

Twin Peaks Aspen Condition Survey, 2014-2015

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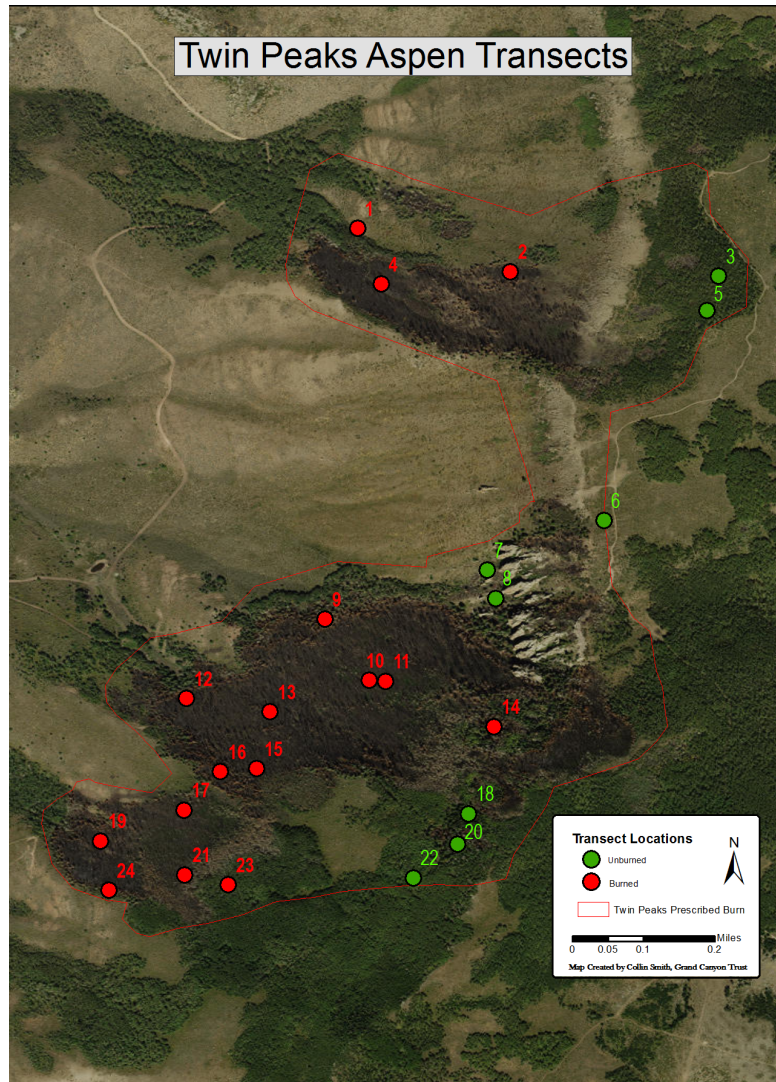


Figure 1: Map of Twin Peaks prescribed burn and transects

On June 6, 2014, the Twin Peaks prescribed fire burned 254 acres of aspen and mixed conifer aspen forest on the southern tip of Monroe Mountain, near Forshea Peak on the Richfield Ranger District of Fishlake National Forest.

Subsequent to the Twin Peaks prescribed fire planning, the collaboration called Monroe Mountain Working Group (MMWG) formed in 2011 to provide recommendations to the Richfield Ranger Station for restoration of aspen throughout Monroe Mountain, utilizing the 2010 [Guidelines for Aspen Restoration in the National Forests of Utah](#)

A critical element of the guidelines adopted by the Forest Service for the [Monroe Mountain Aspen Ecosystems Restoration Project](#) ("Monroe Aspen Project") are quantitative thresholds for browse of aspen sprouts (<6' tall). The thresholds following prescribed or wild fire are designed to ensure at least 1,000-2,000 aspen saplings (6'-12' tall) per acre and 400-600 aspen recruits (>12' tall) per acre. The thresholds vary depending on initial density of sprouts per acre.

Due to the steepness and inaccessibility to cattle of the Twin Peaks area, and estimated low use of southern Monroe Mountain by elk, the Forest Service decided not to fence or change management to prevent browse in the area of the prescribed burn, even though the burn area was small. This report analyzes the results of that decision and

whether it is consistent with the thresholds set for the Monroe Aspen Project.

In order to estimate both initial sprout density and percent browse in the Twin Peaks fire area, 24 transects were randomly established within the fire perimeter. Sixteen of the 24 transects fell within burned patches of the fire perimeter and 8 fell within unburned or partially burned (canopy still intact) patches of the fire perimeter. Transects in partially burned patches were grouped with unburned patches because their height structures more closely matched the unburned patches. The transects were read September 21-22, 2014 by a group of students from Whitman College under the direction of the Grand Canyon Trust Utah Forests Program, and were read again July 29-30, 2014 by a Grand Canyon Trust employee and interns.

In 2014, two perpendicular 6'x100' belt transects (one due north, the other due east) were located at each transect point to record density and percent browse of all aspen leaders within the top 6" of the tallest leader. The 2015 survey used GPS waypoints taken by the 2014 survey to find transect site locations and repeated the transects, but with transects of only 50' by 6'. The 2015 transect lines are the closest approximation to the lines read in 2014 but they are not an exact replication, as stakes had not been placed at the transect points.

Results

Prescribed burn perimeter

September 21-22, 2014

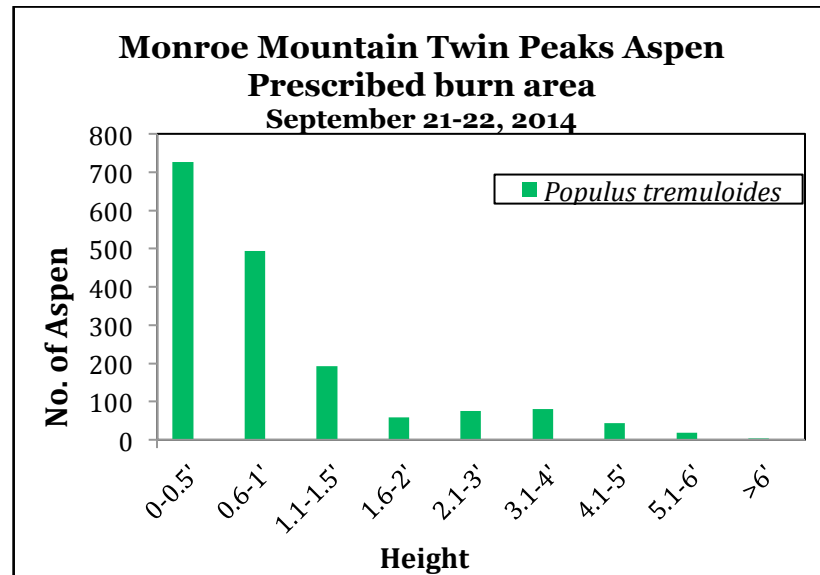


Figure 2: 2014 aspen understory height distribution. Note, aspen over 6' were not recorded in 2014.

Table 1: Monroe Mountain Twin Peaks Aspen Burn perimeter 1690 <i>Populus tremuloides</i> <6'	
	<i>Populus tremuloides</i>
% subleaders browsed	41.2
% subleaders browsed or dead	41.2

July 29-30, 2015

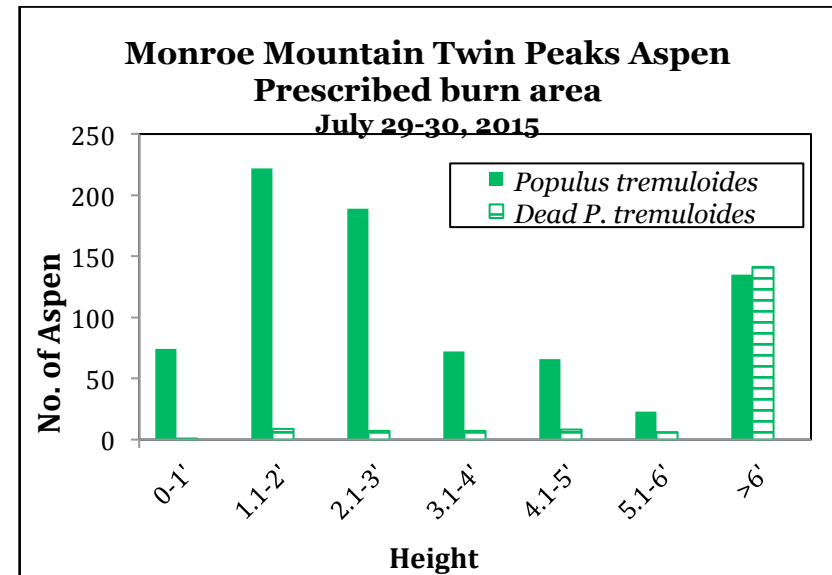


Figure 3: 2015 aspen height distribution, including overstory aspen (>6').

Table 2: Monroe Mountain Twin Peaks Aspen Burn perimeter 646 <i>Populus tremuloides</i> <6' 135 <i>Populus tremuloides</i> >6'; Ave. DBH 3.7" 358 Dead <i>Populus tremuloides</i> <6' 141 Dead <i>Populus tremuloides</i> >6'; Ave. DBH 3.3"	
	<i>Populus tremuloides</i>
% subleaders browsed	22.9
% subleaders browsed or dead	26.3

Unburned patches (Sept. 21-22, 2014)

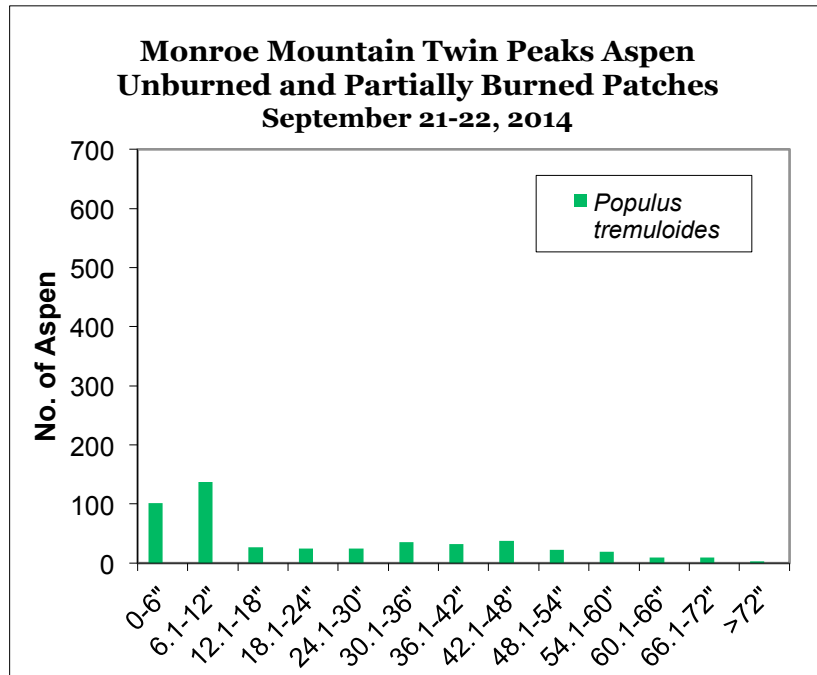


Figure 4: 2014 aspen understory height distribution in unburned and partially burned patches within the prescribed burn perimeter. Note, aspen over 6' were not recorded in 2014.

Table 3: Monroe Mountain Twin Peaks Aspen
Unburned and Partially Burned Patches
485 *Populus tremuloides* <6'

	<i>Populus tremuloides</i>
% subleaders browsed	27.0
% subleaders browsed or dead	27.0

Burned patches (Sept. 21-22, 2014)

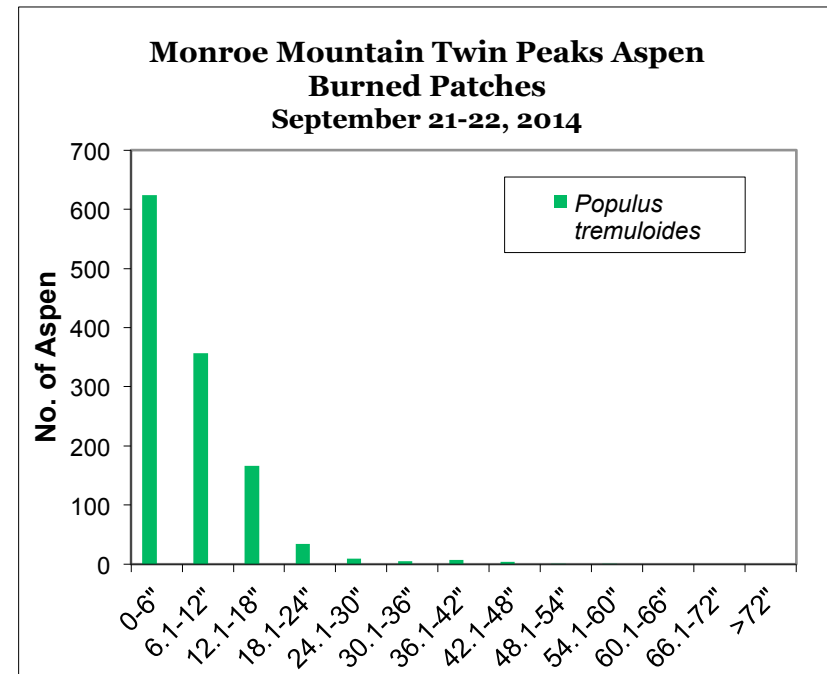


Figure 5: 2014 aspen understory height distribution in burned patches within the prescribed burn perimeter. Note, aspen over 6' were not recorded in 2014.

Table 4: Monroe Mountain Twin Peaks Aspen
Burned Patches
1208 *Populus tremuloides* <6'

	<i>Populus tremuloides</i>
% subleaders browsed	44.7
% subleaders browsed or dead	44.7

Unburned and Partially Burned patches (July 29-30, 2015)

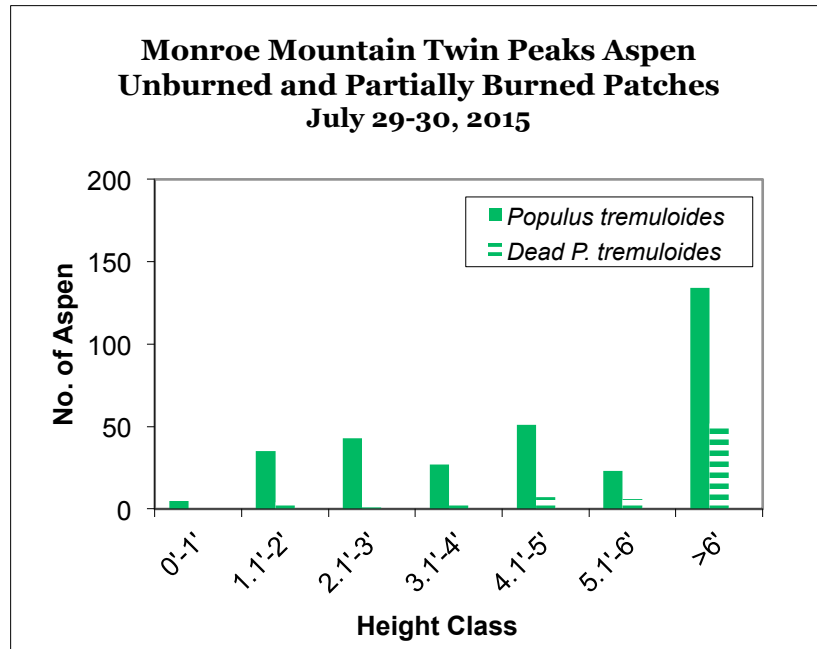


Figure 6: 2015 aspen height distribution in unburned and partially burned patches

Table 5: Twin Peaks Aspen – Unburned Area
184 *Populus tremuloides* <6'
21 Dead *Populus tremuloides* <6'
134 *Populus tremuloides* >6'; Ave. DBH 2.5"
52 Dead *Populus tremuloides* >6'; Ave. DBH 2.6"

	<i>Populus tremuloides</i>
% subleaders browsed	12.9
% subleaders browsed or dead	23.6

Burned patches (July 29-30, 2015)

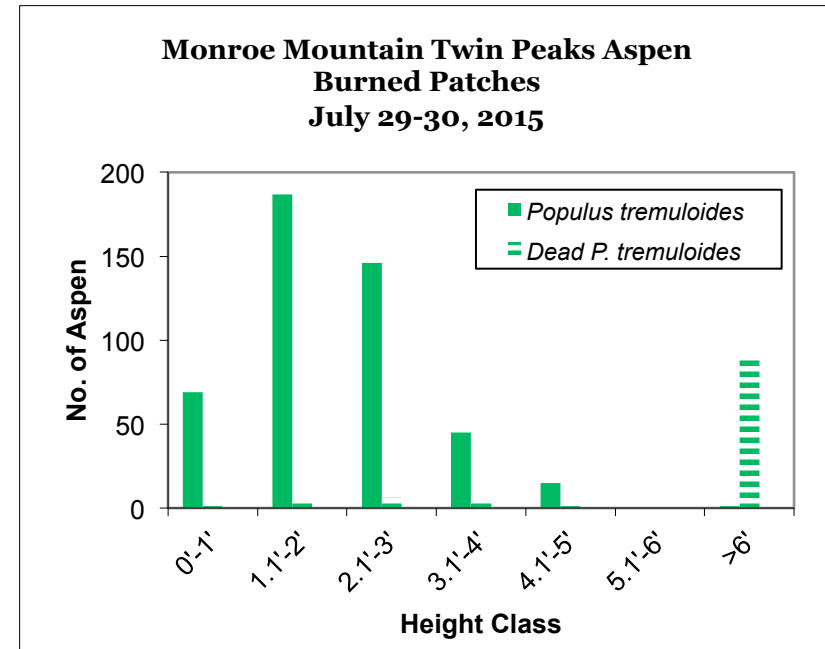


Figure 7: 2015 aspen height distribution in burned patches

Table 6: Twin Peaks Aspen -- Burned Area
462 *Populus tremuloides* <6'
17 Dead *Populus tremuloides* <6'
1 *Populus tremuloides* >6'; DBH 7.7"
89 Dead *Populus tremuloides* >6'; Ave. DBH 4.0"

	<i>Populus tremuloides</i>
% subleaders browsed	26.8
% subleaders browsed or dead	27.3

The belt transects conducted in 2014-2015 give an estimate of aspen stems per acre in the Twin Peaks burn area by the following equations:

$$\text{Aspen stems/acre} = (\text{Total \# live stems}) / (\text{belt transect area in ft}^2) \times 43,560$$

Tables 7 and 8 show aspen densities for 2014 and 2015 in the burned and unburned patches within the Twin Peaks fire perimeter. Table 3 shows total aspen densities for 2014 and 2015 within the fire perimeter.

	2014 (<6')	2015 (<6')	2015 (all)
Live aspen	488	181	315
Total Area (acre)	0.22	0.11	0.11
Density (live stems/acre)	2214	1646	2864

Table 7: Aspen density of transects in unburned patches, 2014-2015

	2014 (<6')	2015 (<6')	2015 (all)
Live Aspen (<6')	1208	462	463
Total area (acre)	0.44	0.22	0.22
Density (live stems/acre)	2741	2100	2105

Table 8: Aspen density in transects of burned patches, 2014-2015

		Stems	Total area (ac)	Stems/acre
2014	Live aspen <6'	1683	0.66	2546
2015	Live aspen <6'	643	0.33	1945
	Live Aspen >6'	135	0.33	408
	Total	778	0.33	2,353

Table 9: Aspen density within fire perimeter, separated by height. Original regeneration density recorded in 2014 was 2,546 stems per acre

The eight transects in the unburned patches had a density of 2,214 sprouts per acre in 2014; 1,646 in 2015. Aspen density in the burned patches were 2,741 sprouts per acre in 2014; 2,100 per acre in 2015. The total density of aspen sprouts (<6') in the fire perimeter was 2,546 sprouts per acre in 2014; 1,945 sprouts per acre in 2015.

In 2014, the percent of browsed or dead subleaders of aspen <6' tall within the fire perimeter was 41.2%; in 2015 the percent browsed or dead was 26.2%.

Scat counts performed at each of the 24 transect locations in 2015 recorded 24 cow patties and 28 wild ungulate pellet groups.

Discussion

The Aspen Restoration Project specifies that browse thresholds for treated or burned areas of aspen should be dependent on the initial saplings per acre. The goal of the thresholds is to ensure 1,000 to 2,000 aspen saplings (6'-12' tall) per acre and 400 to 600 aspen recruits (>12' tall) per acre. The thresholds (Table 10) project attainment by sprouts of sapling height within 4-6 years depending on site conditions (e.g., whether the site is moist and/or with deep soils). Below are the annual browse thresholds set for the Monroe Aspen Project.

Years after which 1,000 aspen saplings (≥6 feet tall) per acre would be present	5,000 initial sprouts per acre	10,000 initial sprouts per acre	20,000 initial sprouts per acre	30,000 initial sprouts per acre	40,000 initial sprouts per acre
	Percent Browse				
4	32	43	52	57	60
5	27	36	45	49	52
6	23	31	39	43	45

Table 10: Thresholds from the *Monroe Mountain Aspen Ecosystem Recovery Plan EIS*, Table 10, pg. 56

The initial sprout density observed in 2014 at the Twin Peaks burn was 2,546 stems per acre (Table 9), lower than the threshold categories established in the Monroe Aspen Project EIS, which complicates using the established benchmarks for browse. In light of this survey, new categories may need to be established for low regeneration areas. Employing the same modeling method used in the EIS, the equivalent browse thresholds for the Twin Peaks area are shown in Table 5.

Years after which 1,000 aspen saplings per acre would be present	2,546 (observed) initial sprouts per acre
	Percent Browse
4	21
5	17
6	14

Table 11: Modeled browse thresholds for observed Twin Peaks aspen regeneration

Observed browsed or dead percentage was 41.2% in 2014 and 26.2% in 2015. The timing of the surveys perhaps contributed to the discrepancy in browse. The 2014 survey, completed in September, allowed 8 more weeks time for browse to take place than the 2015 survey, completed at the end of July. The observed level of browse in 2014 (44.2%) indicates that the target 1,000 saplings per acre might not be reached. Alternatively, the thresholds may overestimate the impacts of browse on recruitment in the coming years.

Between 2014 and 2015, the density of live sprouts decreased across burned and unburned patches of the Twin Peaks area. It is safe to assume that trees over 6' in 2015 were already over that height in 2014. The cause of the decrease in sprouts is unknown but may be in part due to high browse in 2014.

Overall, sprouts increased in height between 2014 and 2015 (Figs. 2-3). In 2014, the majority of sprouts were less than 1' tall and in 2015, the majority fell between 1-3' tall. Although there seems to have been significant loss of stem density between the two surveys, the sprouts present are growing, but remained (as of July 29) below 5', and thus vulnerable to browse. This effect is most notable in the burned patches (compare Figs. 5 and 7).

The scat count shows that both domestic and wild ungulates are present in the Twin Peaks burn area. It is likely both types of ungulates contributed to the browse observed.

Transect 1



Transect 1 fell within an unburned patch. In 2015, no section of the transect fell within the aspen stand.

Transect 2

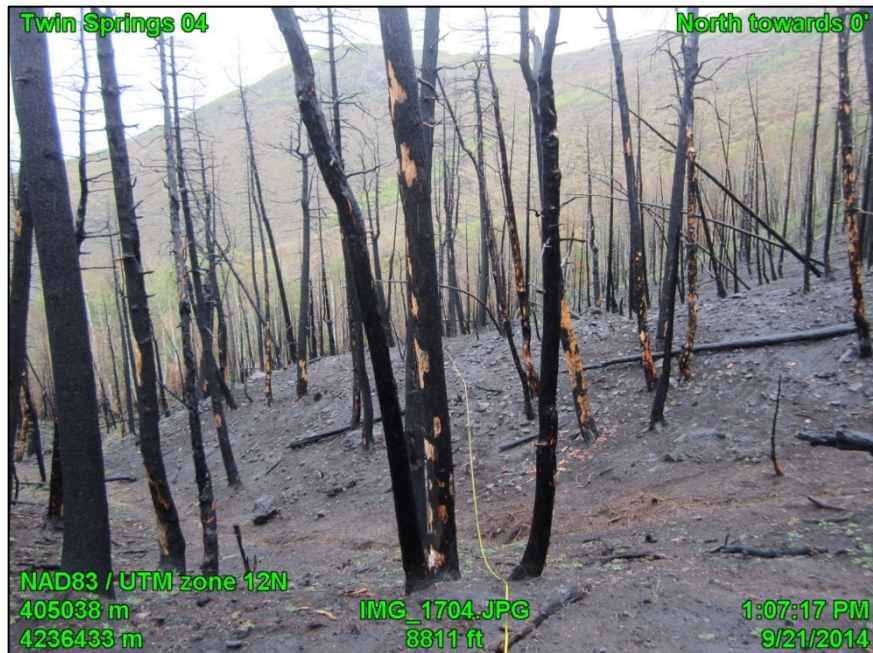


Transect 3



Transect 3 fell within an unburned patch.. No photo taken in 2014.

Transect 4

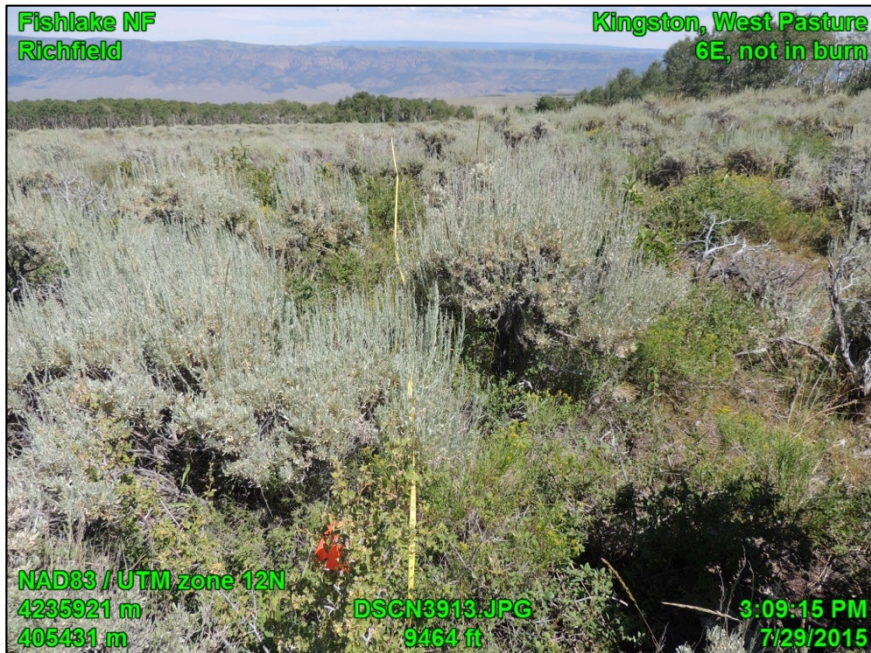


Transect 5



Transect 5 fell within an unburned patch. No photo taken in 2014

Transect 6



Transect 6 fell within and unburned patch and outside the aspen stand. No photo taken in 2014.

Transect 7



Due to difficulties locating the transect, transect 7 was completed in a different area in 2015. The transect read in 2015 was in an unburned area while in 2014 was at least partly in a burned area. The two paired photos above show relatively equivalent areas in the vicinity of transect 7.

Transect 8



Transect 8 fell within an unburned patch, though some signs of an older burn were observed.

Transect 9



Transect 10



Transect 11



Transect 12



Transect 13



Transect 14



Transect 15



Transect 16



Transect 17



Transect 18



Fig. 1 Transect 18 was partially burned, though the canopy remained intact. No photo was recorded of Transect 18 in 2014.

Transect 19



Transect 20



Similar to transect 18, transect 20 was in a partially burned patch. No photo was taken of transect 20 in 2014.

Transect 21



Transect 22



Transect 22 fell within an unburned patch. No photo of transect 22 was taken in 2014.

Transect 23



Transect 23 was in an unburned patch.

Transect 24

