

## **Soda fire report on the April 12, 2016 Tour.**

### **Roger Rosentreter, 24 April 2016.**

This tour was sponsored by the Society for Ecological Restoration.

Planned and Co-lead by Dr. Matt Germino, USGS, and Pete Torma, BLM range conservationist.

Stop #1. Wilson meteorological/ erosion station.

Stop#2. Not visited.

Stop #3. Blackstock drill seeding and D7 bacteria study, plus sagebrush spring transplant site.

Stop#4. Upper Blackstock area. Treated with herbicide (Plateau, imazapic).

### **Summary:**

The tour visited a small number of sites. Based on observations at these sites is possible that BLM caused more damage than good on the Soda fire rehabilitation. Many of these actions caused damaged forbs and biocrusts. These disturbances destabilized the soil and will encourage the colonization by invasive species including cheatgrass.

### **Observations and Photos are below:**

Stop #1 dominated by cheatgrass and other invasive annuals. There was no rehabilitation at this site.

This is the area that could have been treated with the herbicide, Plateau, not the area that appears to not have any cheatgrass.

### **At Stop #3.**

There was no need to rehabilitate this area. The natural recovery was excellent. (Photos #1-4.) Lots of perennial grass and lots of preferred sage-grouse forbs were present. Nearly 90% vascular plant recovery and numerous species of biological soil crusts in the interspaces (*Psora montana*, *Diploschistes muscorum*, *Cladonia pocillum*, *Collema tenax* (a nitrogen fixer), *Encalypta vulgaris*, *Ceratodon purpureus*, *Bryum argenteum*, *Syntrichia ruralis*.) (Photos #5-6). The only areas lacking vegetation are where the rangeland drills disturbed the soil. The rangeland drills dug deeply into the sod and tended to turn over the sod. Few seeds had germinated in the drill rows as of April 12. Forb cover was at least 20-25%.

All the islands of unburned sage that were fairly common on the hillside were early sagebrush (*Artemisia longiloba*) and Wyoming sagebrush (*A. tridentata* ssp. *wyomingensis*). However, the BLM planted about 50,000 sagebrush seedlings from The Lucky Peak Nursery in early March. The sagebrush seedlings were planted and were thought by the BLM to be Wyoming sagebrush. However, Both Drs. Bryce A. Richardson and Roger Rosentreter agreed on the determination of the sagebrush taxa seen in the field. Field examination of the planted sagebrush seedlings showed them to be about 80% mountain big sagebrush, (*A. vaseyana*) and 20% basin big sagebrush, (*A. tridentata* ssp. *tridentata*) (Photos #7-8). In contrast, early sagebrush is one of the most preferred sagebrush foods for sage-grouse and basin big sagebrush is one of the least preferred sagebrush species (Rosentreter 2005).

#### **Stop #4.**

##### **Herbicide Treatment area:**

The herbicide treatment to control invasive annuals was conducted in an area that apparently did not have any cheatgrass or medusahead rye and was applied 5-6 months later than optimal. The spring application of herbicide killed most of the native annuals and most of the perennial sage-grouse forbs, damaging the small perennial bluegrass and increasing the surface water erosion at the site. (Photo #9-10.)

The herbicide killed most of the tender forbs and all composites. The herbicide was applied by a helicopter and this method can produce a very irregular application of the chemical. The soil looks black where the herbicide was applied and in the small areas that the chemical missed it is full of *Crepis*, *Lomatium*, and phlox. The chemical killed a lot of the bluegrass, *Poa*; generally the herbicide left some Lupine, one deeper rooted species of milkvetch (*Astragalus miser*) and some death camas. It was a substantial loss of forbs preferred by sage-grouse.

The Plateau treatment was at a high concentration, ( $\geq 6$  oz/ acre, trip leaders did not know the actual concentration) so it killed most of the sage-grouse forbs and shocked and killed some of the Sandberg bluegrass (*Poa sandbergii*). A local BLM field office range person said that the *Poa* was an unnecessary species and did not add to the resilience. He said, "Resilience is only from deep rooted grasses". Yet, the site had been very resilient to the disturbance from this fire. So, perhaps resilience needs to be re-evaluated by other scientists? The chemical treatment was very spotty and there were sites (e.g., the roadway) that had few signs of chemical

impact (Photo #11). These areas had an abundance of perennial grass and many forbs.

As of April 12<sup>th</sup> the seeding had a few lightly rooted grasses germinated in the seed rows, and the reseeding effort appeared to be a waste resources and a great loss of biodiversity since natural regeneration was excellent. The only cheatgrass observed was miles away the areas sprayed. More pre-existing vegetation data should have been collected by the rehab team before application of herbicides.

### **Unburned Islands of Sagebrush and forbs:**

Several unburned islands of sagebrush and forbs were found at the Stop #4 area. Sagebrush islands were physically damaged and degraded by the rangeland drills (Photo #12). Sagebrush was ripped from the ground and many of the forbs were uprooted. These islands could and to some extent will be valuable islands of dispersal for the recovery of sagebrush for the area. Unburned islands should have been protected rather than being disturbed.

### **Soil disturbance from the Rangeland drills:**

Some areas were disturbed by the rangeland drills exposing bare soil to invasive species including cheatgrass. The drill often flipped the native sod over killing the vascular vegetation and biocrust. These are the areas most likely to become dominated by invasive plants in the future. Such soil disturbance damages vascular plants and mycorrhizal fungi as well as possibly destroying ground dwelling bees needed for the pollination of the forbs critical to sage-grouse (Photo # 13).

### **Discussion:**

The BLM project personnel may not have consulted with a broad cross section of their own experienced resource personnel and, instead, relied on less ecologically knowledgeable fire, operations, and local range staff for planning this apparently ill-fated rehabilitation operation. An oversight review by BLM soil scientists, botanists and more experienced wildlife personnel could have provided valuable recommendations for adaptive management. Future review by non-agency scientists might help to improve future fire rehabilitation plans and actions. This rehabilitation did not utilize the knowledge gained from recent science on fire rehabilitation nor on the vegetative needs of sage grouse.

It is my recommendation that the monitoring planned on this fire be transformed to fully integrate the important role that forbs, *Poa*, and biocrusts play in the sagebrush steppe ecosystem. It is clear that BLM's rehabilitation practices need to be drastically overhauled.

**Literature cited:**

- 2005 Rosentreter, R. Sagebrush identification, ecology, and palatability relative to sage grouse. In: Shaw, Nancy L.; Pellant, Mike; Monsen, Stephen B., comps. 2005. Sagegrouse habitat restoration symposium proceedings; 2001 June 4–7; Boise, ID. RMRS-P-38, Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.



Photo by Dr. Clint Shock:

Photo # 1. Drill seeded area showing natural recovery and lack of seeded grasses as of April 12, 2016. This shows the high forb cover from natural recovery and both Sandberg bluegrass and other plants recovering. This photo is typical of much of the rehabilitated area.





Photo Dr. Clinton Shock.

Photo# 2. Overview of the natural recovery of the Soda fire near Blackstock. This area was drill seeded, despite the natural recovery that started with the fall rains.



Photo by Dr. Clinton Shock.

Photo #3. Close up of the natural recovery on the Soda fire near Blackstock. Note that the seeded grasses had not germinated and that the bighead clover and *Crepis* recovered as did the bunchgrasses. One bunchgrass shows the center blackened and one can see the drill rows thru the native sod.





Photo by Dr. Clinton Shock.

Photo #4. Close up of the natural recovery of the Soda fire. Bighead clover (*Trifolium macrocephalum*), and Sandberg bluegrass are abundant the only bare soil is where the rangeland drills disturbed the soil.



**Photo #5.** Moss that survived the fire. **Photo #6.** Moss and lichen biocrusts that survived the fire are stabilizing the soil. Photos by Dr. Clinton Shock.





Photo by Dr. Clinton Shock.

Photo #7. Basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*) spring planted and not looking to healthy. This site should have been planted to **Early and Wyoming** sagebrush seedlings. Note the drill row marks in the soil.





Photo #8. Basin and Mt big sagebrush plants spring planted into dense competition from the natural recover of the Soda fire. Early and Wyoming sagebrush occupied the site pre-fire and plantings should have been composed of those species planted in more barren black hotspots from burnt shrubs. Photo by Dr. Clinton Shock.





Photo # 9. The spring application of herbicide killed native annuals and perennial sage-grouse forbs and damaged the small perennial bluegrass. Most of the green plants in the foreground are death camas. This herbicide treatment was done in an area that did not have cheatgrass or medusahead rye, so the treatments were not necessary. Photo by Dr. Clinton Shock.





Photo # 10. This is a close up of the herbicide treated area with some bits of Sandberg bluegrass that is green and yellowed and the seasonally later sprouting death camas showing some yellowing from herbicide injury. Few preferred sagegrouse forbs survived the herbicide, nor did the annual forbs that were in the seed bank. Photo by Dr. Clinton Shock.



Photo # 11. In this photo the range plants in the road that were not as affected by the herbicide but the foreground was treated with herbicide showing the dead plants rather than the green in the natural recovery areas. Photo by Dr. Clinton Shock, April 20, 2016.





Photo #12. This island of unburned sagebrush on unstable ground was drill seeded causing physical damage to the shrubs and unburned forbs. These areas could have acted as centers of dispersal for the locally adapted sagebrush and forbs. The linear lines going down slope are from the rangeland drills. Some up rooted sagebrush are now a pile of dead branches in the photo. Photo by Dr. Clinton Shock.





Photo # 13. This photo shows some areas where the drill seeding flipped the native sod over causing it to die. Most of the green plants in the rows are death camas sprouting from bulbs deep in the soil. These areas are the most likely to become invaded by exotic plants such as cheatgrass and medusa head. Photo by Dr. Clinton Shock.