

Disturbance and Rehabilitation of Cold to Warm Desert Transitional Shrublands in Southwestern Utah

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Stop 1: Mile Square Subdivision, Escalante Valley Near Beryl Junction

Extensive drought during the years of 2002, 2003, and 2004 removed most plant cover. On May 10, 2004, a cold front to the north resulted in weather stations in the area recording 600+ miles of wind travel (comparable to 60 mile hour winds for 10 hours). The effect of these two climatic events was to bury the Mile Square subdivision in wind-blown sand. Sand filled homes, garages, barrow pits, and closed roads. Even though the drought decimated perennial vegetation, including killing most of the shrubs in the area, the only areas that did not blow were the areas occupied by dead shrubs.



Figure 1—Mountain Meadows, March 1877.

Stop 2: Mountain Meadow

This stop was the scene of the tragic Mountain Meadow Massacre of September 11, 1857, where 120 men, women, and children were massacred. History of the incident was discussed. This site was a resting and staging area on the Old Spanish Trail circa 1800 to 1850 and later a wagon road to southern California. The original vegetation was wet meadows near the numerous springs and grasslands on the drier sites. Overgrazing in the mid 1800s caused arroyos to cut north and south resulting in the lowering of the water table and the displacement of the original grassland by xeriphytic sagebrush. Presently, private lands at the site are seeded rangelands or are under cultivation. A photo taken on March 23, 1877, reveals few pinyon or juniper trees at that time (fig. 1). Abundant pinyon and juniper at the present time is consistent with evidence observed from throughout the West that pinyon-juniper woodlands have increased dramatically since the mid 1800s (fig. 2).



Figure 2—Mountain Meadows, July 2005.

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Stop3: Pinyon-Juniper Blackbrush Chaining Near Jackson Spring

Chaining was conducted on deep soils in 1964 near Jackson Spring. The BLM seeded the area to crested wheatgrass and intermediate wheatgrass (fig. 3). These introduced grasses were abundant when data was first collected in 1984. Small amounts of Indian ricegrass, sand dropseed, purple three-awn, and bottlebrush squirreltail were also present. By 2001 most of the wheatgrass plants had disappeared. Sagebrush and juniper dominate the site at the present time (fig. 4).



Figure 3—Excellent seeding following chaining of blackbrush and pinyon-juniper, approximately 6 years after the seeding (photo taken in 1970).



Figure 4—Same seeding as figure 3 except a slightly different view. Previously seeded area as it looks today (2007).

Stop 4: Blackbrush

This site was formerly a dense, essentially monotypic stand of blackbrush (*Coleogyne ramosissima*) (such as fig. 5). From this vantage point you can see extensive burned areas in Utah and Nevada that were previously stands of blackbrush (fig. 6). Once burned, blackbrush sites such as this do not return to blackbrush. We are currently seeing extensive areas of red brome (*Bromus rubens*) and cheatgrass (*B. tectorum*) taking the place of blackbrush. Seedlings in this area using introduced forage grasses are largely unsuccessful and are instead occupied by cheatgrass, red brome, and sprouting shrubs such as desert almond (*Prunus fasciculata*), desert bitterbrush (*Purshia glandulosa*), turpentine broom (*Thamnosma montana*) and to a lesser extent creosote bush (*Larrea tridentata*). Joshua tree (*Yucca brevifolia*) plants are often able to survive a single fire, but appear to be susceptible to repeated burning. Some preliminary success in seeding the introduced half-shrub, forage *Kochia* (*Kochia prostrata*), offers some hope that this drought tolerant, fire resistant species may successfully establish and persist on these harsh sites following fires.



Figure 5—Tour participants examining undisturbed stand of blackbrush.



Figure 6—View of burned-over blackbrush (stop 4) looking northwest (photo taken in 1981).

Stop 5: 1979 Prescribed Burn in Blackbrush, Seeded to Introduced Wheatgrass

This burn was seeded to intermediate and crested wheatgrasses. Favorable moisture conditions at that time resulted in a good stand of these introduced perennial grasses (fig. 7). An exclosure was constructed on this site to permit evaluation of any effects of livestock grazing on the seeding. Like most seedings on these monotypic blackbrush sites, the seeding has failed both inside the exclosure and in the surrounding area. Herbaceous vegetation is predominantly, cheatgrass and red brome with a few native annuals. Desert bitterbrush and desert almond have sprouted but there is no evidence of blackbrush recovery on the site.



Figure 7—Former blackbrush area subjected to controlled burn and seeding (photo take in 1980).

Stop 6: 1945 Blackbrush Burn

This stop is a burn that occurred in 1945 adjacent to the Desert Inn (DI) landing strip (fig. 8). This is the oldest burn that we have a record of and it is unclear whether this was an intentional or natural burn. There is no evidence that this burn was seeded to perennial grasses. A desirable stand of native shrubs including desert bitterbrush, desert almond, and big sagebrush have subsequently occupied and stabilized the site. To the best of our knowledge these were not seeded.



Figure 8—Photo of 1945 blackbrush burn (stop 6). Burned area on the right; unburned blackbrush on left.

Stop 7: 1980 Unauthorized Intentional Burn

This stop was seeded and chained to cover seed (fig. 9). A good stand of introduced perennial wheatgrasses resulted. However, as with most seedings in this area, the seeded species did not persist and are now absent. A recent (2 years ago) seeding of forage Kochia may ultimately provide persistent perennial cover. The encroachment of yerba santa (*Eriodictyon angustifolium*) was apparent at a later date.



Figure 9—View of unauthorized 1981 burn and subsequent seeding.

Stop 8: Burn Near Jackson Spring

This blackbrush site is located near the Pahcoon Spring south of the Motoqua road (fig. 10). The area burned in 1995 and again in 1999. This site was seeded to intermediate and crested wheatgrass, forage Kochia, and sideoats grama (*Bouteloua curtipendula*). The wheatgrasses are still occupying the site but this has happened on previous burns only to disappear over time. This was one of the first sites to be seeded to forage Kochia and sideoats grama; however, it is too early to know if these species will persist or reduce the biomass of the annual bromes.



Figure 10—Blackbrush burn near Jackson Spring. Photo shows forage Kochia as small half shrub on the near left side of the fence. Large plants on near slope are mostly sideoats grama, intermediate wheatgrass, and Kochia.

Stop 9: True Interior Chaparral on Oak Grove Road _____

Return to Cedar City _____

This stop was in true interior chaparral, a vegetative community clearly adapted to fire in contrast to what had been observed at previous stops (fig. 11). To us, this is the most unique vegetation type in Utah. This chaparral, which is characterized by low growing evergreen shrubs, lies between the pinyon-juniper and gambel oak/ponderosa pine zones. Dominant shrubs are desert lilac (*Ceanothus greggii*), Silk-tassel (*Garrya flavescens*), manzanita, and live oak (*Quercus turbinella*). Non-sprouting shrubs such as snakeweed and sagebrush as well as small amounts of pinyon and juniper trees were also observed. Vegetation response to a 1986 burn was examined.



Figure 11—True interior chaparral type east of Pine Valley Mountains.

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