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Cover Page Footnote

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Field Trip Overview: Habitat Loss and Plant Invasions in Northern Utah's Basin and Range

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ABSTRACT

An all-day field trip was conducted on May 19, 2010, as part of the 16th Wildland Shrub Symposium program. The tour consisted of Tour A and Tour B, which visited Utah's west desert shrublands in Park Valley (Tour A), and Bear River Mountains montane shrublands and Hardware Ranch Wildlife Management Area (Tour B). Both tours convened in the early afternoon at Golden Spike National Historic Site at Promontory, Utah, to visit salt desert-sagebrush revegetation research before the last stop to visit broom snakeweed/ sagebrush rangeland interaction research conducted on private lands adjacent to ATK facilities along Faust road in Box Elder County.

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Tour A – Utah's West Desert Shrublands, Park Valley

Ron Greer, Utah Division of Wildlife Resources (UDWR), hosted the first stop at a wildlife habitat restoration area just south of Highway 30 in Park Valley on the Overland Stage Route Road. A human ignited wildfire burned public and private land in the summer of 2005. Through the efforts of Utah's Watershed Restoration Initiative (UWRI), a partnership-driven effort to conserve, restore, and manage ecosystems in priority areas across the state, this area was successfully reseeded directly after the devastating wildfire. The seed mix included three varieties of crested wheatgrass (*Agropyron cristatum* [L.] Gaertn.), Siberian wheatgrass (*Agropyron fragile* [Roth] P. Candargy), Great Basin wildrye (*Leymus cinereus* [Scribn. & Merr.] A. Löve), Russian wildrye (*Psathyrostachys juncea* [Fisch.] Nevski), Snake River wheatgrass (*Elymus wawawaiensis* J. Carlson & Barkworth), three varieties of alfalfa (*Medicago sativa* L.), sainfoin (*Onobrychis viciifolia* Scop.), small burnet (*Sanguisorba minor* Scop.), fourwing saltbrush (*Atriplex canescens* [Pursh] Nutt.), and forage kochia (*Bassia prostrata* [L.] A.J. Scott.). The establishment of seeded species was highly successful and the results have enhanced this area of Park Valley for wildlife and biological diversity, water quality and yield for all uses, and provided opportunities for sustainable uses (figure 1).

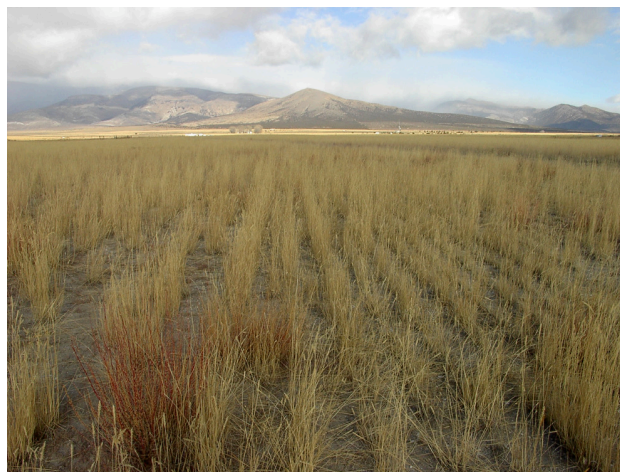


Figure 1. Successful establishment of grasses by the Utah Division of Wildlife Resources and Utah Watershed Restoration Initiative in Park Valley, Utah following a 2005 wildfire.

Due to the timely actions of the UWRI regional team, consisting of Utah Partners for Conservation and Development members, conservation organizations, and local Park Valley stakeholders, who met to discuss priority conservation focus areas early on, this burned area was identified as a potential project where resources (funding, technical assistance, logistics support) could be implemented for restoring this area for sage grouse, deer, and livestock grazing habitat. It was critical to establish and enact an effort such as this to prevent the problems being faced just across fence boundaries and where the next stop took the field-trip participants.

Utah State University (Chris Call, Merilynn Hirsch, and Beth Fowers), USDA Agricultural Research Service (Tom Monaco and Justin Williams), and Private landowners (Royce Larsen and Ken Spackman) showcased their research demonstration areas located four miles south of Park Valley, Utah and Highway 30 in the second stop. Burned by the 2005 wildfire, this area was previously dominated by Wyoming big sagebrush and greasewood (*Sarcobatus vermiculatus* [Hook.] Torr.) with low species diversity in the shrub understory. This site was not reseeded after the fire and converted to a cheatgrass (*Bromus tectorum* L.) dominated landscape thereafter (figure 2).



Figure 2. Cheatgrass dominated areas where revegetation demonstration areas were established as part of the Area-Wide project in 2008.

Because it was dominated by cheatgrass, this area was chosen for demonstration research areas as part of the USDA Agricultural Research Service-funded Ecologically Based Invasive Plant Management (EBIPM) Area-Wide Project. Settlement of Park Valley began in the 1870s but really took off during the land boom of the 1910s. Settlers in Park Valley raised cattle and sheep. Livestock grazing was instrumental in the introduction and spread of invasive plant species in the Great Basin. Settlement was also accompanied by a great deal of land clearing to obtain homestead patents and for agriculture. The fallowed fields and cleared lands abandoned by homesteaders were staging areas of disturbed soil that harbored invasive species. Cheatgrass has greatly expanded in Park Valley since the early 1980s. In the last decade, wildfires in 1999 and 2005

promoted large expanses of rangelands dominated primarily by cheatgrass. Sandberg bluegrass (*Poa secunda* J. Presl) and squirreltail (*Elymus elymoides* [Raf.] Swezey) do occur, but generally at less than two percent ground cover. Attempts to seed crested wheatgrass and other perennials have been highly successful in certain areas if seeding occurs immediately after fires. The areas chosen for the EBIPM demonstration studies have been unsuccessfully seeded or never been seeded before. Evaluation of four treatments (intensive cattle grazing, prescribed fire, herbicide application, and drill seeding), alone and in combinations at large scales (10 to 30 acres) at this site were implemented to determine their effectiveness in modifying ecological processes and promoting a transition from a cheatgrass-dominated state to a perennial species dominated state.

Research led by Lesley R. Morris, USDA Agricultural Research Service, Logan, Utah, on historic dry farming impacts in Park Valley area was the focus of the third stop (figure 3). Across the arid West, dry farming (agriculture without irrigation) helped fuel a land rush of new homesteads after 1909. Homesteaders cleared sagebrush, plowed and harrowed the soils, and planted grains in hopes of making a living. Although successful in some areas, most of the dry farms failed and many people lost everything. The impacts of this historic land use can still be seen in aerial photos nearly 100 years after cultivation. Research objectives are to evaluate how site history (dry farming) has influenced rangeland vegetation and soil nearly a century after being cultivated. If this site history influences present conditions, it is likely to have similar influences on future management outcomes. Comparisons were made of vegetation and ground cover in historically dry-farmed areas to adjacent land outside of the historically cultivated fields at six paired sites across three ecological sites. Results of current research indicate that historic dry farming has had long-lasting impacts on vegetation and ground cover across different ecological sites that could influence key ecosystem properties. Understanding the legacies of this land use has important applications for invasive species management, ecological site classification, livestock producers and land management.



Figure 3. A typical shrubland site that was historically impacted by dry farming in the early 1900s. The recovery of native species in these areas has been variable across ecological sites.

Tour B – Bear River Mountains, Montane Shrublands, Hardware Ranch Wildlife Management Area

Dan Christensen and Darren Deblois of the UDWR lead the first two stops at the Hardware Ranch Wildlife Management Area (WMA) and mahogany forests located 15 miles up the Blacksmith Fork Canyon. This area has been a popular site for discussion of many issues such as wildlife politics, shrub management, and wildlife needs. Hardware Ranch WMA and surrounding land is an important range site for wildlife, especially in winter, when it is heavily utilized. High quality forage and habitat encourage wildlife to stay on wildlands and off farms and urban areas. The WMA visit showcased a mosaic of various species and size classes of shrubs in a background of forbs and grasses, each with a different utility for wildlife. The implications of changing plant communities (species, age classes, and densities), wildlife requirements, animal impacts on shrub communities, and shrub stand influence on the watershed were discussed. Of special interest and concern to this region is curl-leaf mountain mahogany (*Cercocarpus ledifolius* Nutt.), which is good forage for all classes of browsing animals in both summer and winter and is one of the few browse species that meets or exceeds the protein requirements for wintering big game animals (figure 4). It was noted that moose have a high preference for curl-leaf mountain mahogany stands in winter.

Currently curl-leaf mountain mahogany stands are mature with many populations in decline, yet lack regeneration of new stands. It appears that this species does germinate, but fails to establish well in wildland settings. One successful, but expensive tool used to establish shrubs in critical areas has been to plant containerized plants. Problems with containerized plants include water demands of plants with established leaf area, but with small roots, and the attractiveness of the plant material to foraging wildlife. Less expensive materials and methods of establishing shrubs are needed to improve wildlife habitat.



Figure 4. Discernible browse line on curl-leaf mountain mahogany tree.

Combined Afternoon Tour – Golden Spike National Historic Site And Broom Snakeweed / Sagebrush Rangeland Interactions

Eugene Schupp and Jan Summerhays of Utah State University lead a visit to their salt desert-sagebrush shrubland revegetation research south of the parking lot at the visitor center of Golden Spike National Historic Site (GSNHS) (figure 5). Golden Spike National Historic Site in Box Elder County, Utah, marks the location of the completion of the transcontinental railroad in 1869. Historically a sagebrush-steppe ecosystem, this site and its surrounding land have been subject to over a century of ground disturbing activities such as grazing and agriculture. These stressors have led to degradation of sagebrush ecosystems and the loss of understory perennial grasses and forbs. Current vegetation of

GSNHS consists of sagebrush grassland dominated by basin big sagebrush (*Artemisia tridentata* Nutt. ssp. *tridentata*), rubber rabbitbrush (*Ericameria nauseosa* [Pall. ex Pursh] G.L. Nesom & Baird), and purple three-awn (*Aristida purpurea* Nutt.). Disturbed areas along old railroad lines and roads have high concentrations of cheatgrass, common sunflower (*Helianthus annuus* L.), and broom snakeweed (*Gutierrezia sarothrae* [Pursh] Britton & Rusby).

One of the primary missions of the National Park Service is to conserve the natural and cultural resources and values of the national park system for the enjoyment of this and future generations. Restoring the existing vegetation community to resemble 1869 has limitations. Current research is

aimed at determining methods of reincorporating perennial grasses into the understory. However, due to the incidence of cultural resources and artifacts within Golden Spike National Historic Site, park management prohibits the use of ground-disturbing activities such as drill seeding. As such, all seeding must be done via aerial broadcasting, a non-disturbing method of seed distribution. A primary goal of the experiment is to search for ways to increase the success of aerial broadcast seeding. Restoration treatments at GSNHS were implemented with the specific purpose of manipulating soil nutrients and other resource conditions to favor perennial grass establishment while addressing some of the factors that contribute to cheatgrass dominance.



Figure 5. Eugene Schupp (at left) from Utah State University addressing tour participants at research plots located on the Golden Spike National Historic Site at Promontory, Utah.

The final stop of the afternoon was hosted by Michael Ralphs, USDA Agricultural Research Service (ret.), Logan, Utah and Chris Call of Utah State University. They illustrated broom snakeweed/sagebrush rangeland interactions along a well-defined fenceline contrast east of ATK facilities (Corinne, Utah) on Faust Valley Road (figure 6). A 5-year (2002-2006) study was initiated following grazing and fire disturbances on an Upland Gravelly Loam ecological site to evaluate broom snakeweed invasion in different plant communities. Broom snakeweed (*Gutierrezia sarothrae*) is an aggressive native invasive species that thrives after disturbance in semi-arid rangelands of the western U.S. The site originally had two plant communities: a 'sagebrush-bunchgrass' community that was grazed by cattle in alternate years in fall and winter, which was dominated by bluebunch wheatgrass and an open stand of Wyoming big sagebrush; and a 'sagebrush' community that was grazed in spring each year, which removed the bunch grasses, leaving a dense stand of Wyoming big sagebrush with an understory of Sandberg's bluegrass. Portions of these two plant communities were burned in a wildfire in 2001, removing the sagebrush, and creating two additional communities. By the end of their study, the burned portion of the sagebrush-bunchgrass community became a 'bluebunch wheatgrass' dominated community, and the burned portion of the sagebrush community became a 'snakeweed' dominated community. Mature snakeweed plants that existed in

the sagebrush-bunchgrass community died in 2003, due to competition from bunchgrasses during drought conditions. Snakeweed was eliminated in the bluebunch wheatgrass community by the wildfire in 2001, and did not reestablish. Snakeweed density and cover remained constant in the sagebrush community. Snakeweed cover increased from 2 to 31 percent in the snakeweed community, despite the presence of Sandberg bluegrass. The data were used to evaluate and update the current Upland Gravelly Loam (Wyoming big sagebrush) ecological site description and its state-and-transition model to reflect vegetation changes associated with snakeweed invasion.



Figure 6—Various vegetation states within close proximity with the Upland Gravelly Loam ecological site in northwestern Utah.