The Nature Conservancy
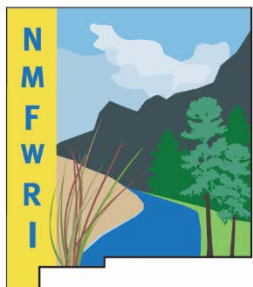
2020

McGaffey CFRP Pre-Treatment Vegetation Monitoring

New Mexico Forest and Watershed Restoration Institute

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NMFWRI

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Introduction

In summer 2019, the New Mexico Forest and Watershed Restoration Institute (NMFWRI) collected forest vegetation monitoring data on fixed-radius plots in the McGaffey Forest and Rio Grande del Rancho Watershed Restoration in Taos County in the Sangre de Cristo Mountains (referred to as "McGaffey" in the rest of this report). This monitoring is part of the NEPA planning analysis process; NMFWRI was contracted for this work under an agreement with The Nature Conservancy (The Natures Conservancy) as part of a Planning Collaboration Forest Restoration Program (CFRP) grant.

The McGaffey NEPA project analysis area is around 30, 000 acres which was identified as a high priority area in various Taos County Watershed Plans and Restoration strategy documents. The area includes Pot Creek, Talpa, Miranda Canyon, Llano Quemado and Rancho de Taos. Much of the land is managed by the Carson National Forest, Camino Real Ranger District.

Significant restoration work has already occurred in the area by a variety of stakeholders including Pot Creek residents, Southern Methodist University, the Taos Soil and Water Conservation District, Taos County, and the Carson National Forest in the form of thinning and prescribed fire, as well as managed wildfire. In 2016, a 524-acre lightning fire on McGaffey Ridge was managed by the Carson National Forest as a successful fuels treatment. The NEPA planning and analysis grant will allow implementation of further restoration work in ponderosa pine, mixed conifer, and riparian.

NMFWRI collaborated with TNC on this project due to an existing partnership through the Rio Grande Water Fund (RGWF) to collect, analyze and store ecological monitoring data for projects using a student crew from NM Highlands University supervised by NMFWRI staff. Monitoring leadership was shared by TNC and NMFWRI and followed standard forest monitoring protocols based on the Common Stand Exam and agreed upon by TNC, NMFWRI, and the Carson National Forest. Data collected on 1/10th acre fixed radius plots included slope, aspect, understory species, ground cover, canopy cover, tree height, diameter, and condition, and surface fuels. Details of the monitoring protocol and example datasheets can be found in Appendix IV.

Establishment of Monitoring Points

Because significant differences exist between planned and collected monitoring plots, NMFWRI wanted to explain the process for how plots were originally placed in planning, as well as how they were collected during field monitoring.

Stratified Random Sampling Design for McGaffey Project and Planned Points

Due to the large size of the study area (30,000 acres), monitoring site locations were identified using the following techniques to stratify the number of points while capturing the variety of the landscape. To get an idea of the vegetation types, Landfire 2014 Existing Vegetation Types were downloaded for the study area. The top four dominant vegetation types identified were; 1) Ponderosa Pine, 2) Douglas-Fir, 3) Pinyon Juniper Woodlands, 4) White Fir.

Points were distributed to capture a variety of those 4 vegetation types within the following conditions:

1. Outside of Private Land

2. Within a 1/3 mile buffer of a serviceable road (not jeep trails)

3. In areas where one would not traverse over slopes less than 60%. Percent slope was calculated using 2016 LiDAR data.

4. Captured a representative sample of the top four dominate vegetation types.

Once these available areas were identified, the largest general regions these areas were digitized. Within these regions, random points were generated so that no point was closer than 60 meters between each other. In some cases if points landed on roads they were manually shifted away from roads.

Ultimately, 40 planned plot locations were established which, in their distribution, matched the proportion of the four dominant vegetation types. See these plots in Figure 1. Planned monitoring points for McGaffey CFRP.

Differences between Planned and Collected Points

The NMFWRI monitoring crew's access to monitoring plots during the peak field season was severely restricted by closures of portions of the Carson National Forest due to the Amole wildfire (order 02-469). With coordination with the Carson National Forest, the monitoring crew was able to access portions of the project dominated by Piñon-Juniper and Ponderosa Pine. Heavy rain during the field crew's available time added further complications included making roads impassable by vehicle. Ultimately, the NMFWRI crew completed 14 of the planned 40 monitoring points, all within the Juniper-Pinyon Pine Woodland and the Interior Ponderosa Pine LANDFIRE veg classes. A map of the planned plots is available in Figure 2. Collected monitoring points for McGaffey CFRP.

McGaffey CFRP Landfire Existing Vegetation Type
NMFWRI Monitoring Points (40)
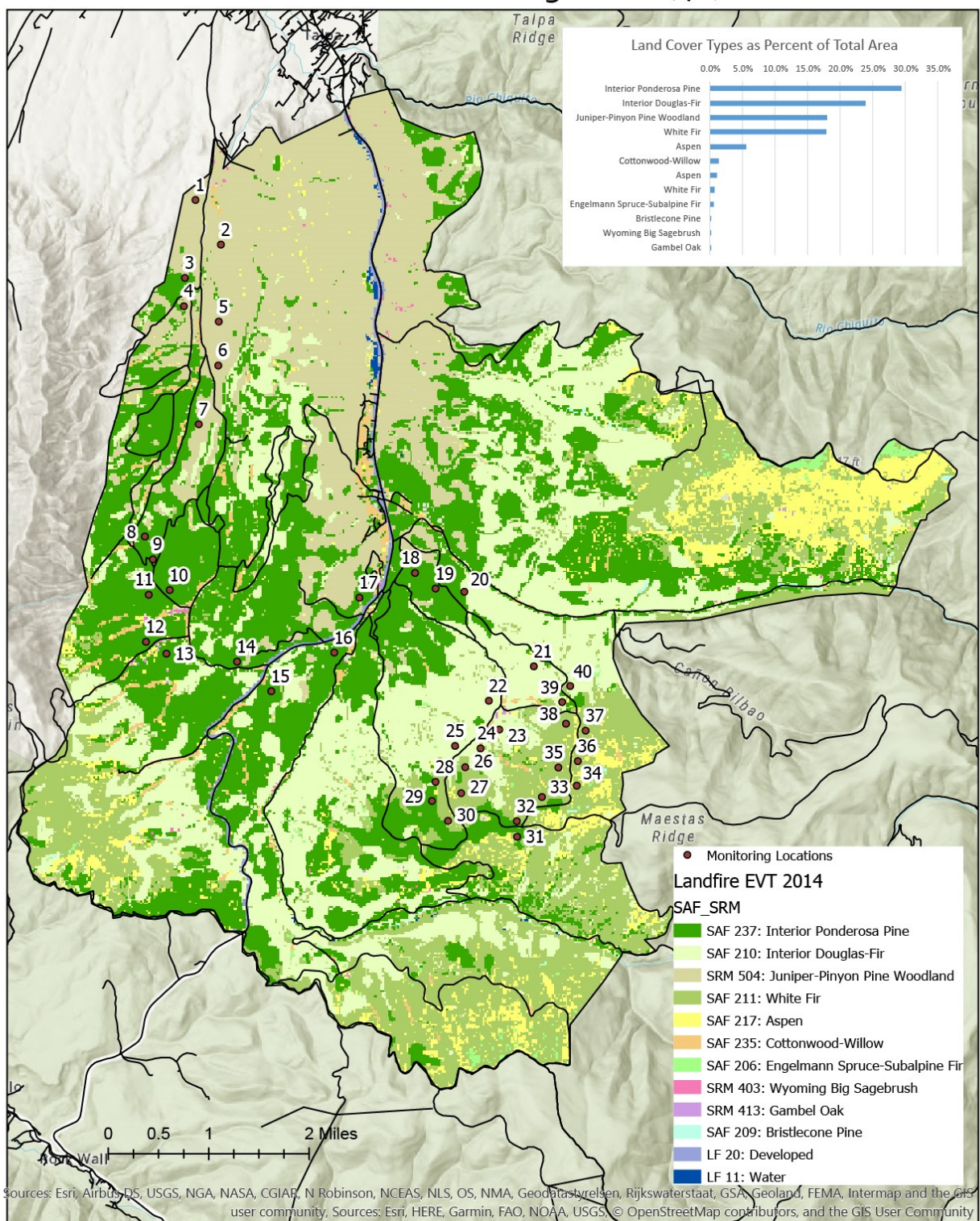
Figure 1. Planned monitoring points for McGaffey CFRP.

NMFWRI McGaffey Monitoring Locations 2019

Plot Numbers	SAF_SRM
1-7	SRM 504: Juniper-Pinyon Pine Woodland
9-16	SAF 237: Interior Ponderosa Pine

Land Cover Types as Percent of Total Area

- Interior Ponderosa Pine
- Interior Douglas-Fir
- Juniper-Pinyon Pine Woodland
- White Fir
- Aspen
- Cottonwood-Willow
- Aspen
- White Fir
- Engelmann Spruce-Subalpine Fir
- Bristlecone Pine
- Wyoming Big Sagebrush
- Gambel Oak

Landfire EVT 2014

- Rocky Mountain Aspen Forest and Woodland
- Colorado Plateau Pinyon-Juniper Woodland
- Rocky Mountain Lodgepole Pine Forest
- Southern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest and Woodland
- Southern Rocky Mountain Mesic Montane Mixed Conifer Forest and Woodland
- Southern Rocky Mountain Ponderosa Pine Woodland
- Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland
- Rocky Mountain Subalpine-Montane Limber-Bristlecone Pine Woodland
- Southern Rocky Mountain Pinyon-Juniper Woodland
- Inter-Mountain Basins Aspen-Mixed Conifer Forest and Woodland
- Rocky Mountain Lower Montane-Foothill Shrubland
- Southern Rocky Mountain Ponderosa Pine Savanna
- Southern Rocky Mountain Juniper Woodland and Savanna
- Inter-Mountain Basins Semi-Desert Grassland
- Southern Rocky Mountain Montane-Subalpine Grassland
- Rocky Mountain Montane Riparian Forest and Woodland
- Abies concolor Forest Alliance
- Quercus gambelii Shrubland Alliance
- Open Water
- Developed-Low Intensity
- Developed-Roads

Monitoring Locations collected by NMFWRI

Map Produced by Patti Dappen on 5/20/2020

0   0.5   1   2   3 Miles

New Mexico Forest and Watershed Restoration Institute
New Mexico Highlands University

Figure 2. Collected monitoring points for McGaffey CFRP.

Results from Data Collection

Piñon-Juniper

This section presents results from monitoring plots 1 through 7 in LANDFIRE EVT Colorado Plateau Piñon-Juniper (abbreviated CPPJ on some figures).

These plots had an average slope of 14% and had dominant aspects of North and West. More detail is presented below.

Table 1. Slope for McGaffey CPPJ plots.

Slope (in %)	
Range of slope	
Max	21
Min	5
Mean slope	14
Median slope	16
Mode slope	16

Table 2. Aspect for McGaffey CPPJ plots.

Aspect (cardinal direction)		
Direction	**Count**	**Percent of plots with this aspect**
N	3	42.9%
E	0	0.0%
S	0	0.0%
W	4	57.1%

Overstory

Full stand tables are present in the Tables on the following pages. These results are also highlighted with individual figures.

Overall, CPPJ plots had 167 trees per acre (114 live trees per acre and 53 sick trees per acre) with an average basal area of 293 square feet per acre. There were an average of 5.7 snags per acre with an average basal area of 8.4 square feet for acre. The average quadratic mean diameter (QMD) was 15.8 inches. Average height of trees was 30 feet, with a live crown base height of 5 feet.

Table 3. Overstory summary for McGaffey CPPJ.

McGaffey CPPJ			2020		
Summary Table for all Plots			# Sample Trees on plot	Trees per acre	Basal area per acre
Plot Total			**121.00**	**172.86**	**301.46**
Growing Stock		Healthy (H)	0.00	0.00	0.00
		Unhealthy(U)	0.00	0.00	0.00
		Sick (S)	37.00	52.86	128.18
		Living (L)	80.00	114.29	164.89
Sum of Growing Stock			**117.00**	**167.14**	**293.07**
Dead		Dead (D)	4.00	5.71	8.39
Sum of Dead			**4.00**	**5.71**	**8.39**
Plot Total: Growing Stock & Dead	**Sum of**		**121.00**	**172.86**	**301.46**

Transition from PJ to PIPO are the densest native veg types, and besides having a lot of trees, this area , particularly plot 1, had a lot of multi-stem stem trees. Our monitoring protocol allows measurement at diameter root collar (DRC) for multi-stem oak, piñon, and juniper, and some of these measurements were over 40 inches around. The large basal area values here reflect these measurements.

Figure 3. Plot 1, facing South from PC. Several multi-stemmed juniper are visible.

Table 4. Individual plot summary for McGaffey CPPJ.

McGaffey CPPJ 2020				
Individual Plot Summary Table				
		Growing Stock		
Macro Plot Name	Total number of sample trees on plot	Number of growing stock sample trees on plot	Trees per Acre	Basal Area per Acre
MG_01	22	21	210	1069.85
MG_02	16	16	160	160.91
MG_03	20	20	200	308.89
MG_04	11	11	110	93.07
MG_05	16	15	150	210.86
MG_06	19	17	170	132.59
MG_07	17	17	170	75.31
			Average for all Plots	
Total			**TPA**	**BA/AC**
	121.00	**117.00**	**167.14**	**293.07**

Table 5. Woodland Species Table Stand for McGaffey CPPJ.

Stand Table — McGaffey CPPJ — 2020

Woodland Species		Saplings			Pole			Mature Trees											Total by Species	%Species for all G-Stock
Diameter Class		0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32+		
PIED Pinon pine	COUNT	0	0	0	35	19	9	4	2	1	0	0	1	0	0	0	0	0	71.00	
	TPA	0.00	0.00	0.00	50.00	27.14	12.86	5.71	2.86	1.43	0.00	0.00	1.43	0.00	0.00	0.00	0.00	0.00	101.43	60.68%
	BA/AC	0.00	0.00	0.00	9.45	8.83	6.62	4.62	2.70	1.80	0.00	0.00	3.70	0.00	0.00	0.00	0.00	0.00	37.72	12.87%
	AVE HT. (HL)	0.00	0.00	0.00	32	35	41	38	40	55	0.00	0.00	53	0.00	0.00	0.00	0.00	0.00		
JUMO One-seed juniper	COUNT	0	0	0	0	1	2	2	1	1	1	1	0	0	0	0	0	8	17.00	
	TPA	0.00	0.00	0.00	0.00	1.43	2.86	2.86	1.43	1.43	1.43	1.43	0.00	0.00	0.00	0.00	0.00	11.43	24.29	14.53%
	BA/AC	0.00	0.00	0.00	0.00	0.47	1.42	2.29	1.48	1.91	2.38	3.32	0.00	0.00	0.00	0.00	0.00	170.69	183.96	62.77%
	AVE HT. (HL)	0.00	0.00	0.00	0.00	15	15	13	15	15	16	10	0.00	0.00	0.00	0.00	0.00	14		
JUSC2 Rocky Mnt juniper	COUNT	0	0	0	4	2	2	4	2	0	0	1	1	1	0	1	2	2	22.00	
	TPA	0.00	0.00	0.00	5.71	2.86	2.86	5.71	2.86	0.00	0.00	1.43	1.43	1.43	0.00	1.43	2.86	2.86	31.43	18.80%
	BA/AC	0.00	0.00	0.00	0.92	1.01	1.53	4.37	2.80	0.00	0.00	3.09	3.98	4.27	0.00	6.52	14.24	24.23	66.96	22.85%
	AVE HT. (HL)	0.00	0.00	0.00	42	12	19	19	16	0.00	0.00	15	18	23	0.00	38	19	16		
Woodland Species Sub-total	COUNT	0	0	0	39	22	13	10	5	2	1	2	2	1	0	1	2	10	110.00	
	TPA	0.00	0.00	0.00	55.71	31.43	18.57	14.29	7.14	2.86	1.43	2.86	2.86	1.43	0.00	1.43	2.86	14.29	157.14	94.02%
	BA/AC	0.00	0.00	0.00	10.38	10.31	9.57	11.28	6.98	3.71	2.38	6.42	7.68	4.27	0.00	6.52	14.24	194.92	288.64	98.49%
	AVE HT. (HL)	0.00	0.00	0.00	33	32	34	26	25	34	16	12	35	23	0.00	38	19	14		

Summary by Size Class for Woodland Species		Saplings	Pole	Mature Trees	Total
	TPA	0.00	105.71	51.43	157.14
	TPA %	0.00%	67.27%	32.73%	100.00%
	BA/AC	0.00	30.26	258.38	288.64
	BA/AC %	0.00%	10.48%	89.52%	100.00%
	QUADRATIC MEAN DIA.	0.00	7.24	30.35	18.35
	AVE HT. (HL)	0.00	33	17	18

Table 6. Forestland Species Stand Table for McGaffey CPPJ.

Stand Table — McGaffey CPPJ — 2020

Forestland Species		Saplings			Pole			Mature Trees											Total by Species & Covertype	%Species for all G-Stock
Diameter Class		0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32		
PIPO Ponderosa pine	COUNT	0	0	0	2	3	0	1	1	0	0	0	0	0	0	0	0	0	7.00	
	TPA	0.00	0.00	0.00	2.86	4.29	0.00	1.43	1.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	5.98%
	BA/AC	0.00	0.00	0.00	0.56	1.35	0.00	1.05	1.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.43	1.51%
	AVE HT. (HL)	0.00	0.00	0.00	40.00	44.15	0.00	68.00	57.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Forestland Species Sub-total	COUNT	0	0	0	2	3	0	1	1	0	0	0	0	0	0	0	0	0	7.00	
	TPA	0.00	0.00	0.00	2.86	4.29	0.00	1.43	1.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	5.98%
	BA/AC	0.00	0.00	0.00	0.56	1.35	0.00	1.05	1.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.43	1.51%
	AVE HT. (HL)	0.00	0.00	0.00	40	44	0.00	68	57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

Summary by Size Class for Forestland Species		Saplings	Pole	Mature Trees	Total
	TPA	0.00	7.14	2.86	10.00
	TPA %	0.00%	71.43%	28.57%	100.00%
	BA/AC	0.00	1.92	2.51	4.43
	BA/AC %	0.00%	43.28%	56.72%	100.00%
	QUADRATIC MEAN DIA.	0.00	7.01	12.69	9.01
	AVE HT. (HL)	0.00	43	62	54

Table 7. Overall Stand Table for McGaffey CPPJ.

Stand Total		Saplings			Pole			Tree or Sawlog											Total by Class, Growing Stock & Dead	% by Class, Growing Stock vs Dead
Diameter Class		0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32		
Growing Stock (All living trees in woodland & forestland)	COUNT	0	0	0	41	25	13	11	6	2	1	2	2	1	0	1	2	10	117.00	
	TPA	0.00	0.00	0.00	58.57	35.71	18.57	15.71	8.57	2.86	1.43	2.86	2.86	1.43	0.00	1.43	2.86	14.29	167.14	96.69%
	BA/AC	0.00	0.00	0.00	10.94	11.67	9.57	12.32	8.44	3.71	2.38	6.42	7.68	4.27	0.00	6.52	14.24	194.92	293.07	97.22%
	AVE HT, H_L	0.00	0.00	0.00	33	33	34	29	30	34	16	12	35	23	0.00	38	19	14		
Summary by Size Class (All living trees in woodland & forestland)	TPA		0.00			112.86							54.29						167.14	
	TPA %		0.00%			67.52%							32.48%						100.00%	
	BA/AC		0.00			32.18							260.89						293.07	
	BA/AC %		0.00%			10.98%							89.02%						100.00%	
	QMD MEAN DIA.		#DIV/0!			7.23							29.68						17.93	
	AVE HT, H_L		0.00			33							17						19	
Dead (All dead trees in woodland & forestland)	COUNT	0	0	0	0	1	0	1	1	0	0	0	0	0	1	0	0	0	4.00	
	TPA	0.00	0.00	0.00	0.00	1.43	0.00	1.43	1.43	0.00	0.00	0.00	0.00	0.00	1.43	0.00	0.00	0.00	5.71	3.31%
	BA/AC	0.00	0.00	0.00	0.00	0.47	0.00	0.95	1.51	0.00	0.00	0.00	0.00	0.00	5.46	0.00	0.00	0.00	8.39	2.78%
	AVE HT, H_L	0.00	0.00	0.00	0.00	19	0.00	8	16	0.00	0.00	0.00	0.00	0.00	24	0.00	0.00	0.00	20	
Total for all sample trees including Growing Stock and Dead	COUNT	0	0	0	41	26	13	12	7	2	1	2	2	1	1	1	2	10	121.00	
	TPA	0.00	0.00	0.00	58.57	37.14	18.57	17.14	10.00	2.86	1.43	2.86	2.86	1.43	1.43	1.43	2.86	14.29	172.86	100.00%
	BA/AC	0.00	0.00	0.00	10.94	12.14	9.57	13.27	9.94	3.71	2.38	6.42	7.68	4.27	5.46	6.52	14.24	194.92	301.46	100.00%

NOTE1: Average Diameter calculated using the Quadratic Mean Diameter (QDM), equvalent equation: (SQRT((BA/AC)/TPA) /.005454)) ; NOTE2: Average Height (H_L), calculated using Lorey's height equation for a weighted mean, H_L=SUM(bi * hi)/SUM(bi) , where bi is basal area of individual tree & hi is height of an individual tree.

Live and sick trees recorded on plots included two-needle piñon at 101 trees per acre, Rocky Mountain juniper at 31 trees per acre, oneseed juniper at 24 trees per acre, and ponderosa pine at 10 trees per acre. Most of the sick trees were recorded as piñon with mistletoe.
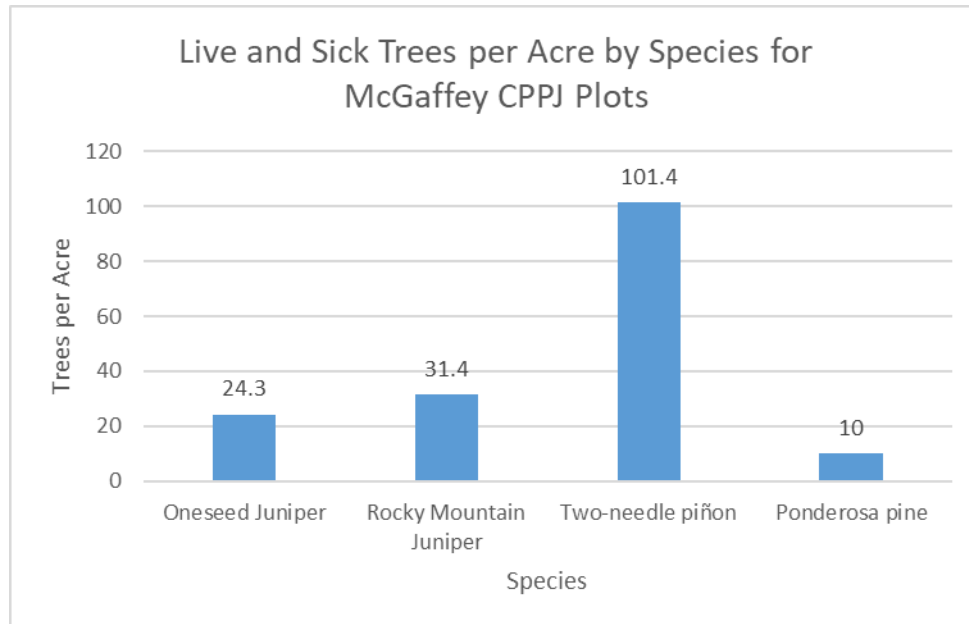

Figure 4. Trees by Species for McGaffey CPPJ.

Snags were 75% Rocky Mountain juniper, and 25% two-needle piñon. All snags were decay classes 2 and 3.
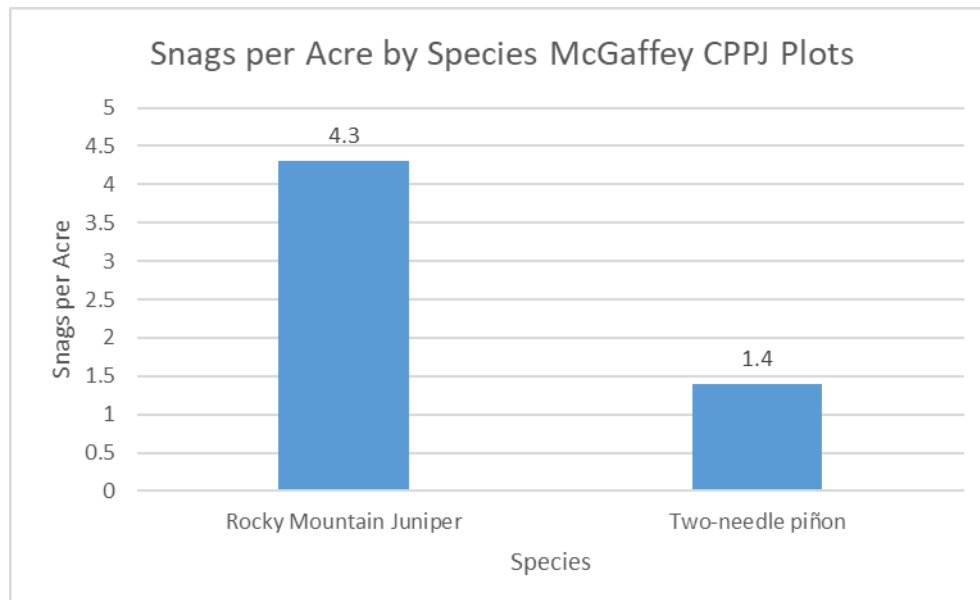

Figure 5. Snags by Species for McGaffey CPPJ.

Saplings averaged 172 live individuals and 29 dead per acre. The live saplings were 42% Rocky Mountain juniper, 33% two-needle piñon, 17% ponderosa pine, and 8% oneseed juniper. The dead saplings were 50% oneseed juniper, and 50% Gambel oak. There were no shrub species recorded in the sapling class, only tree species.
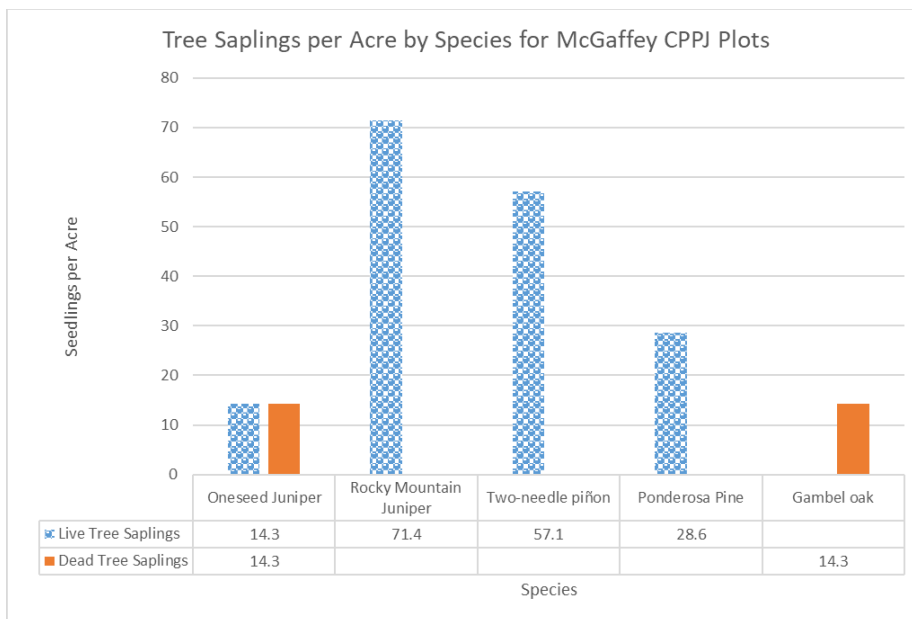

Tree Saplings per Acre by Species for McGaffey CPPJ Plots

Species	Oneseed Juniper	Rocky Mountain Juniper	Two-needle piñon	Ponderosa Pine	Gambel oak
Live Tree Saplings	14.3	71.4	57.1	28.6	
Dead Tree Saplings	14.3				14.3

Figure 6. Tree Saplings per Acre by Species for McGaffey CPPJ.

Seedlings of tree species averaged 1660 live individuals and 43 dead per acre. The live seedlings were 68% two-needle piñon, 25% Gambel oak, 2.5% mountain mahogany, 2.5% Rocky Mountain juniper, and 1.7% oneseed juniper. The dead saplings were 67% two-needle piñon, and 33% Rocky Mountain juniper.

Tree Seedlings per Acre by Species for McGaffey CPPJ Plots

Species	Mountain Mahogany	Oneseed Juniper	Rocky Mountain Juniper	Two-needle piñon	Gambel oak
Live Tree Seedlings	42.9	28.6	42.9	1129	414
Dead Tree Seedlings			14.3	29	
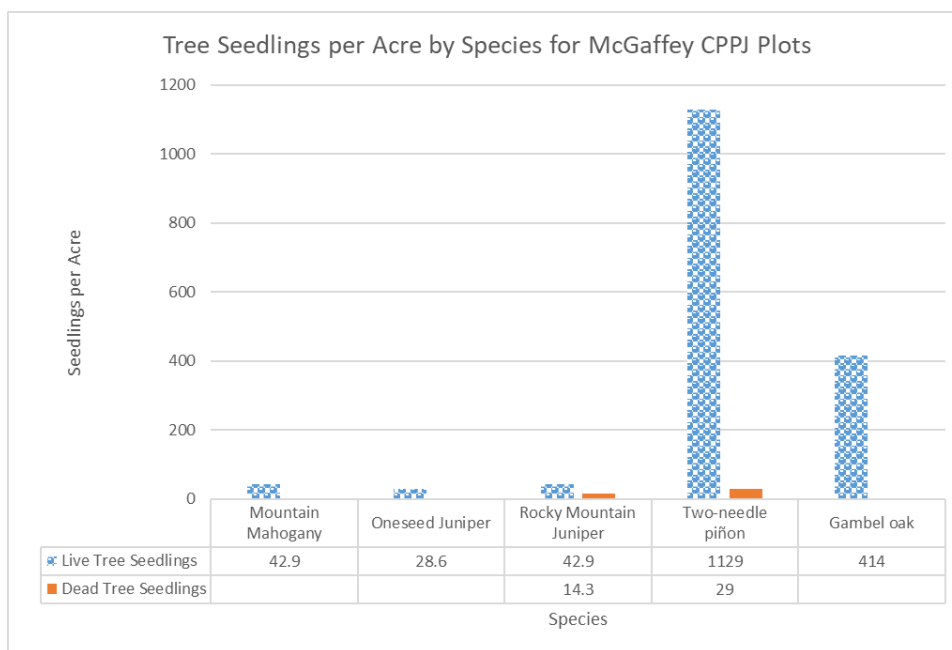
Figure 7. Tree Seedlings per Acre by Species for McGaffey CPPJ.

Seedlings of shrub species averaged 185 live individuals and no dead individuals per acre. The live shrub seedlings were 62% pricklypear cactus, and 38% big sagebrush.

Shrub Seedlings per Acre by Species for McGaffey CPPJ Plots

	Big Sagebrush	Pricklypear
Live Shrub Seedlings	71.4	114
Dead Shrub Seedlings		

Figure 8. Shrub species of seedling stature by Species for McGaffey CPPJ.

Understory
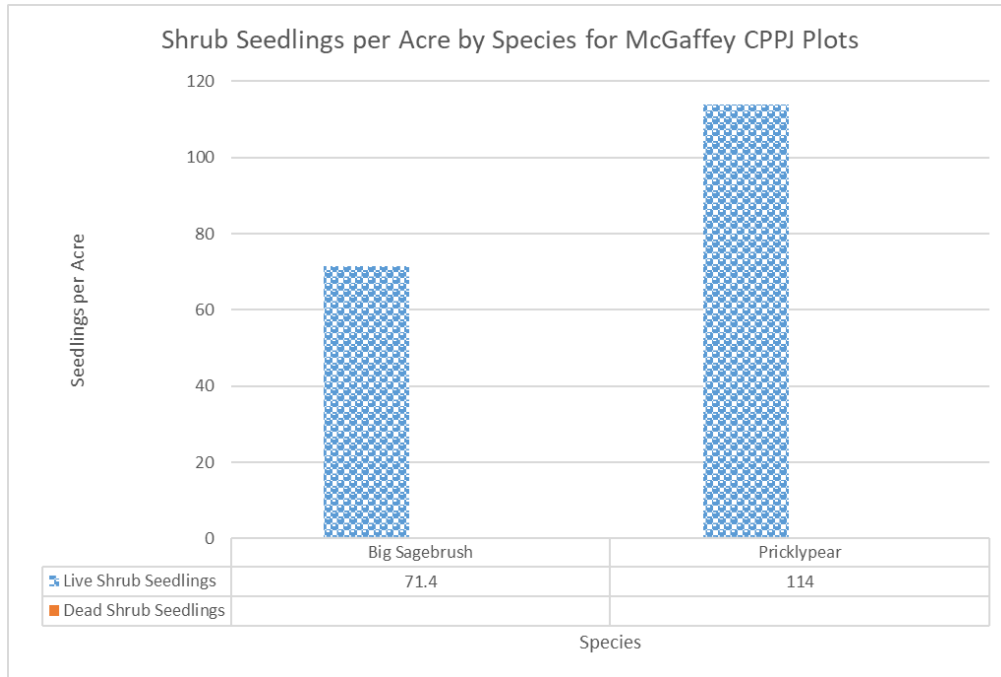
The average tree canopy as recorded by densiometer was 62%.

Ground cover was dominated by gravel and litter.

Table 8. Canopy and Ground Cover Percent for McGaffey CPPJ.

Mcgaffey CPPJ	Ground cover for entire 1/10th acre plot					
Tree Canopy (Densiometer)	**Plant Basal**	**Bole**	**Litter**	**Bare Soil**	**Rock**	**Gravel**
62%	11%	9%	32%	3%	9%	35%

Due to a miscommunication, percent aerial cover was not recorded for all species as it is typically is, however, all individual plants were recorded on the entire 1/10th acre plot by species and lifeform. This detailed list of all plants on plots can provide useful information about the vegetative structure and community.

Forty-one percent of all individuals tallied were gramanoids, 40% were forbs, 12% were trees, 6 % were cacti, and less than 1% were shrubs.

Table 9. All species tallied on McGaffey CPPJ plots, summarized by lifeform.

Lifeform	Individuals Tallied on all Plots	Percentage
Cactus	373	6.0%
Forb	2485	40.2%
Gramanoid	2544	41.1%
Shrub	56	0.9%
Tree	729	11.8%

When considering all life stages of tree species together, piñon remains dominant, but the prevalence of Gambel oak becomes evident.
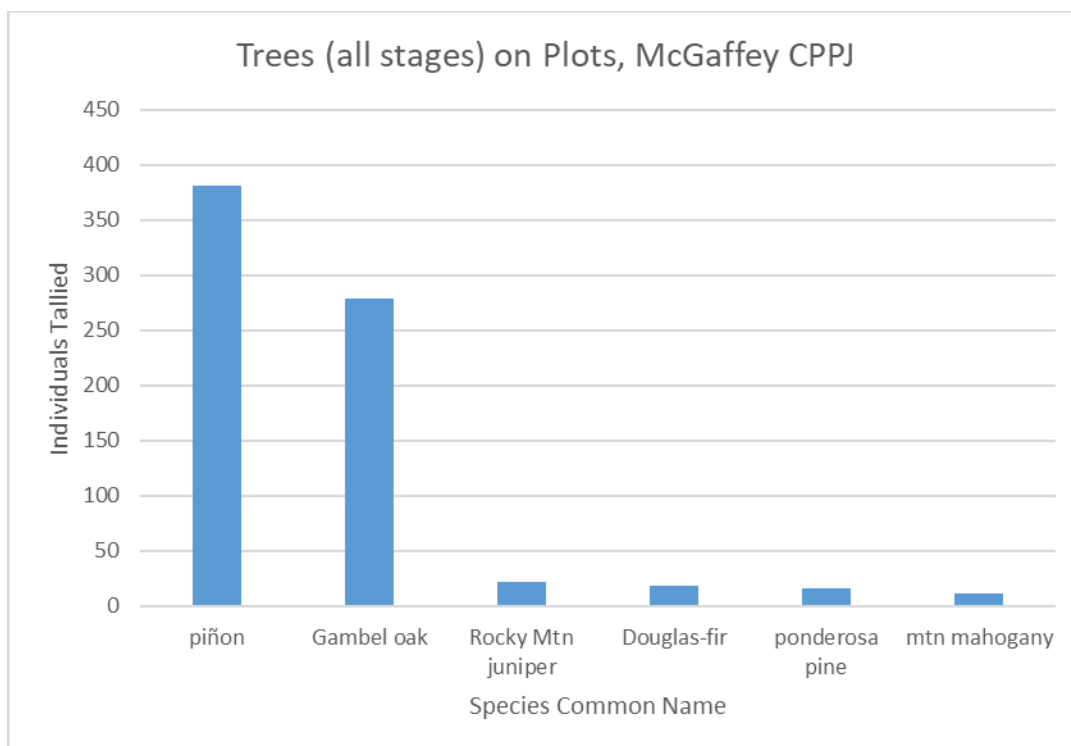
Figure 9. All individuals of trees (all life stages) tallied on CPPJ plots, by species.

Fringed sagewort greatly outnumbered other shrub species on plots.
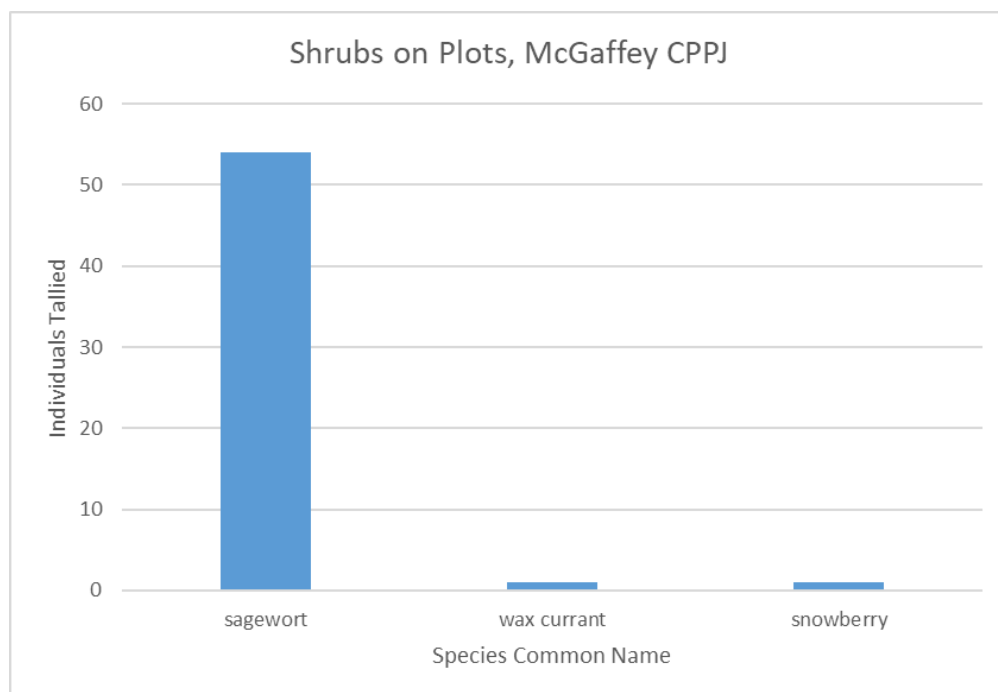
Figure 10. All individuals of shrubs tallied on CPPJ plots, by species.

Pricklypear was abundant.
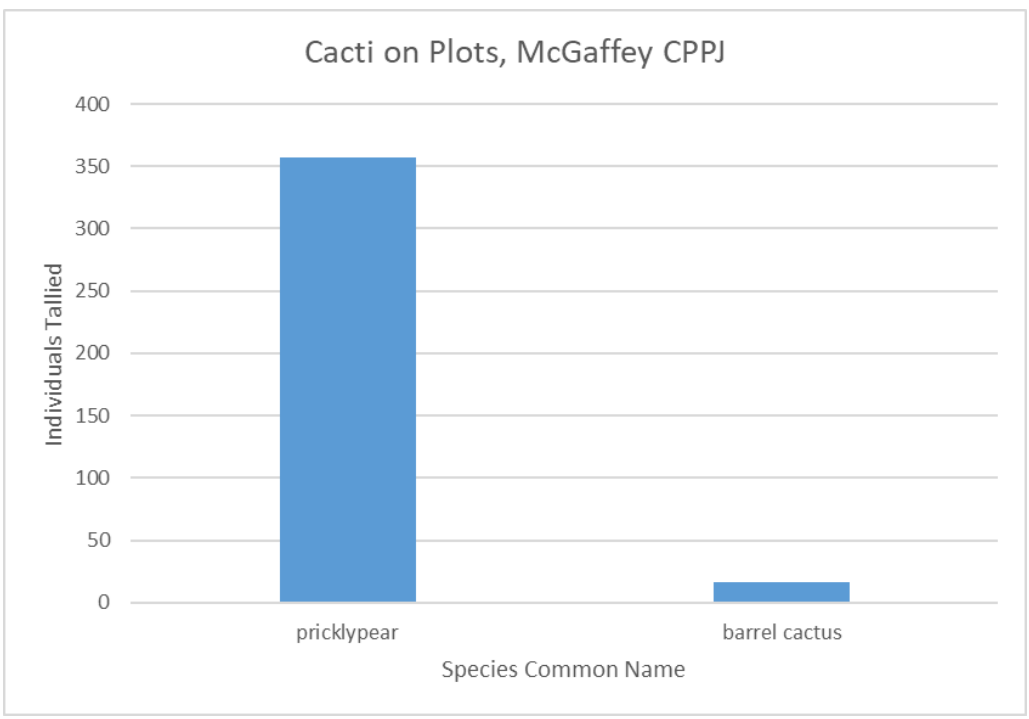
Figure 11. All individuals of cacti tallied on CPPJ plots, by species

In the figure below, multiple unknown (not identified) forbs are counted together. Thirteen other forb species were identified and recorded, including three varieties of buckwheat.
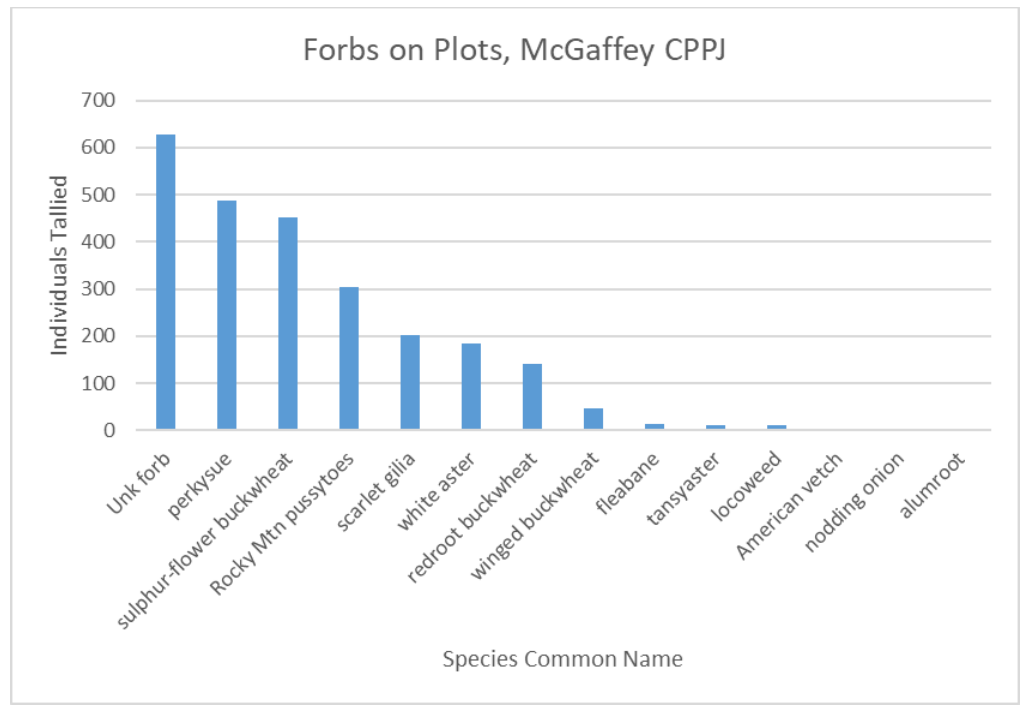
Figure 12. All individuals of forbs tallied on CPPJ plots, by species

Seven species of grasses were recorded; blue grama was dominant. Just as with forbs, the unknown grass category may include multiple unidentified species.
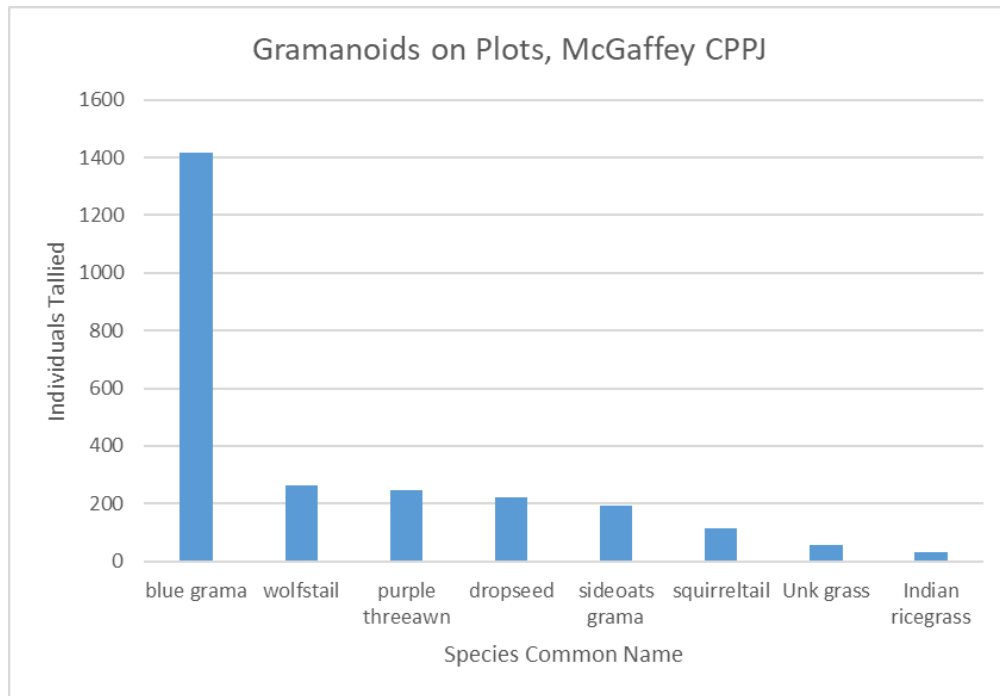
Figure 13. All individuals of gramanoids tallied on CPPJ plots, by species

Fuels

Surface fuels were collected on two Brown's transects, per instruction from the Carson National Forest, to align with their standard monitoring protocol. Overall, plots averaged 2.14 tons per acre of fine wood fuels, and 1.2 tons per acre of coarse (1000-hour) fuels. The decay classes of the 1000-hour fuels were all 2 and 3; no older logs were recorded. This is consistent with the decay classes noted on standing snags.

Litter depth was significant, averaging 2.8 inches (14 tons/acre), consistent with an area which has not burned for many years.

Table 10. Surface Fuels recorded from Brown's transects on McGaffey CPPJ plots.

Fuels - McGaffey CPPJ	
Fuel	**Tons/Ac**
1-Hour	0.14
10-Hour	1.48
100-Hour	0.52
1000-Hour	1.16
Duff	3.12
Litter	14.02
TOTAL FINE WOOD FUELS	2.14
TOTAL WOOD FUELS	3.29
TOTAL SURFACE FUELS	20.43
Fuel	**Depth (inches)**
Duff	0.30
Litter	2.80
TOTAL DEPTH	3.10

Ponderosa Pine

This section presents results from monitoring plots 9 through 14 and plot 16 in LANDFIRE EVT Southern Rocky Mountain Ponderosa Pine (abbreviated SRMPP on some figures).

These plots had an average slope of 23% and had dominant aspects of North, East, and South. More detail is presented below.

Table 11. Slope for McGaffey SRMPP plots.

Slope (in %)	
Range of slope	
Max	51
Min	8
Mean slope	23
Median slope	16
Mode slope	16

Table 12. Aspect for McGaffey SRMPP plots.

Aspect (cardinal direction)		
Direction	**Count**	**Percent of plots with this aspect**
N	2	28.6%
E	2	28.6%
S	2	28.6%
W	1	14.3%

Overstory

Full stand tables are present in the Tables on the following pages. These results are also highlighted with individual figures.

Overall, SRMPP plots had 71 trees per acre (66 live trees per acre and 5.7 sick trees per acre) with an average basal area of 51 square feet per acre. There were an average of 11 snags per acre with an average basal area of 5.9 square feet for acre. The quadratic mean diameter (QMD) was 11.9 inches. Average height of trees was 54 feet, with a live crown base height of 15 feet.

Table 13. Overstory summary for McGaffey SRMPP.

McGaffey SRMPP			2020		
Summary Table for all Plots			# Sample Trees on plot	Trees per acre	Basal area per acre
Plot Total			**58.00**	**82.86**	**57.08**
Growing Stock		Healthy (H)	0.00	0.00	0.00
		Unhealthy(U)	0.00	0.00	0.00
		Sick (S)	4.00	5.71	3.64
		Living (L)	46.00	65.71	47.59
Sum of Growing Stock			**50.00**	**71.43**	**51.23**
Dead		Dead (D)	8.00	11.43	5.86
Sum of Dead			**8.00**	**11.43**	**5.86**
Plot Total: **Growing Stock & Dead**	**Sum of**		**58.00**	**82.86**	**57.08**

Table 14. Individual plot summary for McGaffey SRMPP.

McGaffey SRMPP 2020				
Individual Plot Summary Table				
		Growing Stock		
Macro Plot Name	Total number of sample trees on plot	Number of growing stock sample trees on plot	Trees per Acre	Basal Area per Acre
MG_09	18	16	160	71.85
MG_10	8	5	50	68.08
MG_11	4	3	30	12.30
MG_12	1	1	10	12.11
MG_13	11	11	110	93.99
MG_14	7	7	70	27.46
MG_16	9	7	70	72.79
Total			**Average for all Plots**	
			TPA	**BA/AC**
	58.00	**50.00**	**71.43**	**51.23**

Table 15. Woodland Species Table Stand for McGaffey SRMPP.

Stand Table				McGaffey SRMPP		2020														
Woodland Species		Saplings			Pole						Mature Trees									**Total by Species**	**%Species for all G-Stock**
Diameter Class		*0*	*2*	*4*	*6*	*8*	*10*	*12*	*14*	*16*	*18*	*20*	*22*	*24*	*26*	*28*	*30*	*32+*		
PIED Pinon pine	COUNT	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**1.00**	
	TPA	0.00	0.00	0.00	1.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.43**	**2.00%**
	BA/AC	0.00	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.33**	**0.64%**
	AVE HT. (HL)	0.00	0.00	0.00	28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
JUSC2 Rocky Mnt juniper	COUNT	0	0	0	2	3	2	3	0	0	0	0	0	0	0	0	0	0	**10.00**	
	TPA	0.00	0.00	0.00	2.86	4.29	2.86	4.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**14.29**	**20.00%**
	BA/AC	0.00	0.00	0.00	0.44	1.18	1.36	3.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**6.15**	**12.00%**
	AVE HT. (HL)	0.00	0.00	0.00	26	34	34	38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Woodland Species Sub-total	*COUNT*	*0*	*0*	*0*	*3*	*3*	*2*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*11.00*	
	TPA	*0.00*	*0.00*	*0.00*	*4.29*	*4.29*	*2.86*	*4.29*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*15.71*	*22.00%*
	BA/AC	*0.00*	*0.00*	*0.00*	*0.77*	*1.18*	*1.36*	*3.17*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*6.47*	*12.64%*
	AVE HT. (HL)	*0.00*	*0.00*	*0.00*	*27*	*34*	*34*	*38*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*		

Summary by Size Class for Woodland Species	*TPA*	*0.00*	*11.43*	*4.29*	*15.71*
	TPA %	*0.00%*	*72.73%*	*27.27%*	*100.00%*
	BA/AC	*0.00*	*3.31*	*3.17*	*6.47*
	BA/AC %	*0.00%*	*51.09%*	*48.91%*	*100.00%*
	QUADRATIC MEAN DIA.	*0.00*	*7.29*	*11.64*	*8.69*
	AVE HT. (HL)	*0.00*	*32*	*38*	*35*

Table 16. Forestland Species Stand Table for McGaffey SRMPP.

Stand Table				McGaffey SRMPP		2020														
Forestland Species		Saplings			Pole			Mature Trees											Total by Species & Covertype	%Species for all G-Stock
Diameter Class		0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32		
ABCO White fir	COUNT	0	0	0	4	0	3	1	0	0	0	0	0	0	0	0	0	0	8.00	
	TPA	0.00	0.00	0.00	5.71	0.00	4.29	1.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.43	16.00%
	BA/AC	0.00	0.00	0.00	1.06	0.00	2.21	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.25	8.29%
	AVE HT. (HL)	0.00	0.00	0.00	40.68	0.00	66.75	65.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
PIPO Ponderosa pine	COUNT	0	0	0	6	5	3	3	4	3	4	0	2	0	0	0	0	0	30.00	
	TPA	0.00	0.00	0.00	8.57	7.14	4.29	4.29	5.71	4.29	5.71	0.00	2.86	0.00	0.00	0.00	0.00	0.00	42.86	60.00%
	BA/AC	0.00	0.00	0.00	1.75	2.66	2.10	3.71	6.47	6.09	9.88	0.00	7.65	0.00	0.00	0.00	0.00	0.00	40.30	78.68%
	AVE HT. (HL)	0.00	0.00	0.00	43.12	62.58	74.36	79.48	70.72	53.46	91.26	0.00	103.57	0.00	0.00	0.00	0.00	0.00		
PSME Douglas-fir	COUNT	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	
	TPA	0.00	0.00	0.00	1.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.43	2.00%
	BA/AC	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.40%
	AVE HT. (HL)	0.00	0.00	0.00	34.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Forestland Species Sub-total	COUNT	0	0	0	11	5	6	4	4	3	4	0	2	0	0	0	0	0	39.00	
	TPA	0.00	0.00	0.00	15.71	7.14	8.57	5.71	5.71	4.29	5.71	0.00	2.86	0.00	0.00	0.00	0.00	0.00	55.71	78.00%
	BA/AC	0.00	0.00	0.00	3.01	2.66	4.30	4.69	6.47	6.09	9.88	0.00	7.65	0.00	0.00	0.00	0.00	0.00	44.75	87.36%
	AVE HT. (HL)	0.00	0.00	0.00	42	63	70	76	71	53	91	0.00	104	0.00	0.00	0.00	0.00	0.00		

Summary by Size Class for Forestland Species		Saplings	Pole	Mature	Total
	TPA	0.00	31.43	24.29	55.71
	TPA %	0.00%	56.41%	43.59%	100.00%
	BA/AC	0.00	9.97	34.78	44.75
	BA/AC %	0.00%	22.29%	77.71%	100.00%
	QUADRATIC MEAN DIA.	#DIV/0!	7.63	16.20	12.14
	AVE HT. (HL)	0.00	60	82	77

Table 17. Overall Stand Table for McGaffey CPPJ.

Stand Total		Saplings			Pole			Tree or Sawlog												Total by Class, Growing Stock & Dead	% by Class, Growing Stock vs Dead
Diameter Class		*0*	*2*	*4*	*6*	*8*	*10*	*12*	*14*	*16*	*18*	*20*	*22*	*24*	*26*	*28*	*30*	*32*		
Growing Stock (All living trees in woodland & forestland)	COUNT	0	0	0	14	8	8	7	4	3	4	0	2	0	0	0	0	0	*50.00*	
	TPA	0.00	0.00	0.00	20.00	11.43	11.43	10.00	5.71	4.29	5.71	0.00	2.86	0.00	0.00	0.00	0.00	0.00	*71.43*	*86.21%*
	BA/AC	0.00	0.00	0.00	3.78	3.84	5.67	7.86	6.47	6.09	9.88	0.00	7.65	0.00	0.00	0.00	0.00	0.00	*51.23*	*89.74%*
	AVE HT, H_L	0.00	0.00	0.00	39	54	62	61	71	53	91	0.00	104	0.00	0.00	0.00	0.00	0.00		
Summary by Size Class (All living trees in woodland & forestland)	TPA		0.00			42.86							28.57						*71.43*	
	TPA %		0.00%			60.00%							40.00%						*100.00%*	
	BA/AC		0.00			13.28							37.94						*51.23*	
	BA/AC %		0.00%			25.93%							74.07%						*100.00%*	
	QMD MEAN DIA.		#DIV/0!			7.54							15.60						*11.47*	
	AVE HT, H_L		0.00			53							78						*71*	
Dead (All dead trees in woodland & forestland)	COUNT	0	0	0	5	0	1	0	1	1	0	0	0	0	0	0	0	0	*8.00*	
	TPA	0.00	0.00	0.00	7.14	0.00	1.43	0.00	1.43	1.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*11.43*	*13.79%*
	BA/AC	0.00	0.00	0.00	1.51	0.00	0.72	0.00	1.51	2.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*5.86*	*10.26%*
	AVE HT, H_L	0.00	0.00	0.00	35	0.00	79	0.00	66	11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*40*	
Total for all sample trees including Growing Stock and Dead	COUNT	0	0	0	19	8	9	7	5	4	4	0	2	0	0	0	0	0	*58.00*	
	TPA	0.00	0.00	0.00	27.14	11.43	12.86	10.00	7.14	5.71	5.71	0.00	2.86	0.00	0.00	0.00	0.00	0.00	*82.86*	*100.00%*
	BA/AC	0.00	0.00	0.00	5.29	3.84	6.38	7.86	7.97	8.21	9.88	0.00	7.65	0.00	0.00	0.00	0.00	0.00	*57.08*	*100.00%*

NOTE1: Average Diameter calculated using the Quadratic Mean Diameter (QDM), equvalent equation: (SQRT((BA/AC)/TPA) /.005454)) ; NOTE2: Average Height (H_L), calculated using Lorey's height equation for a weighted mean, H_L=SUM(bi * hi)/SUM(bi) , where bi is basal area of individual tree & hi is height of an individual tree.

Live and sick trees recorded on plots included ponderosa pine at 43 trees per acre, Rocky Mountain juniper at 14 trees per acre, white fir at 11 trees per acre, and piñon and Douglas-fir at 1.4 trees per acre each. Most of the sick trees were recorded as white fir with broom rust and/or insect damage.
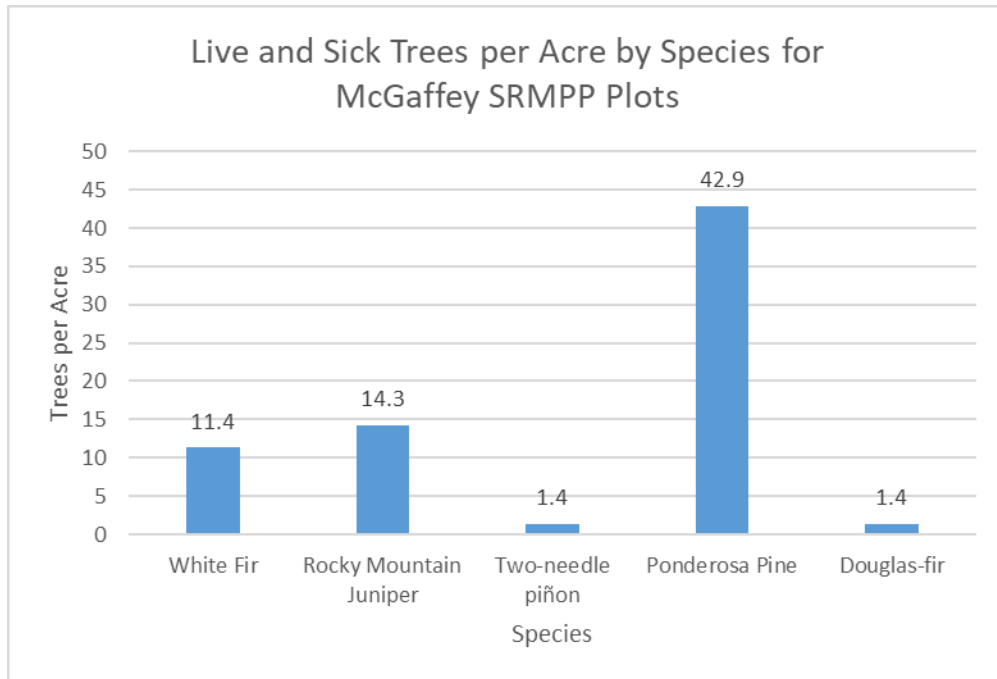

Figure 14. Trees by Species for McGaffey SRMPP.

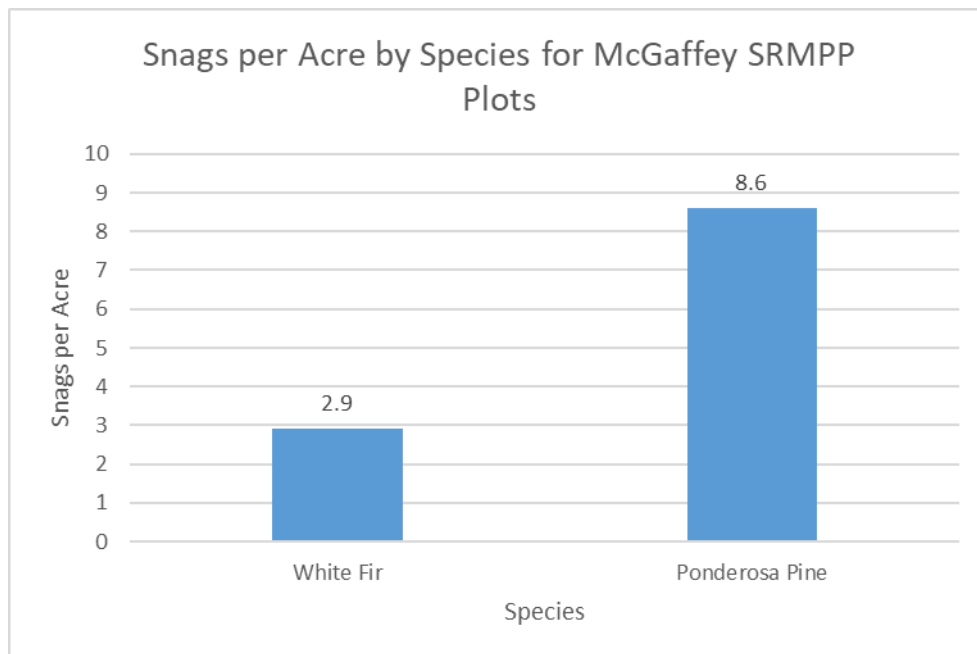Snags were 75% ponderosa pine, and 25% white fir. All snags fell into decay classes 1, 2, and 5.

Figure 15. Snags by Species for McGaffey SRMPP.

Saplings averaged 357 live individuals and 14 dead per acre. The live saplings were 44% Gambel oak, 28% white fir, 20% ponderosa pine, and 8% Rocky Mountain juniper. The dead saplings were 100% Gambel oak. There were no shrub species recorded in the sapling class, only tree species.
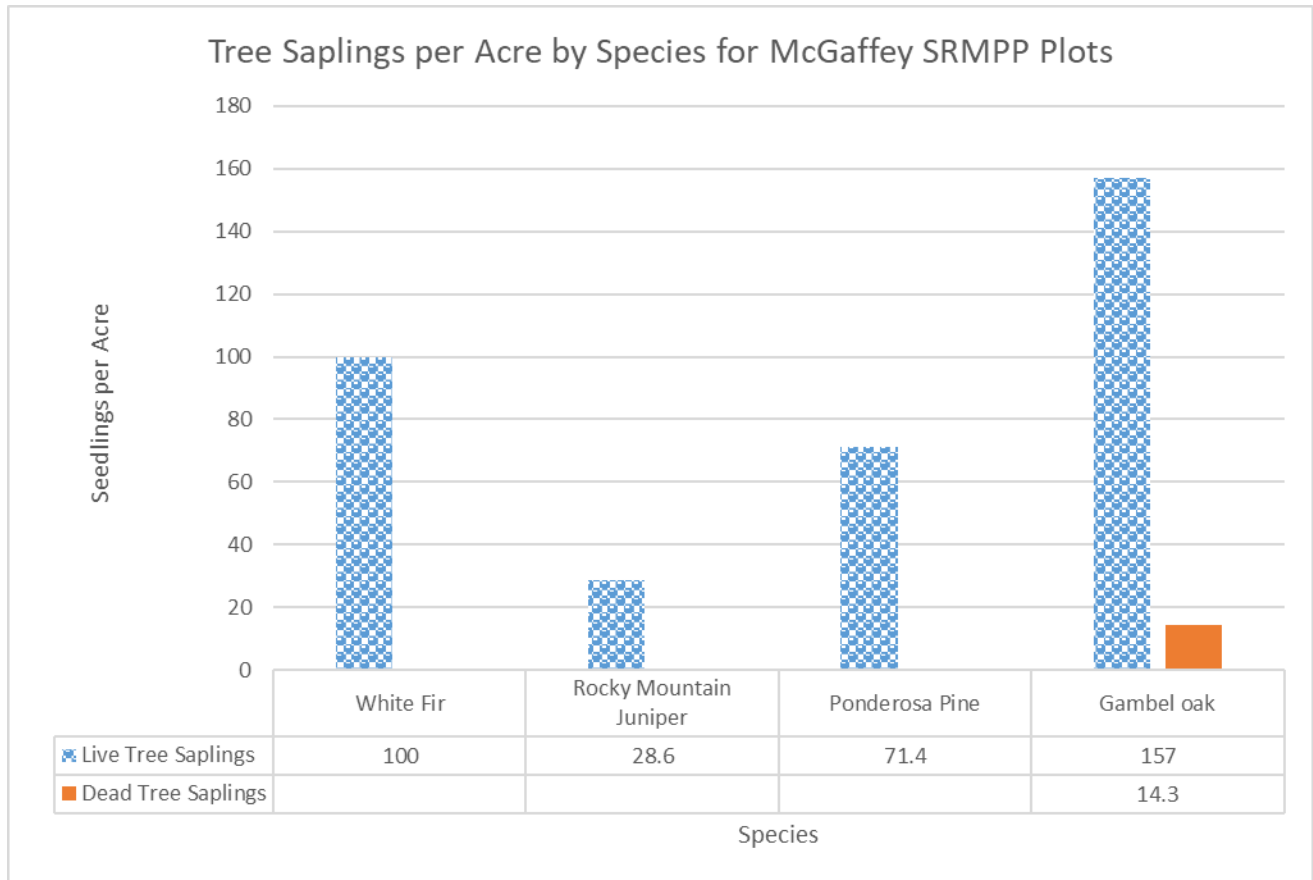

Figure 16. Tree Saplings per Acre by Species for McGaffey SRMPP.

Seedlings of tree species averaged 2000 live individuals and 14 dead per acre. The live seedlings were 74% Gambel oak, 10% Rocky Mountain juniper, 9% white fir, 5% common juniper, and 2% two-needle piñon. The dead saplings were 100% ponderosa pine.
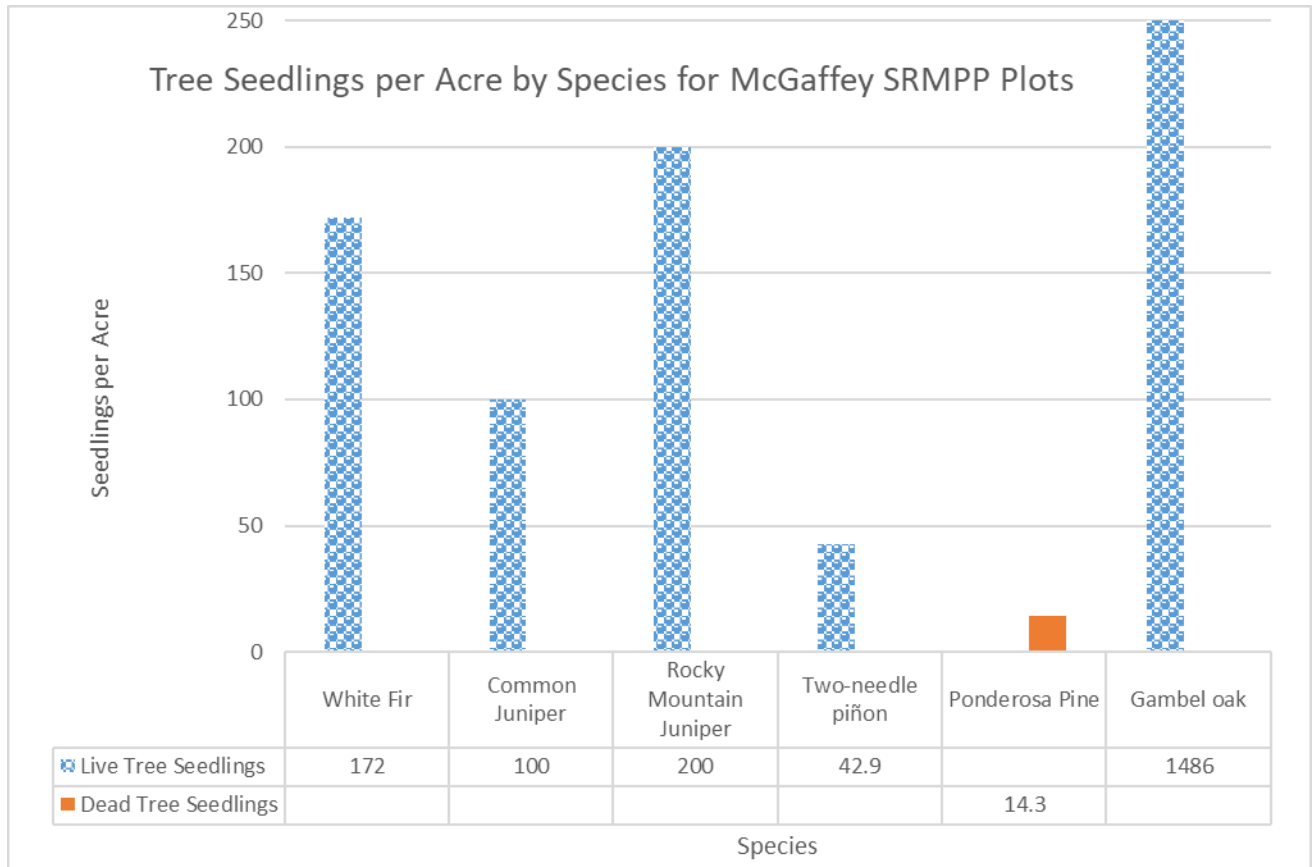

	White Fir	Common Juniper	Rocky Mountain Juniper	Two-needle piñon	Ponderosa Pine	Gambel oak
Live Tree Seedlings	172	100	200	42.9		1486
Dead Tree Seedlings					14.3	

Figure 17. Tree Seedlings per Acre by Species for McGaffey SRMPP.

Seedlings of shrub species averaged 900 live individuals and no dead individuals per acre. The live shrub seedlings were 98% creeping barberry, and 2% mountain-lover.
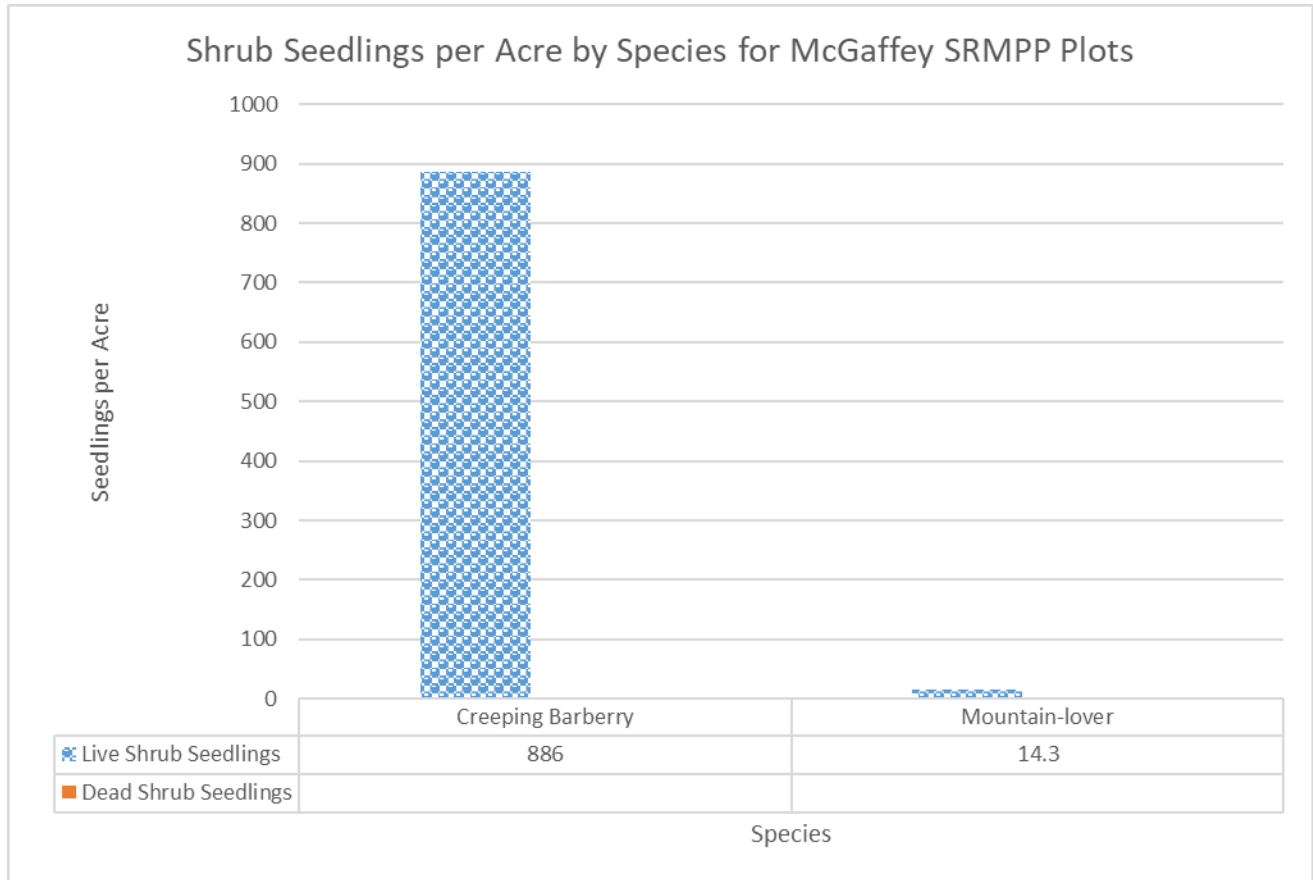

Shrub Seedlings per Acre by Species for McGaffey SRMPP Plots

	Creeping Barberry	Mountain-lover
▦ Live Shrub Seedlings	886	14.3
▪ Dead Shrub Seedlings		

Figure 18. Shrub species of seedling stature by Species for McGaffey SRMPP.

Understory

The average tree canopy as recorded by densiometer was 68%.

Ground cover was dominated by plant basal coverage and litter.

Table 18. Canopy and Ground Cover Percent for McGaffey SRMPP.

Mcgaffey SRMPP	Ground cover for entire 1/10th acre plot					
Tree Canopy (Densiometer)	Plant Basal	Bole	Litter	Bare Soil	Rock	Gravel
68%	50%	7%	27%	5%	9%	1%

Due to a miscommunication, percent aerial cover was not recorded for all species as it is typically is, however, all individual plants were recorded on the entire 1/10th acre plot by species and lifeform. This detailed list of all plants on plots can provide useful information about the vegetative structure and community.

Fifty percent of all individuals tallied were forbs, 23% were gramanoids, 18% were shrubs, and 9% were trees. No cacti were recorded on these plots.

Table 19. All species tallied on McGaffey SRMPP plots, summarized by lifeform.

Lifeform	Individuals Tallied on all Plots	Percentage
Cactus	0	0.0%
Forb	5616	49.8%
Gramanoid	2591	23.0%
Shrub	2030	18.0%
Tree	1039	9.2%

When considering all life stages of tree species together, Gambel oak becomes dominant.
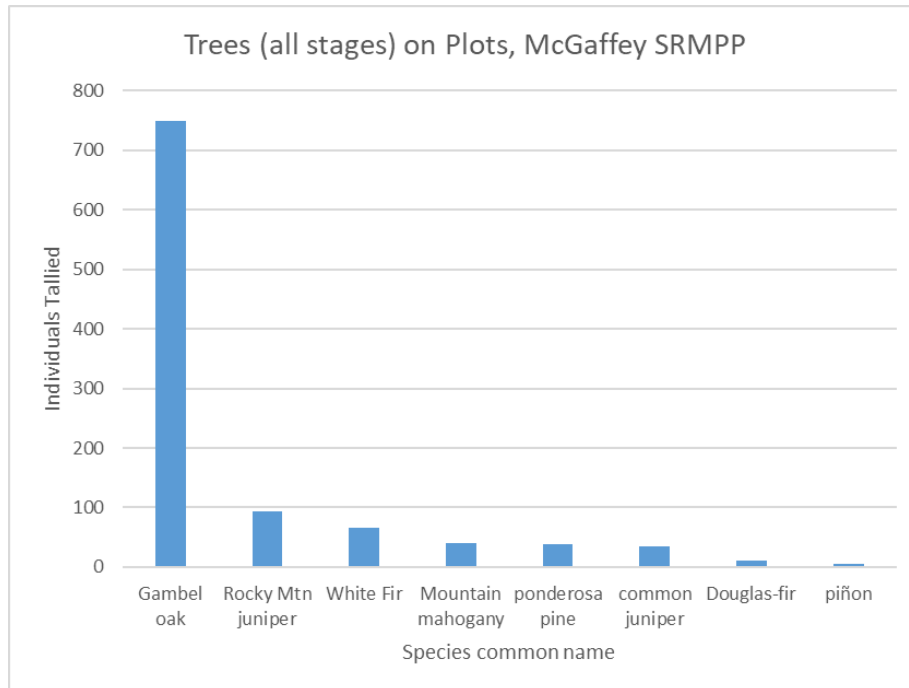

Figure 19. All individuals of trees (all life stages) tallied on SRMPP plots, by species.

Eight shrub species were identified; creeping barberry, Fendler's buckbrush, and fringed sagewort were dominant.
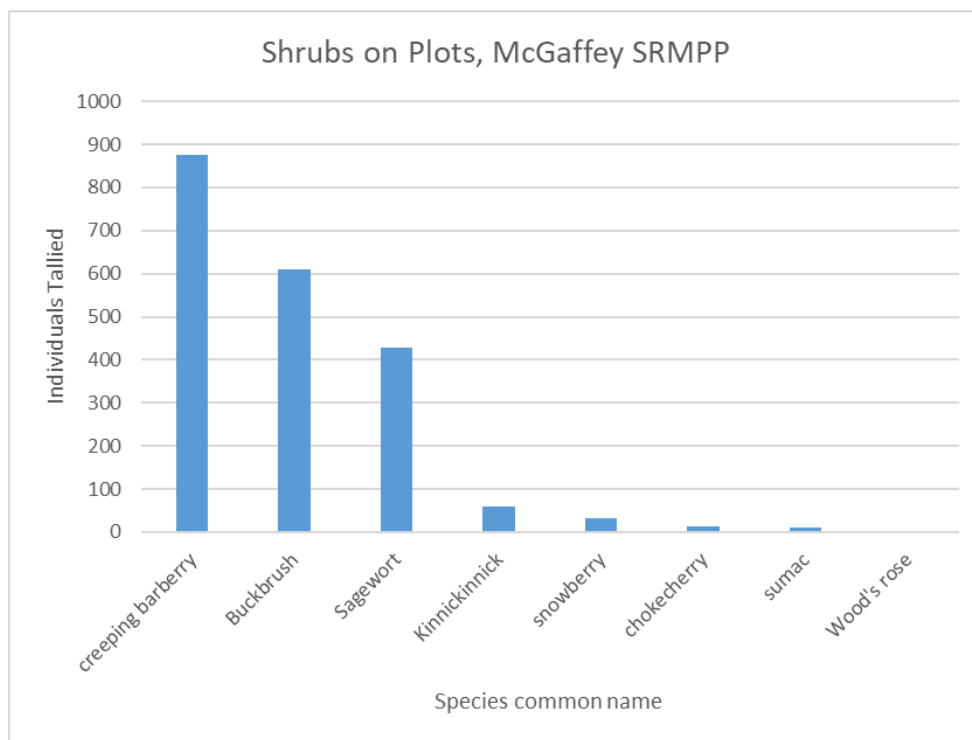

Figure 20. All individuals of shrubs tallied on SRMPP plots, by species.

In the figure below, multiple unknown (not identified) forbs are counted together. The unknown fern category includes only one individual. Twenty-three other forb species were identified and recorded, including Rocky Mountain pussytoes (anntenaria), cinquefoil, and multiple buckwheats, asters and hawkweeds.
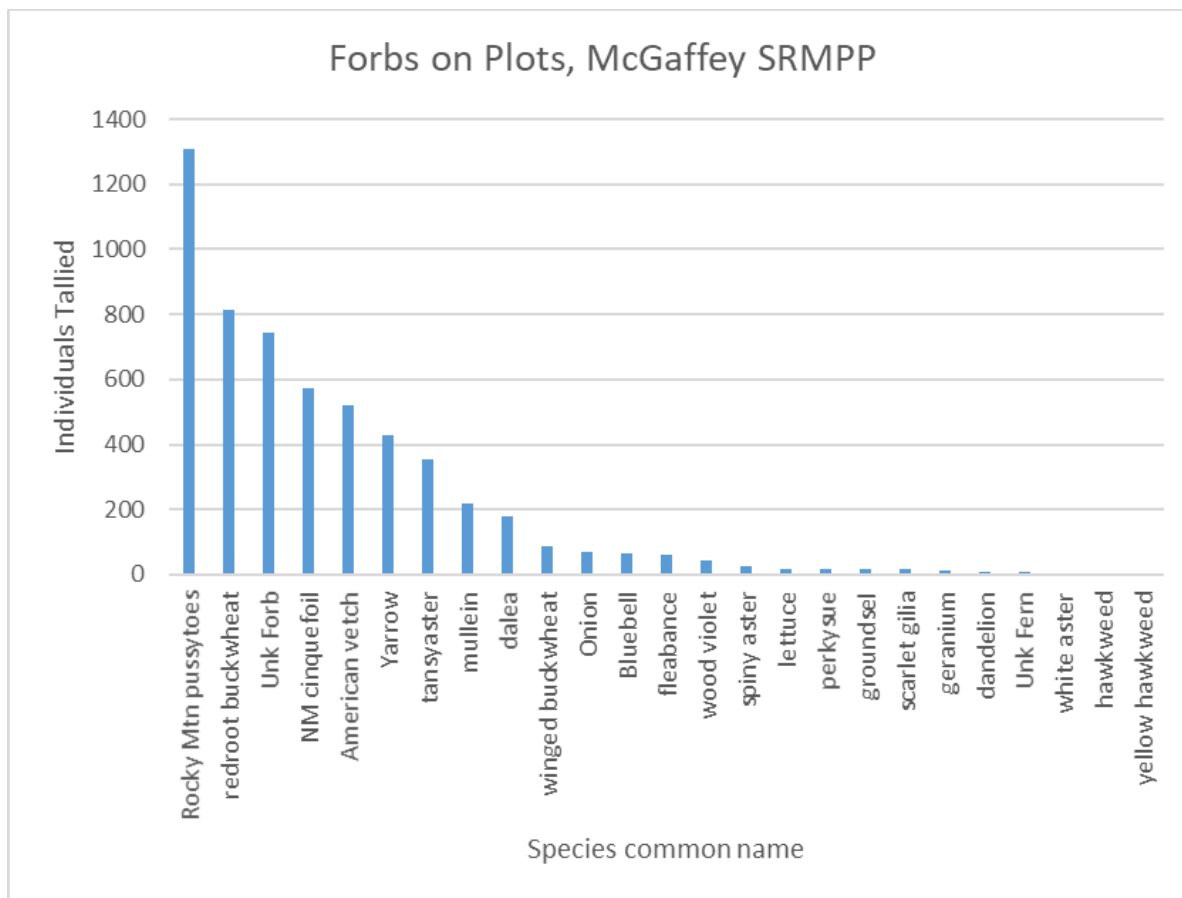

Figure 21. All individuals of forbs tallied on SRMPP plots, by species

Three species of grasses were identified; sand dropseed was dominant. Other grasses were recorded but not identified. Just as with forbs, the unknown grass category may include multiple unidentified species. Sedges were not identified to species level.
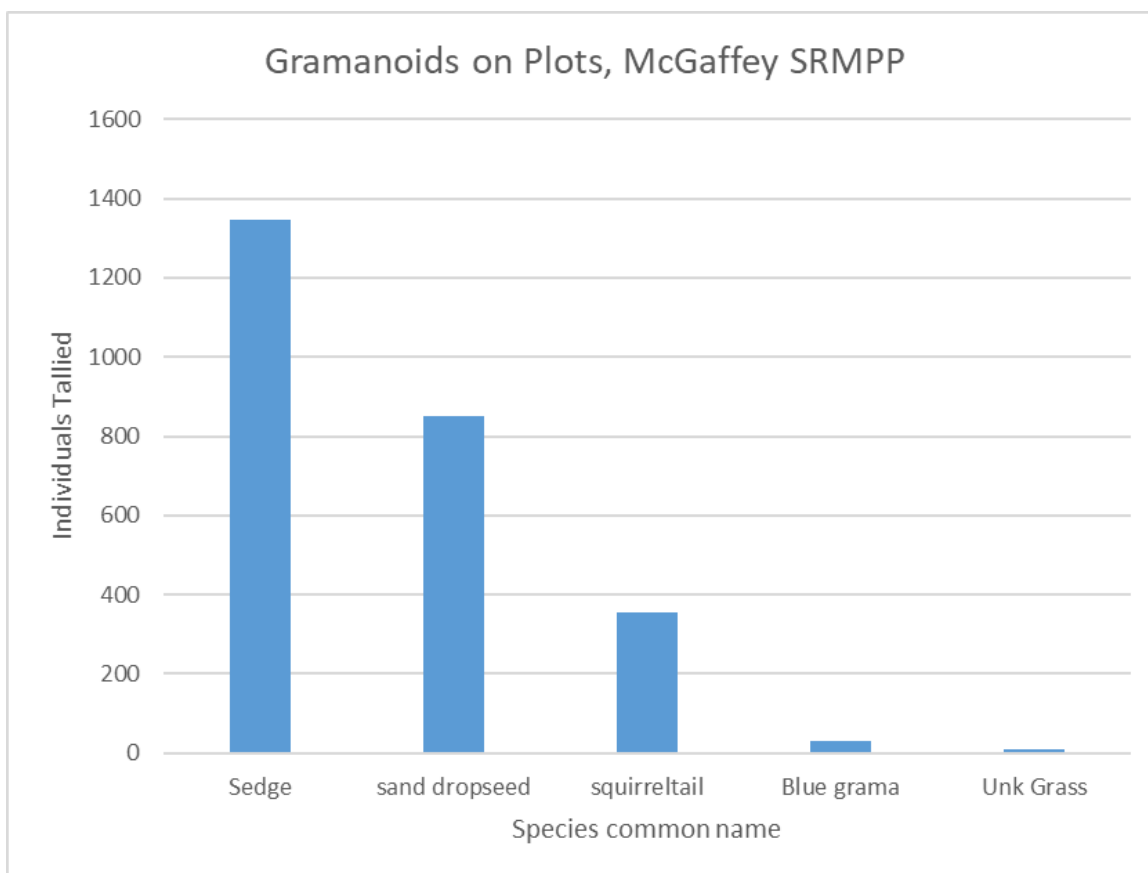

Figure 22. All individuals of gramanoids tallied on SRMPP plots, by species

Fuels

Surface fuels were collected on two Brown's transects, per instruction from the Carson National Forest, to align with their standard monitoring protocol. Overall, plots averaged 1.98 tons per acre of fine wood fuels, and 1.15 tons per acre of coarse (1000-hour) fuels. The decay classes of the 1000-hour fuels were all 3, 4, and 5; no new logs were recorded.

Litter depth averaged 1.9 inches (9.5 tons/acre).

Table 20. Surface Fuels recorded from Brown's transects on McGaffey SRMPP plots.

Fuels - McGaffey SRMPP	
Fuel	**Tons/Ac**
1-Hour	0.07
10-Hour	1.65
100-Hour	0.26
1000-Hour	1.15
Duff	4.99
Litter	9.51
TOTAL FINE WOOD FUELS	1.98
TOTAL WOOD FUELS	3.14
TOTAL SURFACE FUELS	17.63
Fuel	**Depth (inches)**
Duff	0.50
Litter	1.90
TOTAL DEPTH	2.40

Appendix I: Coordinates of collected points

Plot	Latitude	Longitude	Elevation (ft)	Class
MG_01	36.31638130	-105.61051784	7274.9	Colorado Plateau Pinyon-Juniper Woodland
MG_02	36.30877844	-105.61011993	7353.1	Colorado Plateau Pinyon-Juniper Woodland
MG_03	36.30382690	-105.61197280	7432.7	Colorado Plateau Pinyon-Juniper Woodland
MG_04	36.30045265	-105.61130022	7555.8	Colorado Plateau Pinyon-Juniper Woodland
MG_05	36.29780812	-105.60910813	7706.1	Colorado Plateau Pinyon-Juniper Woodland
MG_06	36.29156949	-105.60844522	7780.3	Colorado Plateau Pinyon-Juniper Woodland
MG_07	36.28288153	-105.61082600	7839.0	Colorado Plateau Pinyon-Juniper Woodland
MG_09	36.26302216	-105.61661615	8195.3	Southern Rocky Mountain Ponderosa Pine Woodland
MG_10	36.25851598	-105.61228055	8270.8	Southern Rocky Mountain Ponderosa Pine Woodland
MG_11	36.26004211	-105.61416696	8366.4	Southern Rocky Mountain Ponderosa Pine Woodland
MG_12	36.25352563	-105.61271031	8234.1	Southern Rocky Mountain Ponderosa Pine Woodland
MG_13	36.24981755	-105.61243575	8225.5	Southern Rocky Mountain Ponderosa Pine Woodland
MG_14	36.24968040	-105.59968673	7950.7	Southern Rocky Mountain Ponderosa Pine Woodland
MG_16	36.25237992	-105.58241642	7626.5	Southern Rocky Mountain Ponderosa Pine Woodland

Appendix II: Example photos from plots

Piñon-Juniper

MG_02_C, Plot 2 facing south towards plot center from 75 ft north

MG_04_E, Plot 4 facing east from plot center

MG_05_W, Plot 5 facing west from plot center

MG_06_S, Plot 6 facing south from plot center

Ponderosa Pine

MG_09_BR180, Plot 9 facing north towards plot center from 75 south

MG_11_S, Plot 11 facing south from plot center

MG_12_W, Plot 12 facing west from plot center

MG_16_S, Plot 16 facing south from plot center

Appendix III: Species List, Species Recorded on Plots

Symbol	Scientific Name	Common Name	Genus	Family	Prf. Lifeform
2FERN		Fern or fern ally			Undefined
2FORB		Forb (herbaceous, not grass nor grasslike)			Undefined
2GRAM		Graminoid (grass or grasslike)			Undefined
2S		Shrub, other			Undefined
ABCO	Abies concolor	white fir	Abies	Pinaceae	Tree
ACHY	Achnatherum hymenoides	Indian ricegrass	Achnatherum	Poaceae	Graminoid
ACMI2	Achillea millefolium	common yarrow	Achillea	Asteraceae	Forb/herb
ALCE2	Allium cernuum	nodding onion	Allium	Liliaceae	Forb/herb
ANME2	Antennaria media	Rocky Mountain pussytoes	Antennaria	Asteraceae	Forb/herb
ARFR4	Artemisia frigida	prairie sagewort	Artemisia	Asteraceae	Subshrub
ARPU9	Aristida purpurea	purple threeawn	Aristida	Poaceae	Graminoid
ARTR2	Artemisia tridentata	big sagebrush	Artemisia	Asteraceae	Tree
ARUV	Arctostaphylos uva-ursi	kinnikinnick	Arctostaphylos	Ericaceae	Subshrub
BOCU	Bouteloua curtipendula	sideoats grama	Bouteloua	Poaceae	Graminoid
BOGR2	Bouteloua gracilis	blue grama	Bouteloua	Poaceae	Graminoid
CAREX	Carex	sedge	Carex	Cyperaceae	Graminoid
CARO2	Campanula rotundifolia	bluebell bellflower	Campanula	Campanulaceae	Forb/herb
CEFE	Ceanothus fendleri	Fendler's ceanothus	Ceanothus	Rhamnaceae	Shrub
CERCO	Cercocarpus	mountain mahogany	Cercocarpus	Rosaceae	Undefined
CHSP11	Chloracantha spinosa	spiny chloracantha	Chloracantha	Asteraceae	Subshrub
DAFR6	Dasiphora fruticosa	shrubby cinquefoil	Dasiphora	Rosaceae	Shrub
DALE3	Dalea leporina	foxtail prairie clover	Dalea	Fabaceae	Forb/herb

DICA18	Dieteria canescens		Dieteria		Undefined
ELEL5	Elymus elymoides	squirreltail	Elymus	Poaceae	Graminoid
ERAL4	Eriogonum alatum	winged buckwheat	Eriogonum	Polygonaceae	Subshrub
ERFL	Erigeron flagellaris	trailing fleabane	Erigeron	Asteraceae	Forb/herb
ERRA3	Eriogonum racemosum	redroot buckwheat	Eriogonum	Polygonaceae	Subshrub
ERUM	Eriogonum umbellatum	sulphur-flower buckwheat	Eriogonum	Polygonaceae	Subshrub
FEROC	Ferocactus	barrel cactus	Ferocactus	Cactaceae	Undefined
GERAN	Geranium	wild geranium	Geranium	Geraniaceae	Undefined
HEUCH	Heuchera	alumroot	Heuchera	Saxifragaceae	Undefined
HIERA	Hieracium	hawkweed	Hieracium	Asteraceae	Undefined
HIFE	Hieracium fendleri	yellow hawkweed	Hieracium	Asteraceae	Forb/herb
IPAG	Ipomopsis aggregata	scarlet gilia	Ipomopsis	Polemoniaceae	Forb/herb
JUCO6	Juniperus communis	common juniper	Juniperus	Cupressaceae	Tree
JUMO	Juniperus monosperma	oneseed juniper	Juniperus	Cupressaceae	Tree
JUSC2	Juniperus scopulorum	Rocky Mountain juniper	Juniperus	Cupressaceae	Tree
LACTU	Lactuca	lettuce	Lactuca	Asteraceae	Undefined
LYCUR	Lycurus	wolfstail	Lycurus	Poaceae	Undefined
MARE11	Mahonia repens	creeping barberry	Mahonia	Berberidaceae	Subshrub
OPPH	Opuntia phaeacantha	tulip pricklypear	Opuntia	Cactaceae	Shrub
OXYTR	Oxytropis	locoweed	Oxytropis	Fabaceae	Undefined
PAMY	Paxistima myrsinites	Oregon boxleaf	Paxistima	Celastraceae	Shrub
PANE7	Packera neomexicana	New Mexico groundsel	Packera	Asteraceae	Forb/herb
PIED	Pinus edulis	twoneedle pinyon	Pinus	Pinaceae	Tree
PIPO	Pinus ponderosa	ponderosa pine	Pinus	Pinaceae	Tree
POOB3	Potentilla oblanceolata	New Mexico cinquefoil	Potentilla	Rosaceae	Forb/herb
PRVI	Prunus virginiana	chokecherry	Prunus	Rosaceae	Tree
PSME	Pseudotsuga menziesii	Douglas-fir	Pseudotsuga	Pinaceae	Tree

QUGA	Quercus gambelii	Gambel oak	Quercus	Fagaceae	Tree
RHTR	Rhus trilobata	skunkbush sumac	Rhus	Anacardiaceae	Shrub
RICE	Ribes cereum	wax currant	Ribes	Grossulariaceae	Shrub
ROWO	Rosa woodsii	Woods' rose	Rosa	Rosaceae	Subshrub
SPCR	Sporobolus cryptandrus	sand dropseed	Sporobolus	Poaceae	Graminoid
SPORO	Sporobolus	dropseed	Sporobolus	Poaceae	Undefined
SYPIP3	Symphyotrichum pilosum var. pilosum	hairy white oldfield aster	Symphyotrichum	Asteraceae	Forb/herb
SYRO	Symphoricarpos rotundifolius	roundleaf snowberry	Symphoricarpos	Caprifoliaceae	Shrub
TAOF	Taraxacum officinale	common dandelion	Taraxacum	Asteraceae	Forb/herb
TEAR4	Tetraneuris argentea	perkysue	Tetraneuris	Asteraceae	Forb/herb
VERBA	Verbascum	mullein	Verbascum	Scrophulariaceae	Undefined
VIAM	Vicia americana	American vetch	Vicia	Fabaceae	Vine
VISO	Viola sororia	Wood violet	Viola	Violaceae	Forb/herb

Appendix IV: Monitoring protocols/blank datasheets

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