

# **Battle Mountain Complex Monitoring Report**

## **Spring 2013**

Renewable staff for the Mount Lewis Field Office has been performing drought monitoring throughout the North Buffalo and Copper Canyon Allotments known collectively as the Battle Mountain complex (BMC). Monitoring has been conducted to verify and document drought related resources concerns beginning 2012. Monitoring has continued as the drought persists. Monitoring methodologies and focus is consistent with those described in the Battle Mountain District Drought Detection and Monitoring Plan and analyzed in the Battle Mountain District Drought Management EA (DOI-BLM-NV-B000-2012-0005-EA) dated June 14, 2012.

Vegetation within the BMC is displaying various signs of drought stress. There is a significant lack of forage and water available for wildlife and livestock. The vegetative growth this spring was considerably reduced, with limited to no growth observed within some areas of the BMC. Much of the vegetation is exhibiting reduced leaf growth, seed head development with induced senescence prevalent across the allotments. The lower elevations are exhibiting the most severe signs of drought stress. Water in the allotment is limited to the Mountain Use Area and cattle are concentrating in these crucial riparian zones. Concentration of livestock around the remaining water sources has led to utilization levels that exceed the Drought Response Triggers analyzed in the Environmental Assessment (EA).

The following map displays the allotment boundaries and the locations of the Key Management Areas for upland monitoring and the Designated Monitoring Areas for riparian monitoring.



## **North Buffalo Allotment**

### **DROUGHT MONITORING OVERVIEW:**

The North Buffalo Allotment is currently in the severe drought category according to the US Drought Monitor as of May 14<sup>th</sup> 2013. The Vegetation Drought Response Index (Veg DRI) report on May 6<sup>th</sup> 2013 vegetation condition in the valley portions of the North Buffalo Allotment as being in the severe to extreme drought categories and the foothills within the allotment being in the pre-drought to moderate drought categories. Monitoring of the North Buffalo Allotment has revealed that the allotment is experiencing moderate to severe drought conditions which is negatively impacting the vegetation. The vegetation at these sites is exhibiting less than normal production and vigor for what should be expected at these sites for this time of year. The vegetative growth in most areas of the allotment is stunted with no growth occurring in other areas this season. The sites visited within the allotment display various signs of moderate to severe drought. The areas displaying moderate drought conditions have a lack of perennial understory with large gaps and bare ground between individual plants. The areas exhibiting severe drought conditions are experiencing similar drought impacts of moderate drought conditions with the addition of induced senescence and plant death.

Two consecutive years of drought is impacting the health and productivity of forb, grass and shrub species. Some areas of the allotment have sites that are being impacted as a result of extreme drought conditions. MLFO staff have observed that even the most resilient plant species (shadscale, rabbitbrush, sage brush etc.) show highly reduced growth, little to no seed head production, loss of vigor and even plant mortality. The areas experiencing severe drought conditions will not likely be capable of recovering this growing season even with abundant late season precipitation. The vegetation will not be capable of recovery this season due to the lack of plant available moisture which has forced plants into completing their life cycle prematurely. Other plants observed have surpassed their permanent wilting point due to severe water stress which limits a plants ability to resume growing.

### **WILDLIFE:**

Drought conditions in the valley bottom and foothills have contributed to reduced forb and bunchgrass production, which adversely impacts the quantity and quality of available foods for insectivores (e.g., several bird species and lizards) and herbivores (e.g., rodents, lagomorphs and ungulates). For insectivores, the lack of forb production is particularly detrimental because they often forage on insects that develop in response to flower production to complete their life cycle. For herbivores, low forage availability during the spring typically results in low reproductive success.

In the valley bottom (including monitoring sites NB-06-01 and NB-07-06), the only forage available for herbivores was Cheatgrass, salt desert shrubs (e.g., Shadscale, Budsage, Greasewood), and scattered inclusions of sagebrush. However, the value of these species to herbivores is low, particularly during spring and summer, because they have relatively poor nutritional value and they contain high concentrations of secondary metabolites that can interfere with herbivore digestion, growth, and reproduction. Even though sagebrush is consumed by species such as sage-grouse, these plants were drought stressed and likely had very low nutritional and moisture concentrations. Wildlife sign throughout the valley bottom and at monitoring sites was limited largely to a few avian species (Horned

Lark, Raven, Brewer's Sparrow), reptiles (Sagebrush Lizard, Side-Blotched Lizard, Bull Snake), and sign (feces) indicating the presence of Black-tailed Jackrabbit.

Forage availability was greater in the foothills than in the valley bottoms. However, the combined impacts of drought and livestock use on riparian areas pose a primary threat to wildlife populations. Riparian areas in the foothills were heavily impacted by livestock trampling and grazing (see riparian section of this report), and only remnant hummocks of native riparian vegetation remained. Continued use of these riparian areas by livestock as drought conditions persist will have long- and short-term detrimental impacts to important wildlife species. Short-term impacts include a severe reduction in water quality and quantity and reduced riparian vegetation which reduces the availability of important foods (including insects) and hiding cover. These changes to riparian areas can have a negative impact on sage-grouse and their young, which depend on healthy and diverse riparian areas for summer forage. Long-term impacts include removal of native riparian vegetation, introduction of non-native weedy species, and structural changes that could alter the viability of the riparian system for wildlife.

#### **RIPARIAN:**

In general, riparian areas were severely degraded by livestock over-utilization and trampling. The observed change toward a degraded ecological state is being exacerbated by the drought. Surface water levels and soil moisture were low, especially for May. Growth of riparian vegetation was stunted and most areas that were over-utilized last year showed little sign of repair. Plant species that did re-inhabit the severely degraded sites were nearly always invasive species, decreasing the stability and productivity of the sites for all uses. Drought stress is expected to be severe in the coming months. Over-grazing and weed infestation was ubiquitous in the riparian areas. The mix of native vegetation is at risk. Riparian areas need to be rested to preserve their natural integrity and function.

#### **KEY MANAGEMENT AREAS:**

##### **Valley Bottom (Uplands)**

**NB-06-01:** This site had almost no spring growth this year. Species documented at this site include Shadscale, Budsage, Indian Ricegrass, Cheatgrass and Burr Buttercup. Of these species the Burr Butter cup is the only one that showed any signs of growth this year. Much of the Shadscale is currently dying out. Little or no litter or ground cover are present to protection from soil erosion. Livestock were present several miles across the flat and no signs of use were present outside of cattle moving through.



Figure 1: NB-06-01 Ground cover (note the lack of current growth and limited ground cover).



**Figure 2: NB-06-01 Landscape (note the dye off of shad scale).**

**NB-07-06:** Little to no production occurred at this site. There is extensive plant death occurring at the site with most grasses showing signs of being past the permanent wilting point. Any late season precipitation would most likely not result in plant recovery this growing season. The shrubs at this site were also beginning to show signs of drought stress through reduced growth and vigor. Cattle were observed near the site, however no key species were present to adequately measure livestock utilization.

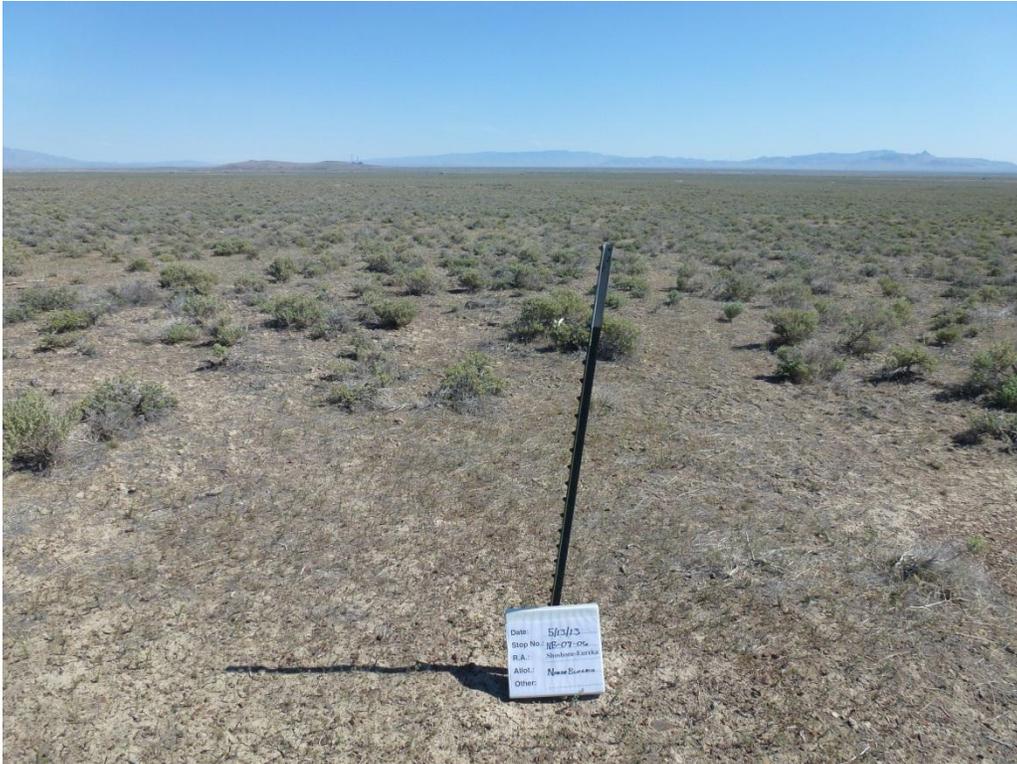


Figure 3: NB-07-06 Landscape.



Figure 4: NB-07-06 Groundcover (note the lack of understory vegetation).



**Figure 5: NB-07-06 Landscape (Note the large gaps between plants and amount of bare ground in the interspaces).**

**Foothills (Uplands)**

**NB-02:** The average utilization at this site was measured as light. Key species in the area displayed good vigor, however, shoot and leaf growth was reduced. Reduced growth of vegetation was the only drought sign noted at this site (average grass height was 2-3 inches). Water was available near the site at a spring fed pond which had a historic fence that was in disrepair and no longer protecting the spring source. The spring source has sustained damage from excessive use by livestock. Cattle were also observed near the site.



Figure 6: NB-02 Cage Plot (Grasses in cage appeared to have 2-3 times more production).



Figure 7: NB-02 Ground Cover (Note limited growth of perennial grass).



**Figure 8: NB-02 Landscape Photo.**

**NB03:** Production at this site was greatly reduced. Vegetative growth was extremely limited with signs of drought stress present including reduced seed head development, induced senescence and plant death. Species Present at this site included: Rabbit Brush, Sagebrush, Shadscale, sandbergs bluegrass, bottlebrush squirelltail, Phlox, and globemallow. Utilization was unable to be determined on this site due to the severely limited growth of the key plant species.



Figure 9: NB-03 Ground Cover (Permanent wilting point was noted in most grasses).



Figure 10: NB-03 Landscape (Little plant growth in the interspace and large amounts of bare ground).



**Figure 11: NB-03 Ground Cover (Note plant mortality).**

**NB04:** Production at this site was slightly reduced with some induced senescence and reduced seed head development noted. Little to no residual vegetation remained from last year's growth with limited regrowth occurring this year. This year's growth showed no significant utilization. Signs of soil erosion were noted on the site including significant pedestalling of plants. Limited ground cover has led to increased susceptibility to soil erosion occurring on this site. Distance from water may be a contributing factor to the lack of utilization in this area. Species Present included Indian ricegrass, bottlebrush squirelltail, Wyoming sagebrush, shadscale, budsage, sandbergs bluegrass, Astragalus, Lupine, bur buttercup, Phlox, globemallow, fourwing saltbush and cheatgrass.



Figure 12: NB-04 Ground Cover (Production slightly reduced with little to no litter or ground cover present).



Figure 13: NB-04 Ground Cover (Pedestalling is apparent throughout site).



**Figure 14: NB-04 Ground Cover.**

**NB-06-05:** Utilization was measured as light on this site. Vegetative production at this site was significantly reduced with signs of drought stress present including reduced vigor and induced senescence. Cattle were observed near the site and riparian areas nearby had reached drought triggers (see Foothills Riparian section). High abundance of species were present at this site. Species present include Indian ricegrass, bottlebrush squirelltail, sandbergs bluegrass, shadscale, Wyoming big sagebrush, allium, lupine, astragalus, bur buttercup, fourwing saltbush and cheatgrass.



Figure 15: NB-06-05 Ground Cover (Note limited growth, vigor and induced senescence).



Figure 16: NB-06-05 Groundcover.



**Figure 17: NB-06-05 Landscape (note limited growth and amount of bare ground in the interspaces).**

**Foothills (Riparian)**

The riparian area located at UTM 11T 0494941 4500012 was monitored. Stubble height was measured, with the average stubble height being 3.8 inches. A significant amount of bank trampling was observed with many parts of this riparian area being devoid of any vegetation. Tamarisk has invaded this site as well. An old dysfunctional development was present on the site with materials including piping and an improvised water tank with materials in and around the spring.



**Figure 18: UTM 11T 0494941E 4500012N Stream bank void of vegetation taken in North Buffalo allotment.**



**Figure 19: UTM 11T 0494941E 4500012N Heavily trampled spring near monitoring site NB06-05.**



**Figure 20: UTM 11T 0494941E 4500012N overview of riparian area near monitoring site NB06-05.**

**Additional Photos of conditions in the North Buffalo Allotment**



**Figure 21: Riparian area along North Fork Trout Creek near 489461E 4501024N NAD83 taken on 5/13/13.**



**Figure 22: Riparian area along North Fork Trout Creek near 489461E 4501024N NAD83 taken on 5/13/13.**



**Figure 23: Location where cattle were loafing by the water. Loss of riparian vegetation species, and encroachment of upland species is apparent (near 489461E 4501024N NAD83) taken on 5/13/13.**

Figures 24 and 25: Nearly 100% channel alteration from livestock trampling. Most channels can maintain stable dimension, pattern, and profile with 10-20% stream bank alteration. This entire channel is altered (nearly 100%) and is not functioning properly. Notice the wild iris. This is the stream segment next to where ~30 cattle were congregating (along North Fork Trout Creek near 489461E 4501024N).



**Figure 24: The stream channel has been entirely altered and unstabilized. Water quality has been severely compromised. Photo taken on 5/13/13.**



**Figure 25: Evidence of stream bank trampling by cattle on 5/13/13.**



**Figure 26: Livestock trampling is widening and incising the channel, draining the saturated soils surrounding the area. Hummocking is creating preferred flow paths that exacerbate the draining of the meadows. This is leading to a loss of riparian habitat and encroachment of upland plants. Notice the sagebrush on stream banks. Soil compaction from cattle loafing has likely decreased natural infiltration rates, leading to a potential reduction in base flows (along North Fork Trout Creek near 489461E 4501024N). Photo taken on 5/13/13.**



**Figure 27: Nearly 100% channel alteration, severe soil compaction, and removal of riparian plants (along North Fork Trout Creek near 489461E 4501024N). Photo taken on 5/13/13.**

## **Copper Canyon Allotment**

### **DROUGHT MONITORING OVERVIEW:**

The Copper Canyon Allotment is currently in the severe drought category according to the US Drought Monitor as of May 14th 2013. The VegDRI report on May 6<sup>th</sup> 2013 shows that the Mountain Use Area is in the Pre-Drought to Moderate Drought Categories were the flats around the Mountain Use Area are mostly classified as being in the severe drought category. As a whole the allotment can be described as being dry with limited vegetative growth. Drought impacts are most apparent throughout the valley and foothill portions of the allotment. The higher elevation sites visited were in better condition but still had less than normal production and vigor for what should be expected at these sites. Two consecutive years of drought is impacting the health and production of forb, grass and shrub species. In areas that are suffering from the most severe drought stress, MLFO staff have observed that even the most resilient plant species (shadscale, rabbitbrush, sage brush etc.) show highly reduced growth, little to no seed head production, loss of vigor and even plant mortality. The areas experiencing severe drought conditions will not likely be capable of recovering this growing season even with abundant late season precipitation. The vegetation will not be capable of recovery this season due to the lack of plant available moisture which has resulted in induced senescence. Other plants observed have surpassed their permanent wilting point due to severe water stress which limits a plants ability to resume growing.

### **WILDLIFE:**

Due to the overall lack of plant production, the wildlife habitat in valley bottoms of the Copper Canyon is considered to be poor. More specifically, the drought has resulted in the reduced quantity and quality of forbs and grasses available to insectivores (e.g., several bird species and lizards) and herbivores (e.g., rodents, lagomorphs and ungulates). For insectivores, the lack of forb production is particularly detrimental because they often forage on insects that develop in response to flower production to complete their life cycle. For herbivores, low forage availability during the spring typically results in low reproductive success. The only forage available for herbivores is salt desert shrubs (e.g., Shadscale and budsage) and scattered inclusions of sagebrush. However, the value of these species to herbivores is low, particularly during spring and summer, because they have relatively poor nutritional value and they contain high concentrations of secondary metabolites that can interfere with herbivore digestion, growth, and reproduction.

The upland sites in the higher elevations within the Copper Canyon Allotment exhibited far more production (forbs and grasses) and provide higher quality habitat than the valley bottoms within the allotment. There was more production in the upper elevations however, evidence of drought conditions was still apparent with production being below average. The upland vegetation was beginning to exhibit signs of drought stress which is reducing the quality of forage available for wildlife. Furthermore, some areas were completely void of perennial grasses and forbs between shrubs, while other areas exhibited some forb production but lacked a sufficient grass component.

In regards to sage-grouse, the current upland conditions are a concern. More specifically, the lack of grasses are a concern for the nesting success of sage-grouse, as Sveum et al. (1998) observed higher

nesting success for nests placed in sagebrush steppe habitat with grasses taller than 18 cm (7.1 in), as the taller grasses resulted in decreased nest predation. Also, an abundance of forbs (greater or equal to 15%) and insects characterize ideal early brood-rearing habitat (Connelly et al. 2000). Though some sites within the upper elevations of the Copper Canyon Allotment did exhibit near normal forb production, cumulatively, the upper elevations did not provide even adequate early brood-rearing habitat.

The riparian areas in the Copper Canyon Allotment are currently functioning as poor habitat for wildlife. The vegetation within these wet meadows illustrated both current and historic heavy livestock use, as the average stubble height was below two inches, sedges and rushes were uncommon, and the predominant vegetation at the majority of the sites was wild iris. Also, historic and current trampling by livestock within riparian areas is impacting the overall quality and quantity of water and native riparian vegetation (used for both hiding cover and forage) available to wildlife.

Overall riparian conditions are a concern. The current conditions of these areas are not considered to provide an adequate amount of forage and cover for sage-grouse. Hens with broods relocate to upper wet meadows and riparian areas with abundant grasses and forbs that are near sagebrush as the summer progresses (Connelly et al. 2000). The stubble height in the wet meadows located within the North Buffalo Allotment will not provide sage-grouse broods with suitable protective cover.

#### **Literature Cited:**

Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. 2000. Guidelines to manage sage grouse populations and their habitats. *Wildlife Society Bulletin* 28:967-985.

Sveum, C.M., J.A. Crawford, and W.D. Edge. 1998. Nesting Habitat Selection by Sage Grouse in South-Central Washington. *Journal of Range Management* 51:265-269.

#### **Riparian:**

Riparian sites in the Mountain Use Area of the Copper Canyon and North Buffalo Allotments were visited on 5/13/2013 to assess their condition. In general, riparian areas were severely degraded as result of overuse by livestock and trampling. Key riparian species were grazed to less than 2" everywhere they were measured, weeds were replacing soil stabilizing riparian species, and streambanks were altered by livestock enough to change the channel morphology, both directly and indirectly. Over 100 livestock were observed during the field visit and most were congregating on riparian areas.

Stubble height was measured at 3 designated monitoring areas (DMA) and 2 representative meadows. The drought EA requires that a 4 inch stubble height for key riparian species be maintained. This was exceeded at all sites. Current and historical disturbance to riparian areas has led to a significant reduction (~20-40%) in native riparian plants, which are being replaced by weeds and colonizing species that are incapable of stabilizing soil, leading to a rapid transition in plant communities and destabilized streambanks.

The observed change toward a degraded ecological state is being exacerbated by the drought. Surface water levels and soil moisture were low, especially for May. Growth of riparian vegetation appeared stunted and most areas that were over-utilized last year showed little sign of repair. Plant species that did re-inhabit the severely degraded sites were nearly always weeds, decreasing the stability and productivity of the sites for all uses. Drought stress is expected to be severe in the coming months. Over-grazing and weed infestation was ubiquitous in the riparian areas. The mix of native vegetation is at risk. Riparian areas need to be rested to preserve their natural integrity and function.

**Mountain Use Area (Riparian)**

<b>Stubble Height Measurements</b>					
	<b>MIM1</b>	<b>MIM2</b>	<b>MIM3</b>	<b>Meadow 1</b>	<b>Meadow 2</b>
<b>Key Species</b>	Rush	Rush	Sedge	Rush	Sedge
<b>Avg Stubble Height (in)</b>	2	1.75	1.5	1	1.5

Table1: Average stubble heights in riparian areas

**Willow Creek (MIM site 1): (BM 1)**



**Figure 28: Utilization cage at MIM site 1 (BM1). Height of un-grazed vegetation inside the cage was ~14 inches. Outside the cage, average stubble height was 2 inches. Photo taken on 5/13/13.**



**Figure 29: Excessive livestock trampling is destabilizing the bank next to a seep and causing saturated soils to drain, leading to a change in vegetation composition. Photo taken on 5/13/13.**



**Figure 29: Streamside loafing has impacted the diversity and composition of the riparian obligate community virtually eliminating the sedge and rush component. Area is being re-colonized by invasive annual grasses and non-native dandelions. Photo taken on 5/13/13.**

**Trout Creek (MIM Site 2):** MIM site 2 (BM 2). Like many heavily grazed riparian areas in the allotment, dandelion is re-occupying the disturbed soils and replacing the stabilizers. This is common in heavily grazed sites (Popolizio 1990). Dense clusters of Iris are also encroaching into the soils disturbed by livestock, replacing the desirable native sedge and rush species.



**Figure 30: Dry conditions of the streambank and lack of vegetation for streambank stability. Photo taken on 5/13/13.**



**Figure 32: Widening streambanks. Average stubble is less than 2 inches. Site needs to be rested for recovery. Photo taken on 5/13/13.**



**Figure 31: Upland vegetation (sagebrush) is encroaching on riparian area, which is likely the result of livestock trailing.**

**Cottonwood Creek (MIM Site 3): MIM site 3 (BM3).** Average stubble height was 1.5". Creek was already dry. A large infestation of Bur Buttercup in last years' disturbance was observed, which is known to be highly toxic and has been linked to sheep mortality. Native sedges and rushes must be allowed to re-establish to prevent dangerous infestations, as well as, to stabilize the channel banks.



**Figure 32: A large infestation of Bur Buttercup in last years' disturbance was observed, which is known to be highly toxic and has been linked to sheep mortality. Native sedges and rush must be allowed to re-establish to prevent dangerous infestations, as well as, to stabilize the channel banks. Photo taken on 5/13/13.**



**Figure 33: Iris infestations in the overgrazed soils. Iris utilizes much of the dissolved nutrients used by the native vegetation, is not consumed by wildlife/livestock, and is a poor stabilizer. Photo taken on 5/13/13.**

**Reference Meadow Area 1 (below Willow Ponds; 486109E 4489146N NAD83):** Heavily grazed and exhibiting signs of changing soil moisture. Average stubble height was 1 inch. Notice the sagebrush by the ruler. Dandelion is occupying disturbed soil.



**Figure 34: Seedling sagebrush encroaching on the meadow. Photo taken on 5/13/13.**



**Figure 35: Meadow displaying heavy cattle use and less the 1" stubble height. Photo taken on 5/13/13.**

**Reference Meadow Area 2: (485421E 4495955N NAD83)** The meadow was heavily grazed, the soil moisture gradient is changing, and soil compaction is likely a problem. Average stubble height is 1.5 inches. Bur buttercup observed in disturbed areas.



**Figure 36: Note the heavy use in the meadow and the pit at the far end of the meadow that has been pawed out by cattle. Photo taken on 5/13/13.**

**Mountain Use Area (Upland):**

**CC-06-02:** Production at this site was about normal compared to an average year. Plants displayed good vigor and no signs of drought stress were observed.



**Figure 39: CC-06-02 General view facing up slope taken on 5/13/13.**



**Figure 37: CC-06-02 General View facing down slope showing some open ground cover. Photo taken on 5/13/13.**

**CC-07-06:** This is a mountain shrub site and has a good variety of shrubs and forbs with limited grass species present. Cattle were observed near the sight on 5/1/2013. Species present are flat onion, mountain big sagebrush, lupine, astragalus, antelope bitterbrush, lomatium, arrowleaf balsamroot, tapertip hawksbeard, bur buttercup, and wax currant.



Figure 38: CC-07-06 ground cover (only two grasses in photo found at site unable to identify due the lack current year's growth and residual matter). Photo taken on 5/13/13.



Figure 39: CC-07-0 Landscape picture taken on 5/13/13.

**Foothills (Upland)**

**CC-02:** Location had slightly limited growth and reduced seed head development. The riparian area adjacent to the site had limited water available. Cattle were observed in the riparian area near the monitoring site. Perennial species were limited in the understory which is dominated by cheatgrass. Very few perennial grass species were observed compared to what is expected for the site.



**Figure 40: CC-02 Lack of Ground Cover.**

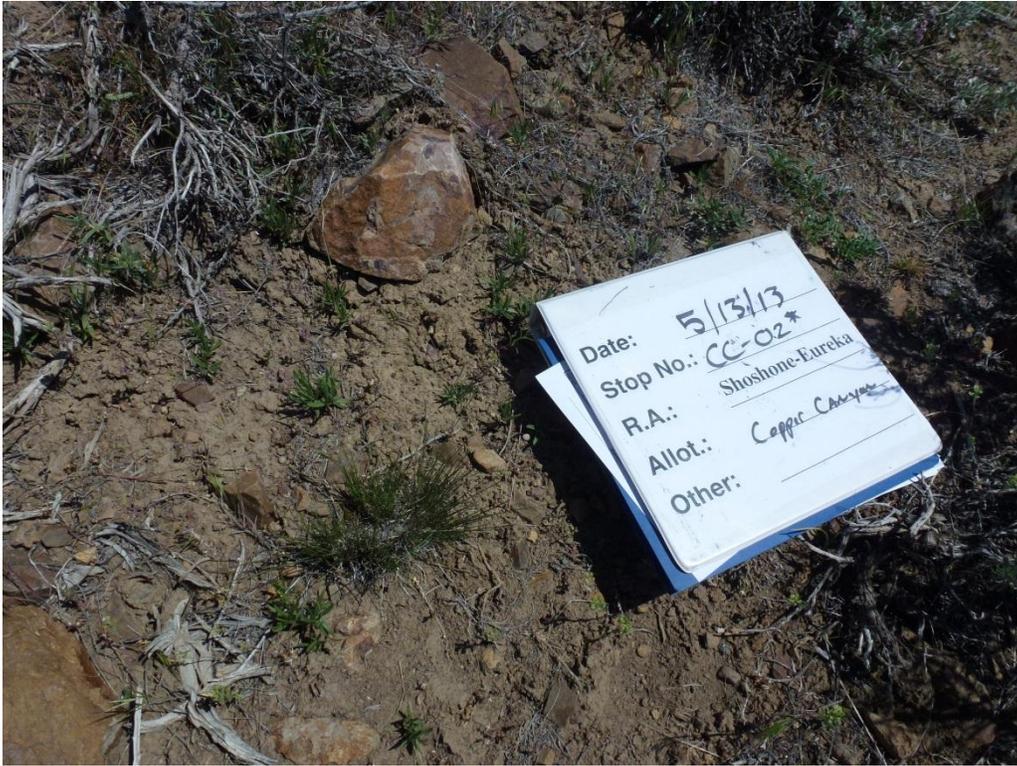


Figure 41: CC-02 Lack of Ground Cover.



Figure 42: CC-02 Landscape (note the amount of cheatgrass compared to perennial grasses).

**Valley Bottom (Upland)**

**CC-04:** Site shows no growth this year as well as plant death for many perennial plants at location. No grazing had occurred on the site due to lack of and available feed. Species Present are Annual Mustard, Shadscale, Burr Buttercup and Bud Sage.



**Figure 43: CC-04 Ground Cover (note shrub mortality).**



**Figure 44: CC-04 Landscape (Shrub die out and lack plant growth).**



**Figure 45: CC-04 Utilization Cage.**

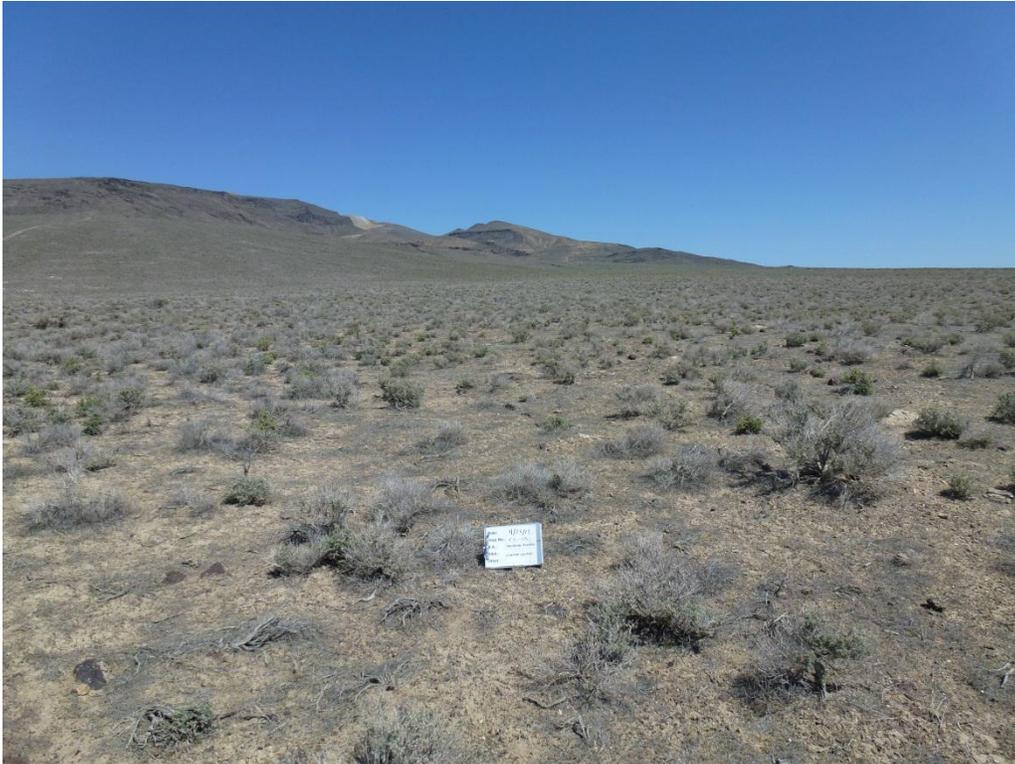
**CC-05:** Little to no growth of perennial grasses has occurred at this site this year. Signs of drought stress are apparent including death of shrub and grass plants. Species present are shadscale, budsage, sandbergs bluegrass, annual mustard, bur buttercup and halogeton.



**Figure 49: CC-05 Ground Cover (note poor shrub vigor and severely reduced growth).**



**Figure 46: CC-05 Utilization Cage.**



**Figure 47: CC-05 Landscape (Little to no current year's growth was observed at this site).**

**CC-06-01:** Little to no forage production was observed at this site with the exception of a few perennial understory plants located within and under individual shrub plants. Extensive plant mortality was observed for both woody and herbaceous species. Many of the shrub species in this site were already beginning to show signs of drought stress. No sign of livestock use was observed most likely due to the lack of forage available. Water is available within a mile of this site with no physical barriers that would restrict livestock access to this area.



Figure 48: CC-06-01 Groundcover (Limited Shrub Cover and Lack of Growth).



Figure 49: CC-06-01 Landscape.

## Additional Photos of the Copper Canyon Allotment



Figure 50: 486259E 4491042N NAD83: Upland site near Willow Creek. Photo taken on 5/13/13.



Figure 51: Upland site at 485928E 4496178N NAD83. Photo taken on 5/13/13.



**Figure 52: Wet meadow near 485340E 4495621N NAD83. Photo taken on 5/13/13.**



**Figure 53: Wet meadow along Trout Creek near 488774E 4498635N NAD83. Photo taken on 5/13/13  
(The tall green vegetation in the photo is wild iris, an undesirable and unpalatable species that typically invades as riparian conditions decline).**



**Figure 54: Riparian area along Trout Creek near 488625E 4498770 N NAD83. Photo taken on 5/13/13.**



**Figure 59: Trampled and hummocked riparian area near 488625E 4498770 N NAD83.  
Photo taken on 5/13/13.**

### **Appendix B – Greater Sage-grouse Summary for the Battle Mountains**

The Battle Mountain Complex, which includes both the Copper Canyon and North Buffalo allotments, are known to provide key habitat for sage-grouse. More specifically, the Battle Mountains are classified as being Preliminary Priority Habitat (PPH) and Preliminary General Habitat (PGH) for sage-grouse through the Nevada Department of Wildlife (NDOW) habitat categorization mapping effort, with the majority of the habitat being classified as PPH. Also, telemetry data has indicated that the sage-grouse within the Battle Mountains are non-migratory. In other words, greater sage-grouse lek, nest, raise broods, and winter in the upper elevations of the Battle Mountains (Figure 1).



### Greater Sage-grouse Habitat and Use in the Battle Mountains

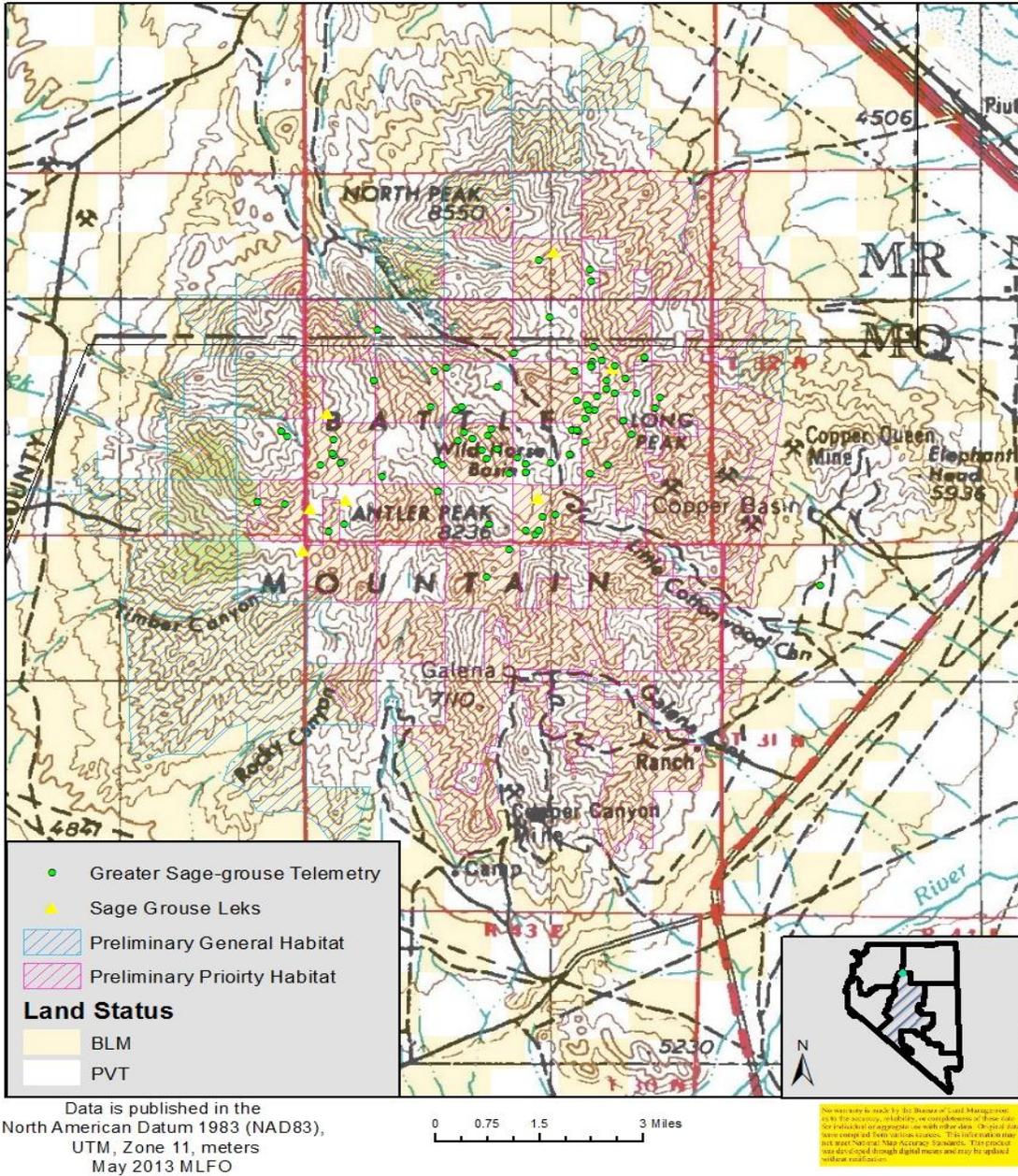


Figure 1: Illustration of Preliminary Priority Habitat and Preliminary General Habitat, leks, and telemetry data for greater sage-grouse in the Battle Mountains.

## Appendix C



**A photo showing the root growth of bunchgrass plants that were kept clipped at certain levels simulating heavy, moderate, light and no utilization. This represents the impacts of overgrazing on plant health. These impacts are known to accelerate when overuse occurs during drought.**