historic range of seral conditions to the current seral conditions (as percentages).

Table 5. Succession (Seral Stages) in Aspen PNV Type

	Early	**Early-Mid**	**Late-Mid**	**Late**
Seral Stage Descriptions*	New stand of aspen seedlings/suckers with grass and forb understory lasting 10 to 20 years	Dense pole-sized aspen, grass and forb understory, lasting 50 to 80 years	Mature aspen overstory, aspen regeneration in the understory where overstory gaps results from individual tree mortality, lasting up to 80 years	Stable multi-storied, multi-aged aspen stand, predominantly forb understory.Lasts until next stand replacing disturbance
VDDT Modeled Range of Seral Conditions	8-14%	23-26%	17-24%	23-43%
Current Seral Conditions	3%	15%	82% (Limited age data makes it difficult to differentiate between late-mid and late seral conditions.)	

*Romme et al. 2003

The aspen PNV type is predominantly in late-mid to late seral conditions. Few areas are in early seral conditions. As with the previous PNV types, the distribution of seral conditions in the aspen PNV type is the result of past large scale fire activity in the late 1800s (Sudworth 1900).

The same fires that influenced the distribution of seral conditions in the spruce-fir-aspen PNV type also affected this aspen PNV type. Because aspen matures faster than spruce or fir, this PNV type shifts into the later seral stages more rapidly, as reflected in the higher amount of late-mid to late seral condition as compared to the spruce-fir-aspen PNV type.

The historic fire regime for aspen is more frequent than for the two previous PNV types. Aspen forest appear to be dominated by a regime of relatively infrequent, large fires at higher elevations, and smaller more frequent fires at lower elevations (Kulakowski and Veblen, Draft 2004). Recent fires have been very infrequent and small in this type.

Two percent of this PNV type has been affected by timber harvest. Clearcuts were done between 1984 to present. The majority of the acres treated are located on Ruth Mountain and in the Crooked Creek watershed. Other clearcut areas are scattered in Surface Creek, Horse Mountain, Park Creek and Baxter Creek. These harvested areas are included in the early seral conditions listed in the table above.

Oak-Serviceberry PNV Type

The oak-serviceberry PNV type has been mapped on 16 percent of NFS lands on the Grand Mesa. Historically, fires occurred in this PNV type at frequent intervals (every 15-30 years). The dominant shrub species, Gambel oak and serviceberry resprout following fire, so areas quickly return to shrub cover. This type transitions from one seral stage to

another at approximately 30 year timesteps. Table 6 compares current conditions in this PNV type to the modeled historic mix of seral conditions.

Table 6. Succession (Seral Stages) in Oak-Serviceberry PNV Type

	Early	**Mid**	**Late**
Seral Stage Descriptions*	Stands are dominated by resprouting shrubs with grasses and forbs in the understory. Persists to 20 or 30 years	Dense clumps of shrubs, usually < 6 feet high. Grass and forbs between clumps. Persists from 30 to 40 years.	Shrubs > six feet high, more open canopy. Grass/forbs between and beneath shrub canopies. Persists until next stand replacing disturbance.
VDDT Modeled Range of Seral Conditions	30-70%	28-34%	0-36%
Current Seral Conditions	8%	34%	58%

*Romme et al. 2003

Most of the oak-serviceberry PNV type in the Grand Mesa Geographic Area is currently in mid and late seral conditions, and little is in early seral conditions. The disparity between the historic conditions and current conditions is because there have been few recent disturbance in this PNV type, primarily due to fire suppression efforts over the past 100 years.

Frequent fires are the historical regime in this PNV type (0 - 35 years) (Kulakowski and Veblen Draft 2004). Fires would have started below the forest on what is mostly private land now, and burned into the oak-serviceberry PNV type on the Geographic Area. Fire suppression efforts, cover type conversion on private lands and past livestock grazing have not allowed fires to burn in this PNV type as frequently as in the past. As a result, the majority of this vegetation type has aged into mid and late seral conditions.

Approximately 14 percent of this PNV type has been treated with prescribed fire between 1978 and 2001. Approximately 70 percent of this area was burned more than once, at different times. Projects were concentrated on Battlement Mesa, Hightower and Oak Creek areas. These projects account for the early seral and part of the mid seral conditions represented in the tables above. The purposes for these treatments was to improve habitat for big game species by restoring earlier seral conditions that provide more forage than later seral conditions.

Pinyon-Juniper PNV Types

Two different pinyon-juniper PNV types have been identified on the Grand Mesa Geographic Area. Together these two types are mapped on nine percent of the NFS land on the Grand Mesa Geographic Area. The most common PNV type is pinyon-juniper (seven percent) located primarily on the west end of the Grand Mesa in the Kannah Creek area and the lower elevations of the Sunnyside area. The pinyon-juniper-oak-serviceberry PNV type two percent) is located in the Sunnyside area, above the pinyon-

juniper type in elevation. Table 7 displays the seral stages and timeline for the pinyon-juniper PNV type.

Table 7. Succession in Pinyon-Juniper PNV Type

	Early	**Early-Mid**	**Late-Mid**	**Late**
Seral Stage Descriptions*	Stands are dominated by a mixture of herbaceous species, persists from stand age 0 until age 10	Within one to several decades after a severe disturbance, shrub seedlings become established and co-dominate with the early successional herbs which are still abundant … persists from stand age 10 until age 50-70	The low shrubs dominate the stand, though the grasses and perennial forbs of earlier successional stages are still well represented, and young trees are poking through the shrub canopy … persists from stand age 50-70 until age 150-200	The stand is dominated by a mature tree canopy. The low shrubs and perennial herbs are still present, but have reduced cover if tree cover is high … persists from stand age 150-200 until the next stand-replacing disturbance
VDDT Modeled Range of Seral Conditions	1-3%	5-11%	56-59%	30-34%
Current Seral Conditions	<1%	5%	2%	93%

*Romme et all, 2003

The vast majority of the pinyon-juniper PNV type is currently in late seral tree dominated conditions. This is a result of past fire suppression not allowing fires to periodically burn in this type. Heavy livestock grazing that persisted until the mid-1950s also contributed to the current tree dominated conditions by removing competing understory species, which allowed the woody overstory species to prosper. The limited amounts of mid and early seral conditions exist where chaining (650 acres), prescribed fire (600 acres) and wildfires (see below) have occurred.

The Kannah Creek area of the Grand Mesa Geographic Area has the highest fire occurrence in the Grand Mesa. All the fires have been lightning caused between 1971 to the present. Approximately 400 acres have been burned in this PNV type. Aggressive fire suppression efforts have been used in this area, which has limited the acres that have been affected.

There is agreement that fires tend to be stand replacing in this PNV type (Eisenhart 2004, Kulakowski and Veblen Draft 2004, Romme et al. 2003). However, the historical fire return interval and fire size has been shown to be quite variable (Eisenhart 2004, Romme et al. 2003).

Key Findings

- Aspen and spruce-fir cover types each currently occupy 26 percent of the Grand Mesa Geographic Area. Aspen is also present in 31 percent of the spruce-fir cover type, making aspen the most common tree species on the Geographic Area.
- The large extent of aspen is the result of large scale fires in the late 1800s (Sudworth 1900), that affected most of the Grand Mesa Geographic Area. As a result, the majority of this geographic area is currently in mid seral conditions.
- Approximately 84 percent of the forest and woodland cover types are in the mature size class.
- The majority of the current forest and woodland vegetation conditions – 91 percent - have dense canopy closures (> 40 percent canopy closure).
- There is very little early seral condition in any cover type on the Grand Mesa Geographic Area, as shown in Tables 3 through 7.
- When comparing the compositions of current vegetation cover types to PNV types (Figure 1 through Figure 7), there is very close comparison, a further indication that current cover types are predominantly in mature conditions.

Vegetation Trends

- The trend across all vegetation cover types on the Grand Mesa is to continue successional progress predominantly with the absence of either natural or human-caused disturbances. Structural and compositional conditions in each cover type will continue to progress along successional timelines. A shift from aspen dominated forests to conifer dominated forests is also occurring as a result of successional changes.

Vegetation Management Implications

Management implications of vegetation conditions relate to differences between current and historic vegetation conditions. Where landscape conditions are similar to historic conditions landscapes are more resilient following disturbances, suitable habitat is provided for all species that evolved there, and ecosystems are productive and sustainable over time. Where current conditions deviate from historic ranges, there are increased risks for natural disturbances to be of higher intensities and affect larger areas than in the past; some habitats may become very limited or lost, threatening species viability; and loss of productivity can result in both ecological and economic losses. Management activities that can include both human and natural disturbances can be used to alter vegetation conditions. Management implications for specific cover types are discussed below.

Spruce-Fir

- The spruce-fir cover type occurs in both the spruce-fir and the spruce-fir-aspen PNV types. Disturbances (human or natural) that occur in the spruce-fir-aspen PNV type will result in aspen regeneration within a very short period of time. Disturbances in the spruce-fir PNV type do not have aspen as an early seral species, and may take 50 to 200 years to regenerate to spruce.

- Both the spruce-fir and spruce-fir-aspen PNV types are currently dominated by mature, dense structural conditions. These conditions are ripe for fire and epidemic insect and pathogen outbreaks (see Forest Health and Fire Management sections). Because so much of the landscape is in the same condition, there is a high probability that large areas can be affected at the same time. Large scale disturbances (both fire and insect outbreaks) are the natural regimes for these PNV types. Management activities that increase diversity in age, size and seral condition, could be used to reduce the potential effects of natural disturbances.

- Approximately 42 percent of the spruce-fir cover type on the Grand Mesa Geographic Area is in currently unroaded areas. Where future management decisions (i.e., theme designations) limit or restrict management activities in these unroaded areas, only natural processes will alter vegetation conditions.

Aspen

- The aspen cover type occurs in both the spruce-fir-aspen PNV type (as the early through late-mid seral conditions) and the aspen PNV type (all seral stages). Based on the percentages in each seral stage displayed in the above tables for these PNV types, aspen currently dominates the Grand Mesa landscape. This is a result of extensive fires in the late 1800s.

- Aspen stands become very susceptible to cankers and root rots as they mature. A large percentage of the aspen cover type on the Grand Mesa Geographic Area is between the age of 80 and 120 years. An increasing amount of mortality caused by these fungal agents is expected in the future.

- Approximately half of the aspen stands on the Grand Mesa Geographic Area include conifer species in the understory or as codominant species. In the absence of some disturbance, these stands will eventually succeed to conifer dominated cover types. A shift from an aspen cover type to various conifer cover types will change the types of habitat available on the Grand Mesa Geographic Area to favor those species that require mature conifer forests.

Gambel Oak and Mountain Shrubs

- Current conditions in the Gambel oak and mixed mountain shrub cover types have less patchiness and structural stage diversity than would have occurred historically. The result is current conditions are more susceptible to higher intensity fires that may affect larger areas of land than would have occurred in the

past. There is also less diversity in the types of habitat provided by these cover types than would have been present.

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