WYOMING WILDLIFE
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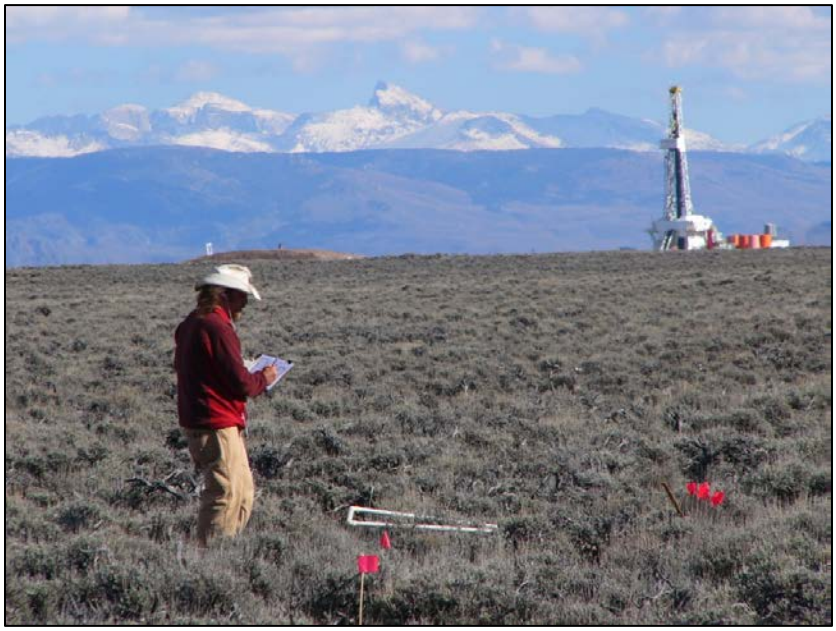
Final Report for
MESA FERTILIZATION DATA COLLECTION
WGFD SERVICE CONTRACT NO. 07SC0403657



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15 FEBRUARY 2015

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1. PROJECT DESCRIPTION

1.1 EXECUTIVE SUMMARY

Range managers have conducted extensive studies into the value of fertilizer as a tool for increasing the quality and quantity of forage produced for livestock. Within the last several decades, there has been stronger emphasis placed on rangeland quality in determining the welfare of wildlife (e.g., mule deer) in Wyoming big sagebrush ecosystems. Winter range on the Pinedale Anticline Project Area is critical for the survival of mule deer. In 2010, the Pinedale Anticline Project Office (PAPO) initiated fertilization treatments on the Mesa mule deer winter range south of Pinedale, Wyoming. The goal of these projects was to enhance winter habitat for mule deer to mitigate declines in populations. Rigorous assessments of these mitigation experiments are especially critical to inform future mitigation projects within the PAPO and other sites in the sagebrush steppe.

This report outlines field and analytical methods of an assessment of the effects of fertilization on mule deer winter range quality. We collected vegetative information from the 2012 and 2013 growing seasons, and utilization during the 2012 – 2013 and 2013 – 2014 winters. Randomly located 0.4 ha blocks were used to sample 3 treatment and 2 control sites. Within each block, line point intercepts methods were used along five 50-m transects to evaluate plant community attributes. Shrub and herbaceous productivity and nutritionally quality were additionally assessed. We compared 95% confidence intervals across treatments and between years to assess the response of vegetation to fertilization.

Comparing the vegetative conditions using common, standardized field techniques in the fertilized areas to the conditions in control areas suggested that fertilization did not influence the vegetation. At a finer scale, the comparison of nutrient value between fertilized and control areas suggested a response to fertilization. In general, fertilized plots had consistently higher biomass across sagebrush, grasses and forbs. However, the nutrient and forage value of the vegetation in fertilized plots was consistently lower than control plots. The results suggest that fertilization of sagebrush-dominated habitats on the Mesa may result in increased biomass for wintering mule deer, but that winter range quality in terms of the nutritive value of the vegetation is not enhanced – and may actually be diminished – through fertilization.

1.2 Project Background and Objectives

Mule deer nutritional requirements change considerably from a fattening diet in early fall to a maintenance diet from late fall through early spring. Throughout this period shrubs provide the majority of required nutrients. Not only are nutrient levels low during this season, lignification of the plant cell wall throughout this period depresses digestibility by deer rumen microorganisms. Within the last several decades, there has been stronger emphasis placed on rangeland quality in determining the welfare of wildlife (e.g., mule deer) in Wyoming big sagebrush ecosystems. Relatively recent investigations have shown increases in total forage production and hence total

protein production following fertilization (Pierce et al. 1998; Sneva et al. 1983) in sagebrush ecosystems.
Miller et al. (1991) found that the addition of nitrogen (NO_3^- or NH_4^+) to a Wyoming big sagebrush site in Oregon resulted in increased aboveground biomass, total shoot density and individual shoot weight in sagebrush. In Canada, Barrett (1979) reported that protein content of silver sagebrush on plots fertilized with nitrogen (N) or N and phosphorous (P) increased initially, but by late summer nutritional content was essentially similar in fertilized and control areas for at least the first 3 years post-application. In contrast, Carpenter and West (1987) reported that mountain big sagebrush in Wyoming did not respond in terms of aboveground biomass and relative growth rate with the addition of ammonium nitrate fertilizer.

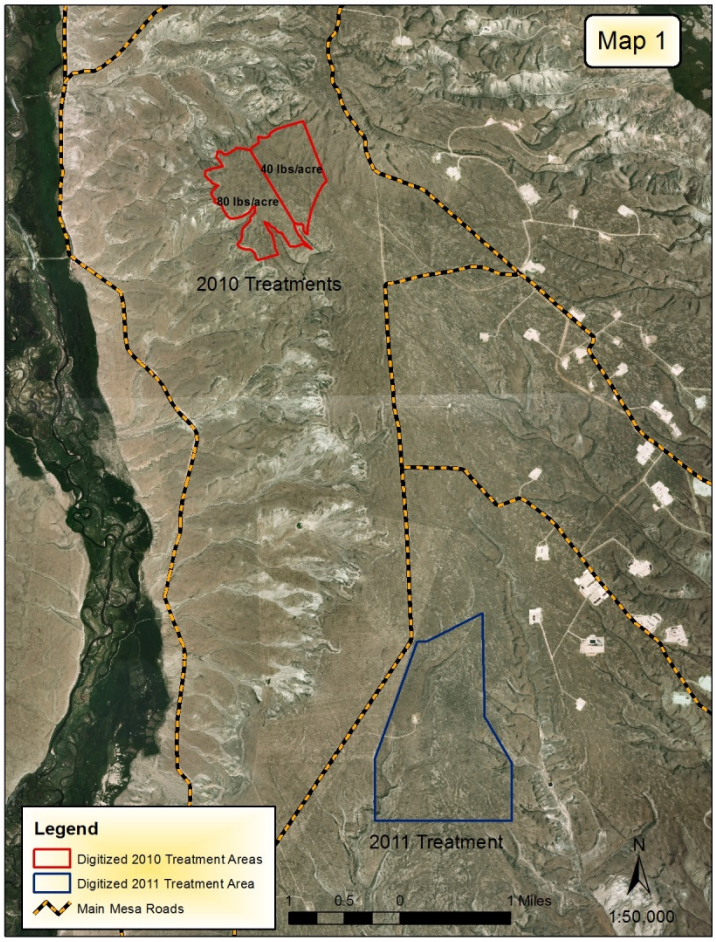
Ecosystems subject to pronounced fluctuation in resource supply (e.g. NO_3^- and NH_4^+) may be more susceptible to annual grass invasion than systems with a more stable resource supply (Rejmanek 1989; McLendon and Redente 1991; Suding et al. 2004; Vasquez et al. 2008; Brooks and Chambers 2011). Increased N availability may directly change competitive dynamics for N or it may create a situation where another resource (e.g., phosphorus, water) becomes more limiting. Both processes can shift competitive dynamics in favor of invasive annual grasses (e.g., cheatgrass).

In 2010, the Pinedale Anticline Project Office (PAPO) initiated fertilization treatments on the Mesa mule deer winter range south of Pinedale, Wyoming. The goal of these projects was to enhance winter habitat for mule deer. In 2010, nitrogen fertilizer of 40 lb/ac and 80 lb/ac was applied on 2 separate areas (site 1 and site 2) and in 2011, a separate application of 40 lb/ac was applied to 1000 acres (site 3); all applications were conducted along the northwest edge of what is locally known as "The Mesa" (Map 1). Pre-treatment and 1-yr post-treatment monitoring was conducted in 2010 and 2011, but because of lack of sample size (i.e., 1 transect/area), statistical comparisons could not be used to assess effects of treatment on mule deer winter range quality.

The overall objective of this project was to sample the vegetation and plant community attributes to estimate responses of vegetation in local sagebrush communities to fertilization. Measures were focused towards vegetative attributes important for wintering mule deer such that analyses could be used to estimate the effects of fertilization treatments on mule deer winter habitat quality.

1.3 Study Area.
The Mesa Fertilization project was conducted on two sites southwest of Pinedale, Sublette County, Wyoming within Major Land Resource Area 34A-Cool Central Desertic Basins and Plateaus from 2010-2011 (Map 1). The dominant native vegetation is *Artemisia tridentate wyomingensis* (Wyoming big sagebrush). Common herbaceous species include *Pseudoroegneria spicata* (bluebunch wheatgrass), *Hesperostipa comata* (needle and thread), *Achnatherum hymenoides* (Indian ricegrass), *Elymus lanceolatus lanceolatus* (thickspike wheatgrass), *Poa secunda* (Sandberg's bluegrass), *Elymus elymoides* (squirreltail), *Astragalus spp*. (milkvetches), *Achillea millefolium* (common yarrow), *Castilleja linariifolia* (Indian paintbrush), *Phlox hoodii* (spiny

phlox), *Stenotus acaulis* (stemless mock goldenweed) and *Antennaria rosea* (rosy pussytoes). *Bromus tectorum* (cheatgrass) may also be present in varying amounts on portions of the study area. Annual precipitation ranges from 10-14 inches per year. Wide fluctuations may occur in yearly precipitation and result in more dry years than those with more normal precipitation (USDA-NRCS). Elevation of the study sites ranges between 1980-m and 2280-m above sea level. The predominate ecological site for each of the treatments is a "Loamy 10-14 ppt" Foothills and Basins West (Site ID: RO34AY222WY). Common soil series is Jemdilon: fine-loamy, mixed, superactive, frigid petronodic ustic calciargids. Soils are deep to moderately deep (greater than 20" to bedrock), and well-drained. Textures range from loams to very fine sandy loam. Parent material is alluvium and residuum from sedimentary rock (USDA-NRCS).



Map 1. The Pinedale Anticline Project Office (PAPO) Mesa fertilization treatment sites in mule deer winter range south of Pinedale, Wyoming. Fertilization treatments were implemented in 2010 and 2011.

2.0 Field Methods

The collection of field data spanned two field seasons. The fall time-frame was chosen as most representative of vegetative conditions going in to winter with forage available to mule deer. Fall is the last time period of time when vegetation sampling is possible due to snow cover. Further, an estimation of biomass was a component of the sampling stated in the RFQ, which required sample

collection prior to snow accumulation. Measurements of vegetative characteristics and collection of samples of forage for nutrient analysis for the 2012 effort was initiated 26 September and concluded 8 November. The 2013 collection period spanned 17 September to 11 November.

Protocols were the same for both years of collection efforts, with different locations selected each year. We selected 5 representative but randomly located 80 m x 50 m (1 acre) blocks within each of 5 sites, 3 treatment sites and 2 controls, for a total of 20 blocks. The 3 treatment sites consist of 2 rates of nitrogen fertilizer of 40 lb/ac and 80 lb/ac applied in separate but adjoining areas in 2010, and another trial of the same fertilizer at the 40 lb/ac rate initiated in 2011. Locations of blocks are illustrated in Map 2 and Map 3 below—note that in 2012 only 4 of the 5 blocks were sampled. This discrepancy was due to weather constraints. Within each block, five 50-m transects, spaced at 20-m intervals, were deployed along an 80-m baseline transect (see Figure 1). Establishment of five 50-m transects is considered five replications per block, which allows for comparison (variance estimation) within blocks and across blocks within treatments. Vegetation monitoring techniques were adapted from the USDI-BLM Technical references (1999 and 2001), Elzinga et al. (1998), and Herrick et al. (2005).

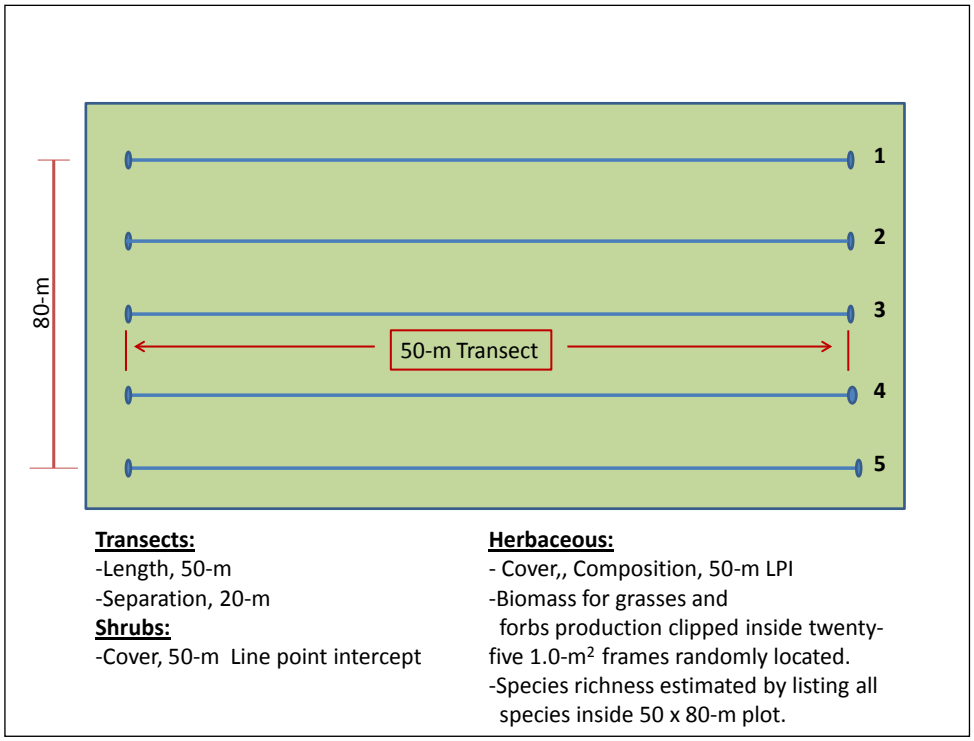


Figure 1. Block (80 x 50 m) design with five 50 m transects.

Control areas were selected by following topography adjacent to treatment areas, avoiding draws and the edge of the Mesa. Sites selected were within the same soil series as mapped by the NRCS. Control plots were a minimum of 100 meters from the edges of treatment to avoid overspray. Control areas were similarly sized in acres to their corresponding treatment. Block locations were randomly selected within the primary ecological site of treatment and control areas. We oriented

transects in the field to avoid micro sites that appeared significantly different from ecological site of the 80-m orientation transect (e.g., areas of taller sagebrush, two-track roads and trails from seismic exploration). The first 50 meter survey transect was laid out and another tape was laid out perpendicular from the center of the first transect. Flags were placed at 20 meter intervals out to 80 meters for a total of 5 transects. We lifted the transect tape upon completing a transect and moved down until centered on the next flag. Cover estimates and vegetation clipping were performed before line intercept to avoid trampling vegetation.

Vegetative parameters measured included:

- Total Grass Cover (%);
- Total Forb Cover (%);
- Bunchgrass Cover (%);
- Rhizomatous Grass Cover (%);
- Annual Forb Cover (%);
- Perennial Forb Cover (%);
- Invasive Annual Grass (%);
- Litter Cover (%);
- Bare Ground (%);
- Sagebrush Canopy Cover (%);
- Other Shrub Canopy Cover (%);
- Sagebrush Height (cm);
- Sagebrush Leader Length (cm).

The line intercept method was used to determine shrub cover on transects. All transects were initiated at 0.0 m on the same side of the plot, and progressed in the same direction towards the 50.0-m meter end point of each transect. For each individual shrub intercepted along transects, shrub species, shrub intercept length, and shrub height were recorded. Shrub length was obtained by recording the start and end values for every shrub intercepted. The distance from 0.0 m at which a shrub was intercepted was recorded, and the last point of the same individual shrub intercepted was recorded; we subtracted to establish length of intercept. Gaps of 5 cm or more established a different measure. Length values were recorded in meters, to the nearest hundredth of a meter (i.e., cm). Canopy cover by transect was estimated by adding the total length of transect intercepted by shrub species, dividing by 5000 (total number of cm measured), and multiplying by 100. Shrub heights were recorded to the nearest cm using a standard meter stick.

Cover of herbaceous species was estimated to the nearest 1% within 1-m^2 quadrates placed along transects. Quadrates were placed at 5-m intervals on the right side of the transect, with the first corner of the first frame placed at 0.0 and extending to 1.0 meters; this resulted in 10 total quadrates being measured per transect. Measures collected included: total grass cover, total forb cover, total bunchgrass cover, total rhizomatous grass cover, total bare ground, and total litter. All cover values were estimated using ocular methods. Field personnel standardized ocular estimation protocol to ensure comparable estimates.

We measured and collected leaders from 10 individual sagebrush plants along each transect; 5 leaders were measured and collected from each plant sampled. We identified individual plants for sampling as the plant nearest the bottom corner – or the corner closest to the 0 end of the transect – on the transect side of each herbaceous quadrat. Leaders collected comprised of the newest growth on the end of 5 randomly selected branches on the sampled plant; newest growth was established were leaf color changes occurred (e.g., leaves became lighter in color towards the end of the branch) and where the stem became more pliable. Leaders were measured to the nearest millimeter and then pinched off by hand and stored in paper bags for subsequent weight and nutrient estimation.

For establishing the nutrient content of herbaceous species and non-sagebrush shrub species (rabbitbrush and winterfat), we clipped vegetation from 0.25-m^2 plots located within the 1-m^2 cover estimation quadrates. Clipping plots were located in the corner of the quadrate closest to the 0 end of the transect. Vegetation was divided into 4 categories for initial collection: rhizomatous grass, bunchgrass, perennial forb and rabbitbrush. Rhizomatous grasses and bunchgrasses were clipped as close to the cotyledon as possible without damaging the plant. Due to extremely dry conditions, plants would often come out of the ground with minimal force. These were clipped off of their roots at the same level as they would have been if they remained in the ground. Grass plants too small or brittle for actual clipping were pinched off by hand while trying to avoid losing too many blades of grass in the often windy conditions. Rhizomatous grasses rooted in the frame and bunchgrasses where more than half of the individual plant was rooted in the frame were collected. Perennial forbs were clipped at dirt level. Again, due to extremely dry conditions leaves were often brittle and fell off easily, so care was taken to work from top down until the plant could be clipped at ground level. If roots did come out with the plant, these were clipped off as close to where dirt level could be discerned by soil and bark on the plant. For short stature plant species such as some of the buckwheats and goldenweed, leaves were pinched off without trying to dig under the plant and clip off at ground level due to high levels of soil within the matrix of the plant. Perennial forbs were collected only if rooted in the frame.

Rabbitbrush samples were collected following a technique between that for herbaceous and sagebrush sampling protocol. Five stems were clipped from a single rabbitbrush plant if one occurred within the 0.25-m2 clip plot; if not in the clip plot, a plant was rooted in the 1-m2 cover quadrate was randomly selected for sampling; if none in the 1-m2 quadrate, but rabbitbrush was recorded during line intercept, then the closest plant to the quadrate was sampled. Rabbitbrush was clipped down to the main stem or stems of the plant while taking care not to lose brittle leaves. Values for rabbitbrush are included in the “other shrub canopy cover” variable in the results.

Vegetation samples were combined by transect, and sent to the Colorado State University Soil, Plant and Water Analysis Laboratory in Fort Collins, Colorado for nutrient analyses through a standard panel of variables targeted for ruminant information.

The laboratory measured the following as percent:

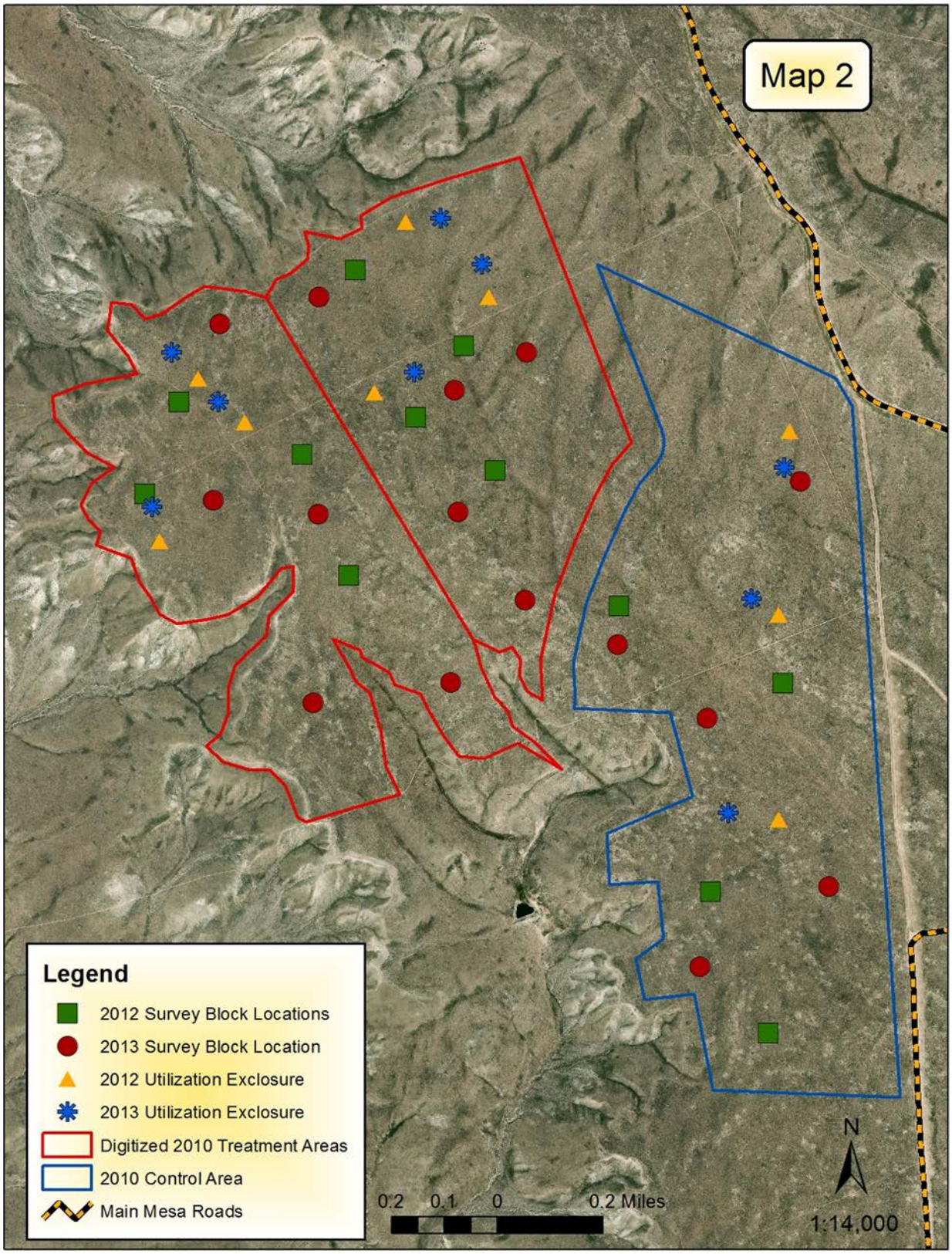
- Moisture;
- Dry Matter;
- Crude Protein;
- Neutral Detergent Fiber;
- Acid Detergent Fiber;
- Total Nitrogen and
- Total Digestible Nutrients.

Analyses in mega-calories per pound were provided for:

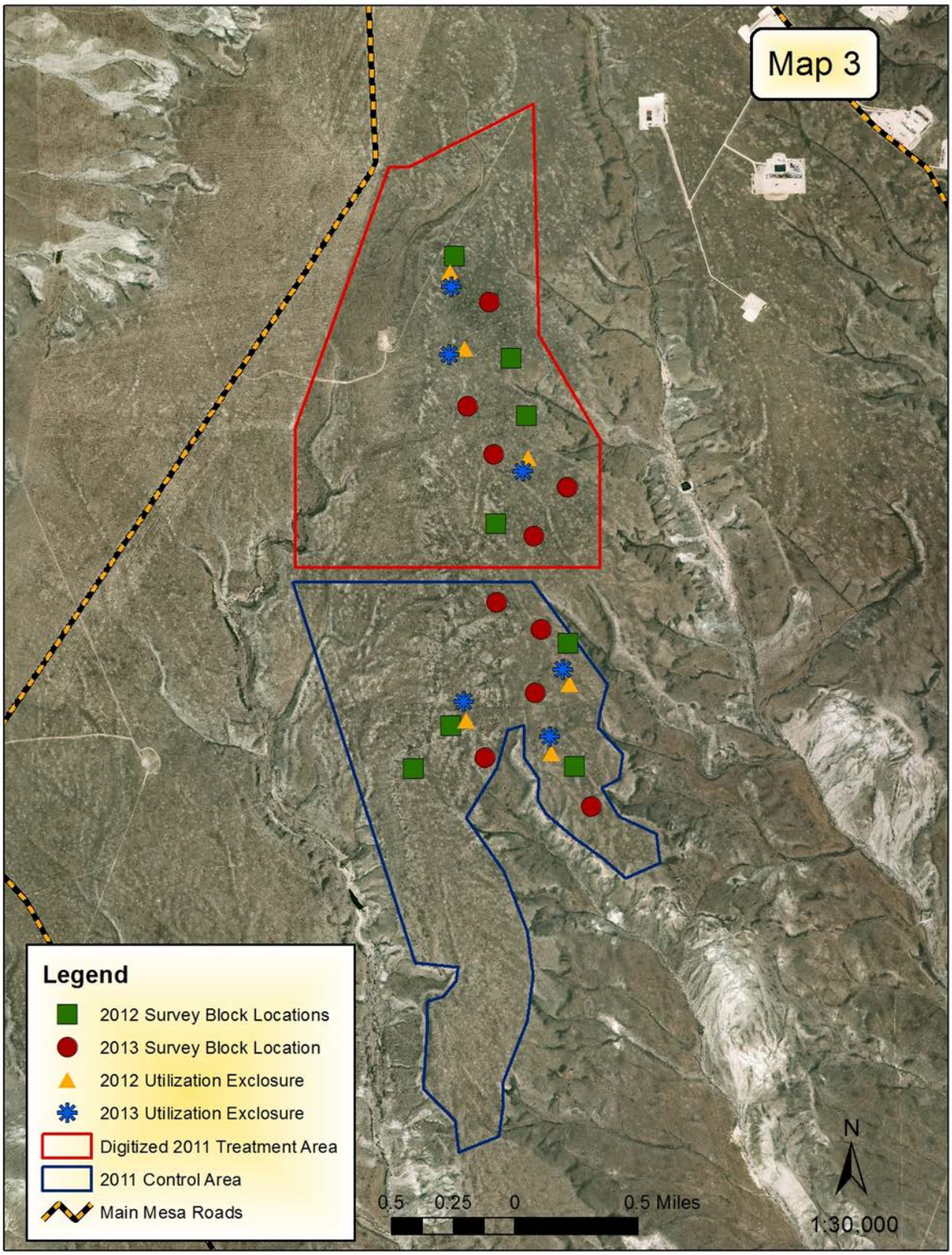
- Digestible Energy;
- Estimated Net Energy;
- Net Energy/Lactation;
- Net Energy/Maintenance;
- Net Energy/Gain; and
- Metabolizable Energy.

Dry Weight of the sample was provided in grams. The lab also provided a Relative Feed Value Index.

To assess vegetation utilization, 15 exclusion cages were erected in random but representative locations throughout treatment and control areas: 9 cages in treatments and 6 in control. Cages were of wire cattle panels 2.4-m square, held in place with a steel post in each corner. We erected cages 16 and 17 November, 2012. Samples of sagebrush and herbaceous vegetation were collected from caged and paired control (e.g., utilized) plots in the spring of 2013 on 6, 7 and 8 May 2013, prior to the growing season. The cages were moved to new locations in the fall on 4, 5 and 6 November 2013. The second round of data collection for utilization measurements occurred 15 and 16 May 2014. All cages and support posts were removed from the study area in October 2014.



Map 2. 2010 treatment site and control area with associated data collection locations in mule deer winter range south of Pinedale, Wyoming.



Map 3. 2011 treatment site and control area with associated data collection locations in mule deer winter range south of Pinedale, Wyoming.

3.0 Results and Conclusions

3.1 Variance Within Blocks

To determine if any transects within blocks exhibited sufficient variation to warrant individual analysis we computed standard deviation values for each transect. All values were within 2 standard deviations of the mean value across all transects (reference Appendix A), suggesting that we could pool values by block.

3.2 Treatment vs. Control Comparison

We compared treatment to control blocks using 95% confidence interval overlap. Confidence intervals were estimated from between block variance. Non-overlapping confidence intervals suggested significant differences at the $p \leq 0.05$ level. We compared 2010 treatments to the 2010 control, and 2011 treatment to the 2011 control across measurement years (i.e., 2012 and 2013 measures combined) as well as by year. These comparisons suggested no consistent differences between treatment and control in terms of the vegetative measures we collected. Values illustrated in the following graphs are provided in Appendix B.

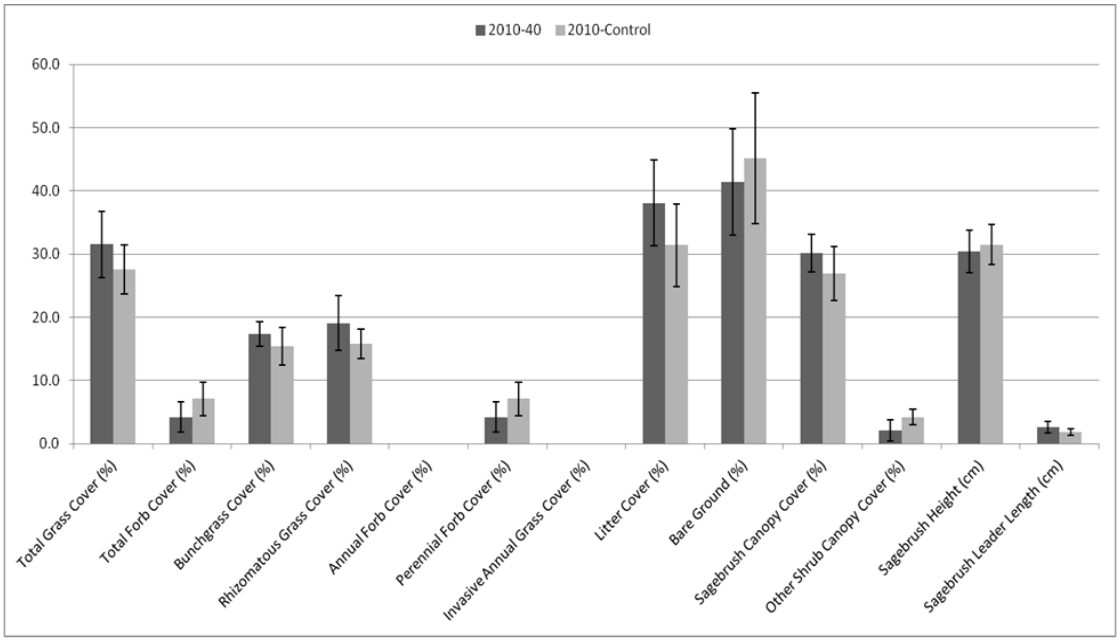


Figure 2. Comparison of vegetation measured in areas fertilized in 2010 at a rate of 40 lb/acre to vegetation measured in the 2010 control (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Error bars represent 95% confidence intervals (95% CI). None of vegetation measured differed significantly between treatment and control as assessed by 95% CI overlap. Reference Appendix B for data values presented in this figure.

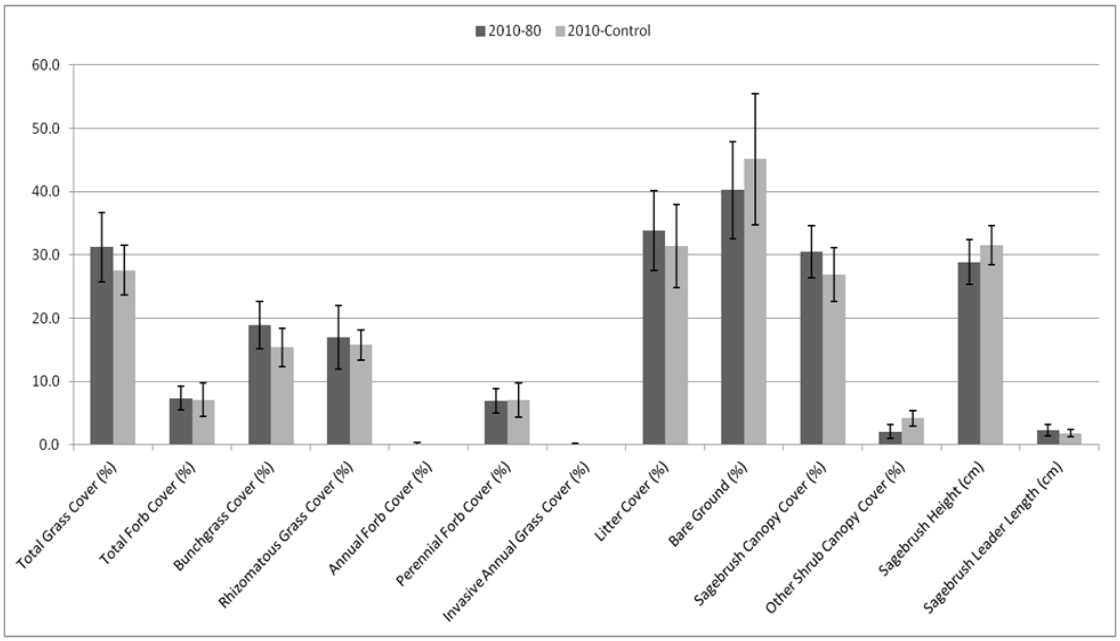


Figure 3. Comparison of vegetation measured in areas fertilized in 2010 at a rate of 80 lb/acre to vegetation measured in the 2010 control (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Error bars represent 95% confidence intervals (95% CI). None of vegetation measured differed significantly between treatment and control as assessed by 95% CI overlap. Reference Appendix B for data values presented in this figure.

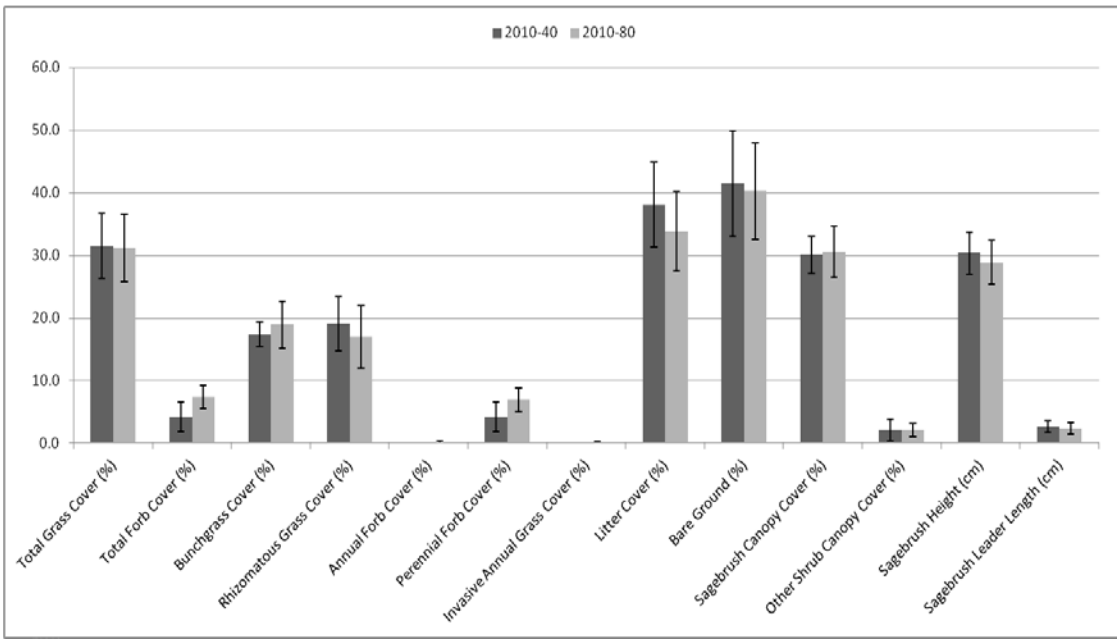


Figure 4. Comparison of vegetation measured in areas fertilized in 2010 at a rate of 40 lb/acre to vegetation measured in 2010 at a rate of 80 lb/acre (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Error bars represent 95% confidence intervals (95% CI). None of vegetation measured differed significantly between treatments as assessed by 95% CI overlap. Reference Appendix B for data values presented in this figure.

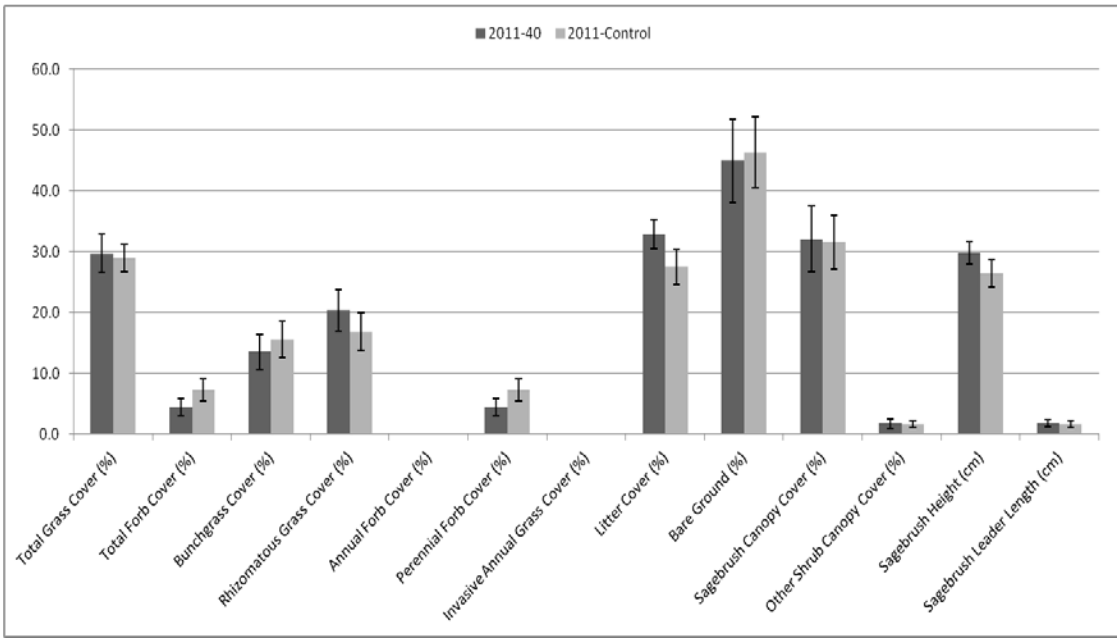


Figure 5. Comparison of vegetation measured in areas fertilized in 2011 at a rate of 40 lb/acre to vegetation measured in the 2011 control (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Error bars represent 95% confidence intervals (95% CI). Litter Cover was the significantly higher in treated habitats compared to control as assessed by 95% CI overlap. Reference Appendix B for data values presented in this figure.

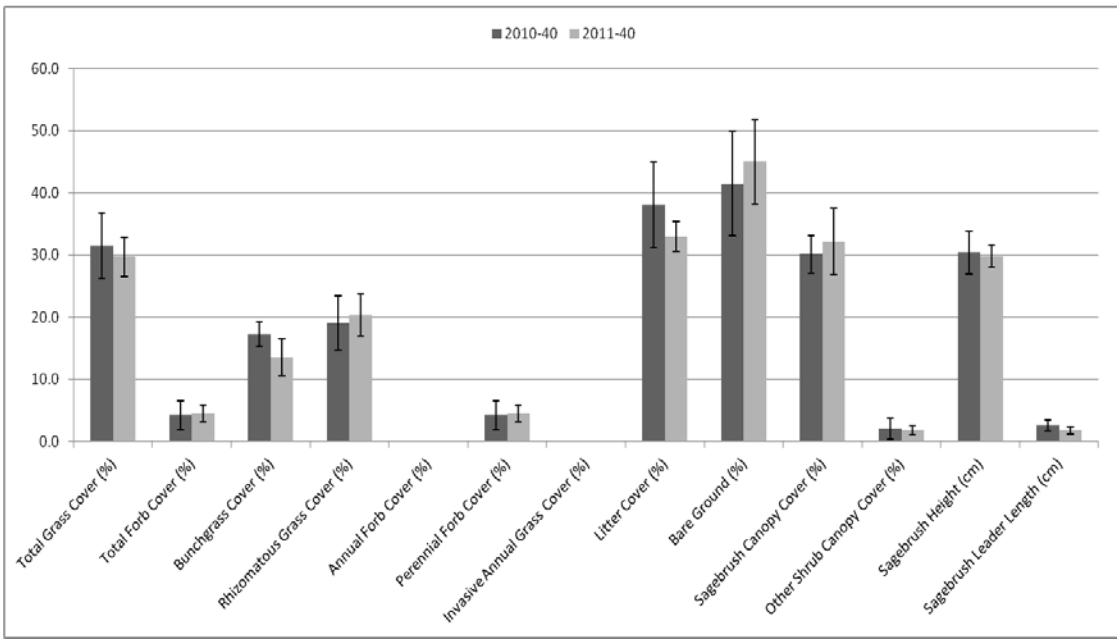


Figure 6. Comparison of vegetation measured in areas fertilized in 2010 at a rate of 40 lb/acre to vegetation measured in areas fertilized in 2011 at a rate of 40 lb/acre (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Error bars represent 95% confidence intervals (95% CI). None of vegetation measured differed significantly between treatments as assessed by 95% CI overlap. Reference Appendix B for data values presented in this figure.

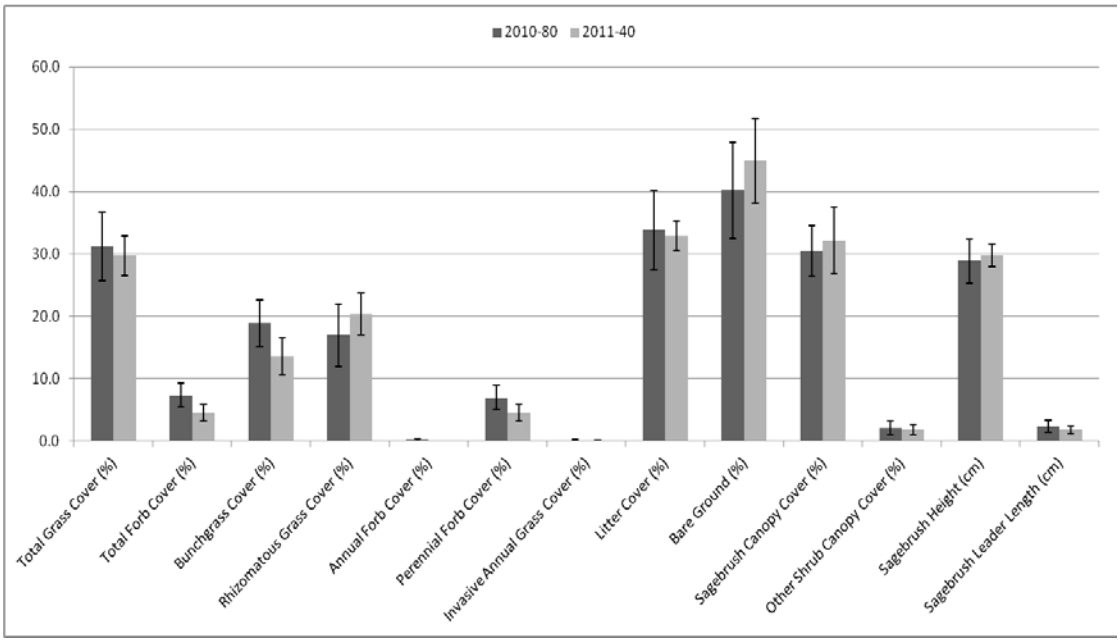


Figure 7. Comparison of vegetation measured in areas fertilized in 2010 at a rate of 80 lb/acre to vegetation measured in areas fertilized in 2011 at a rate of 40 lb/acre (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Error bars represent 95% confidence intervals (95% CI). None of vegetation measured differed significantly between treatments as assessed by 95% CI overlap. Reference Appendix B for data values presented in this figure.

3.3 Annual Comparisons

Comparisons between 2012 measures and 2013 measures separately suggested no significant differences between treatment and control, with patterns in differences similar to those illustrated above. Comparisons of 2 years vs. 3 years post treatment were analyzed with no significant difference found. Values of 2012 measurements and 2013 measurements were pooled to compare against controls. Reference Appendix B for these results

3.4 Nutritional Analyses

In general the results suggest that fertilization resulted in increased biomass across sagebrush, grasses and forbs. Increases included significantly higher weight and fiber values for sagebrush, grasses and forbs in many instances, and similar trends were noted in the non-significant comparisons. But the forage value of the sagebrush, grasses and forbs was significantly lower in energy, digestible nutrients and feed value index in treated compared to control plots, and similar trends were noted in the non-significant comparisons.

No significant differences were noted when comparing the between the two 2010 fertilizer application rates of 40 lb/acre and 80 lb/acre.

These results suggest that although fertilization may result in increased forage available for wintering mule deer, the quality of the available forage in terms of the nutritive value of that forage is not enhanced – and may actually be diminished – through fertilization. Therefore, winter range quality may be negatively influenced by fertilization.

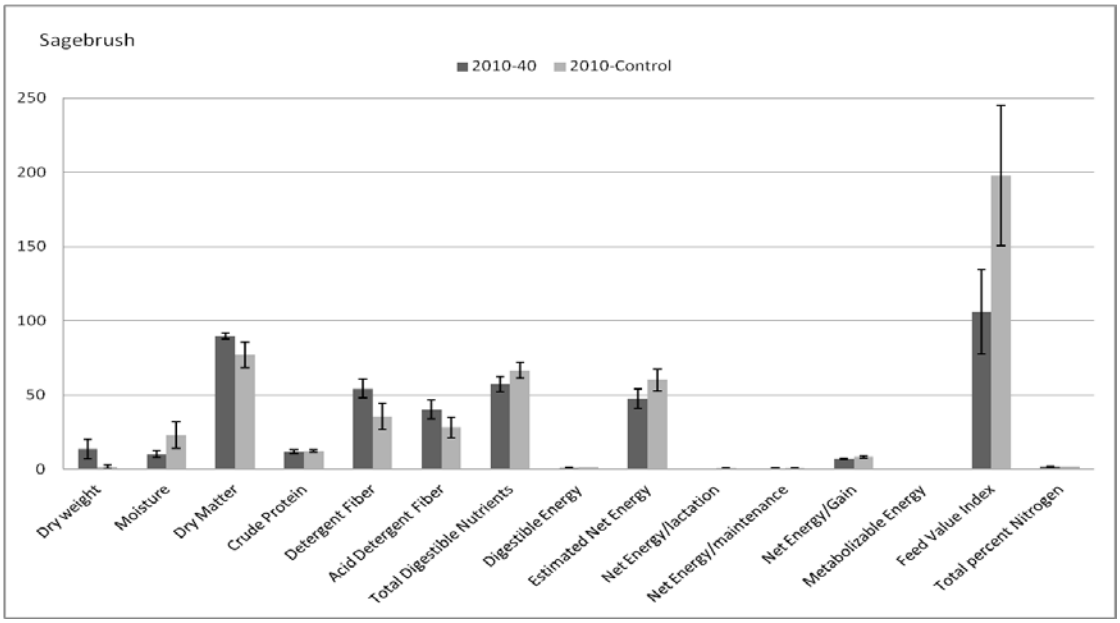


Figure 8. Nutrient values of sagebrush measured in areas fertilized in 2010 at a rate of 40 lb/acre to vegetation measured in the 2010 control (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Error bars represent 95% confidence intervals (95% CI). Measurements of Dry Weight, Dry Matter and Detergent Fiber were significantly higher within the treatment, with Moisture and Feed Value Index significantly higher within the control as assessed by 95% CI overlap. Reference Appendix D for data values presented in this figure.

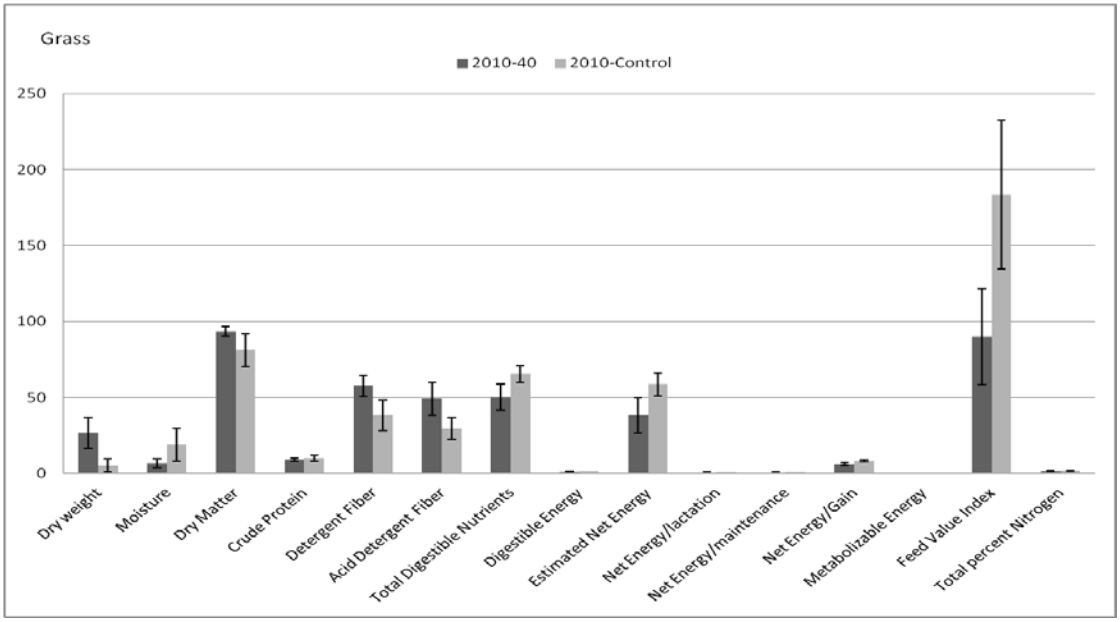


Figure 9. Nutrient values of grass measured in areas fertilized in 2010 at a rate of 40 lb/acre to vegetation measured in the 2010 control (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Error bars represent 95% confidence intervals (95% CI). Measurements of Dry Weight, Detergent Fiber and Acid Detergent Fiber were significantly higher within the treatment, with Digestible Energy, Net Energy/Lactation, Net Energy/Maintenance, Net Energy/Gain, Metabolizable Energy, Estimated Net Energy, Total Digestible Nutrients and Feed Value Index significantly higher within the control as assessed by 95% CI overlap. Reference Appendix D for data values presented in this figure.

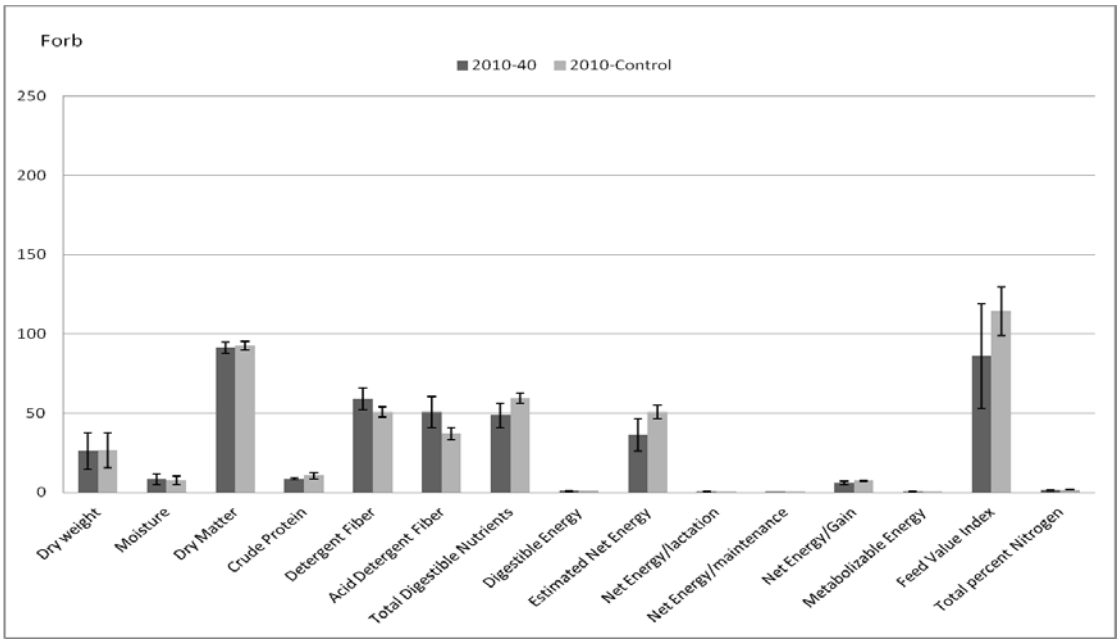


Figure 10. Nutrient values of forbs measured in areas fertilized in 2010 at a rate of 40 lb/acre to vegetation measured in the 2010 control (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Error bars represent 95% confidence intervals (95% CI). None of vegetation measured differed significantly between treatment and control for forbs as assessed by 95% CI overlap. Reference Appendix D for data values presented in this figure.

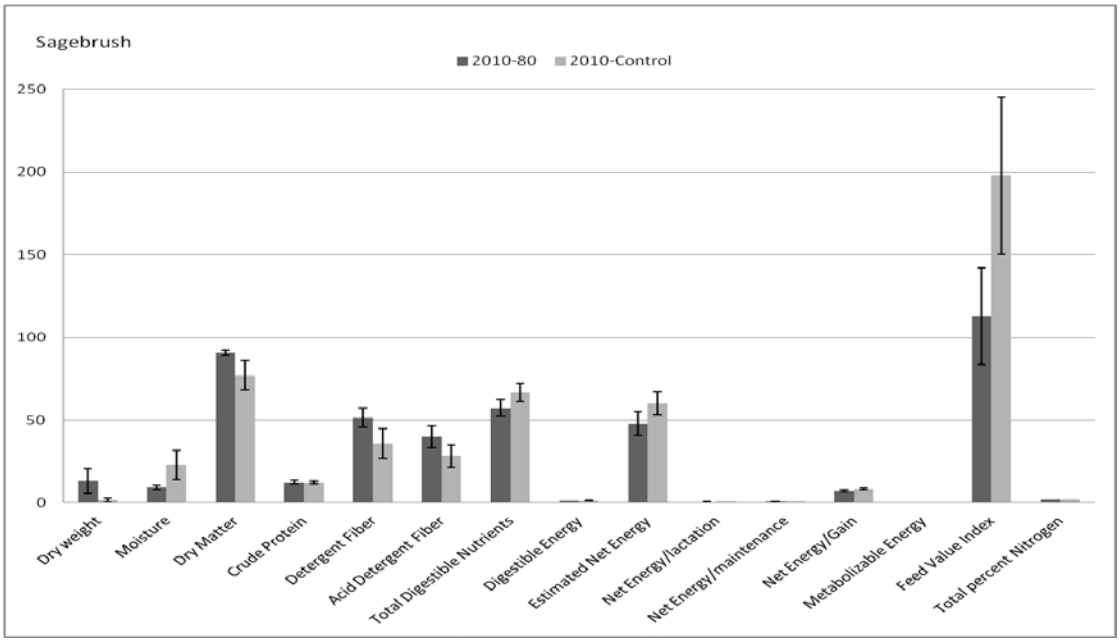


Figure 11. Nutrient values of sagebrush measured in areas fertilized in 2010 at a rate of 80 lb/acre to vegetation measured in the 2010 control (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Error bars represent 95% confidence intervals (95% CI). Measurements of Dry Weight, Dry Matter and Detergent Fiber were significantly higher within the treatment, with Moisture and Feed Value Index measurements higher within the control as assessed by 95% CI overlap. Reference Appendix D for data values presented in this figure.

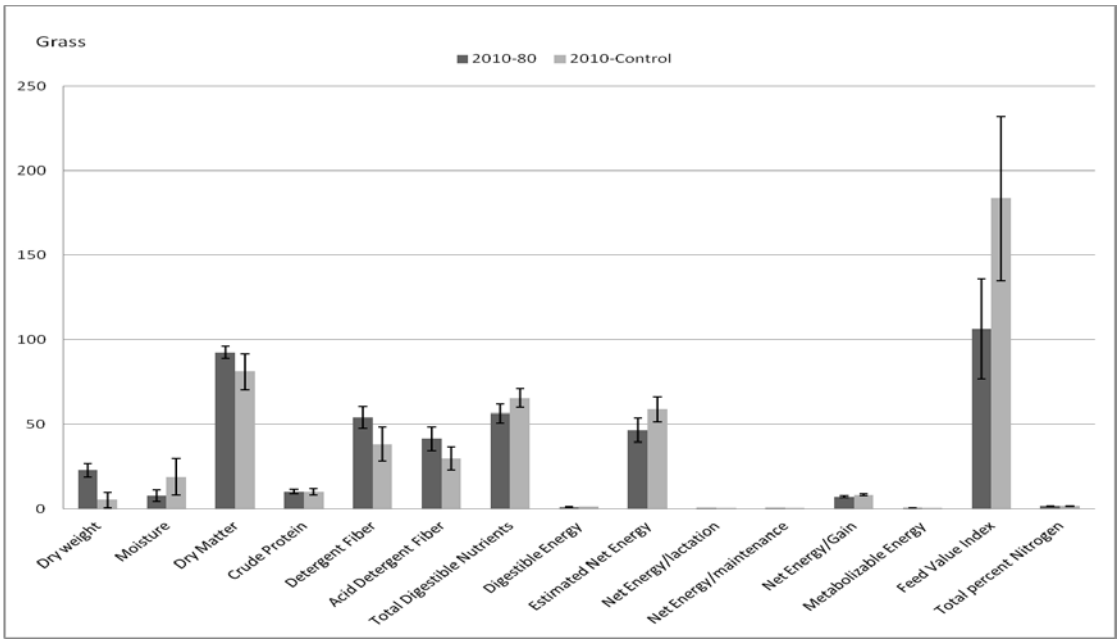


Figure 12. Nutrient values of grass measured in areas fertilized in 2010 at a rate of 80 lb/acre to vegetation measured in the 2010 control (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Error bars represent 95% confidence intervals (95% CI). Dry Weight measurements for grass was significantly higher in the treatment, as assessed by 95% CI overlap. Reference Appendix D for data values presented in this figure.

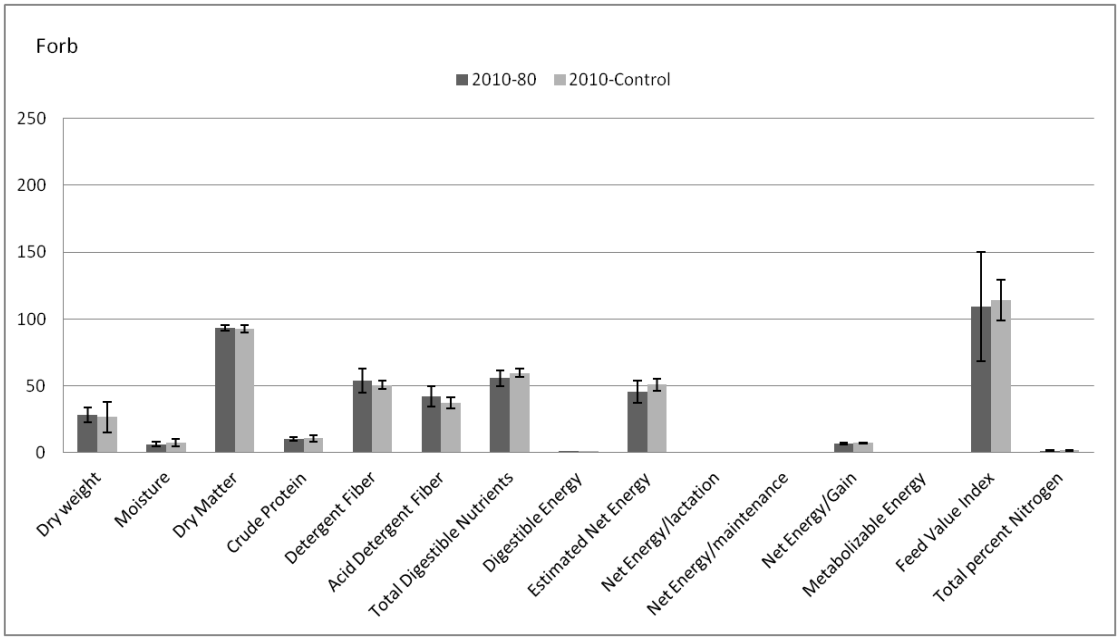


Figure 13. Nutrient values of forbs measured in areas fertilized in 2010 at a rate of 80 lb/acre to vegetation measured in the 2010 control (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Error bars represent 95% confidence intervals (95% CI). None of vegetation measured for forbs differed significantly between treatment and control as assessed by 95% CI overlap. Reference Appendix D for data values presented in this figure.

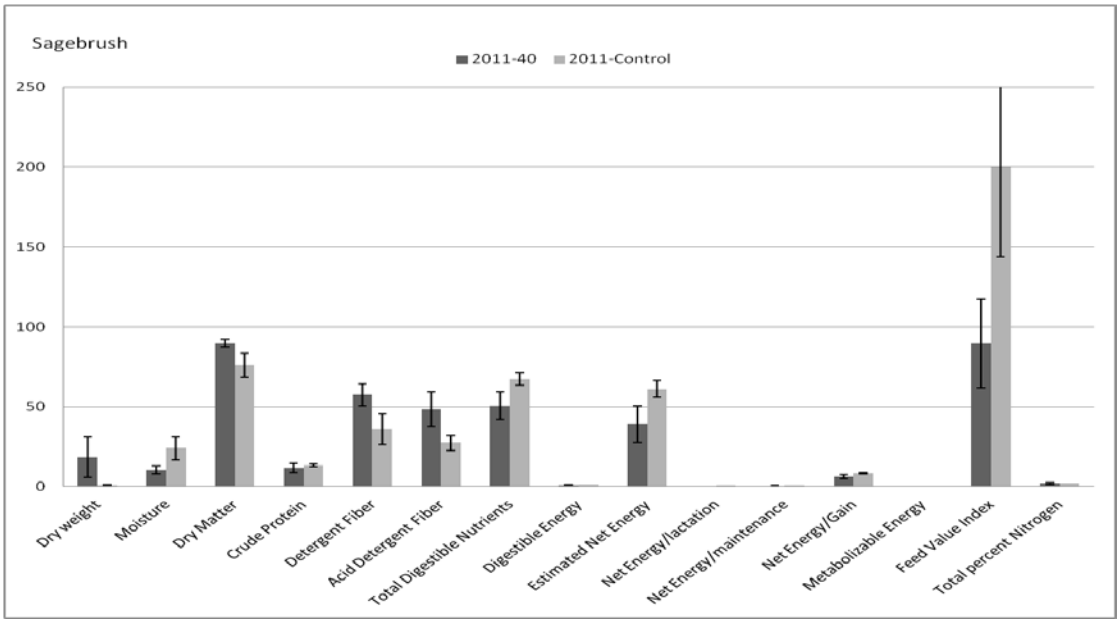


Figure 14. Nutrient values of sagebrush measured in areas fertilized in 2011 at a rate of 40 lb/acre to vegetation measured in the 2011 control (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Error bars represent 95% confidence intervals (95% CI). Measurements of Dry Weight, Dry Matter, Detergent Fiber, Acid Detergent Fiber and Digestible Energy were significantly higher within the treatment, with Moisture, Total Digestible Nutrients, Estimated Net Energy, Net Energy/Lactation, Net Energy Maintenance, Net Energy/Gain, Metabolizable Energy and Feed Value Index significantly higher in the control as assessed by 95% CI overlap.

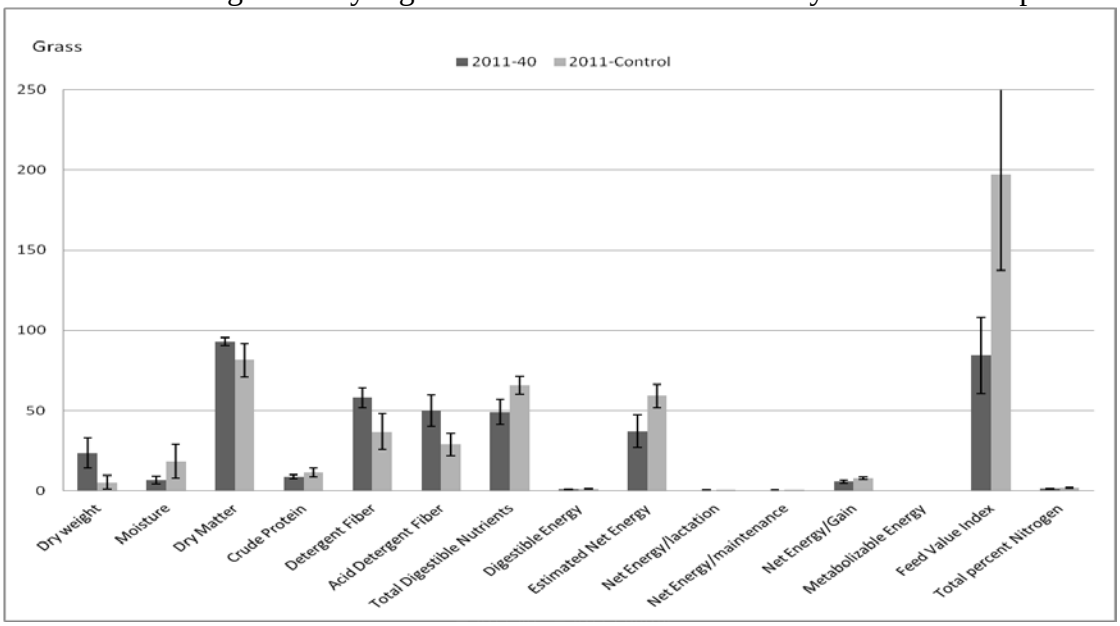


Figure 15. Nutrient values of grass measured in areas fertilized in 2011 at a rate of 40 lb/acre to vegetation measured in the 2011 control (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Error bars represent 95% confidence intervals (95% CI). Measurements of Dry Weight, Detergent Fiber and Acid Detergent Fiber were higher within the treatment, with Total Digestible Nutrients, Digestible Fiber, Estimated Net Energy, Net Energy/Lactation, Net Energy/Maintenance, Net Energy/Gain, Metabolizable Energy and Feed Value Index all with significantly higher values within the control as assessed by 95% CI overlap. Reference Appendix D for data values presented in this figure.

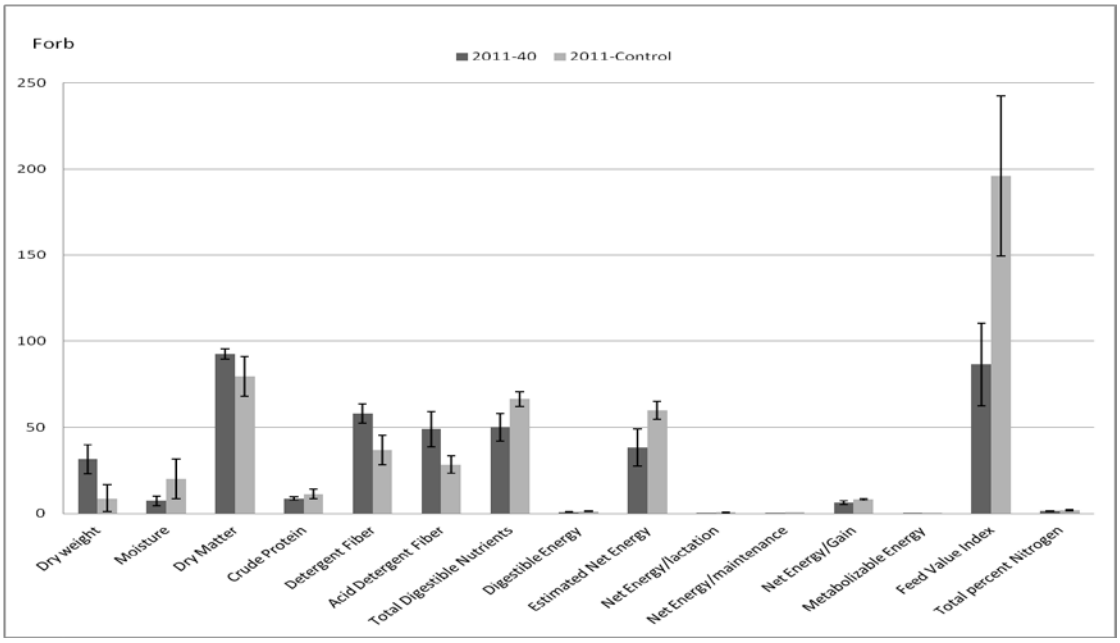


Figure 16. Nutrient values of forbs measured in areas fertilized in 2011 at a rate of 40 lb/acre to vegetation measured in the 2011 control (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Error bars represent 95% confidence intervals (95% CI). Measurements of Dry Weight, Detergent Fiber and Acid Detergent Fiber were significantly higher in the treatment, with Total Digestible Nutrients, Digestible Energy, Estimated Net Energy, Net Energy/Lactation, Net Energy/Maintenance, Net Energy/Gain, Metabolizable Energy and Feed Value Index significantly higher within the control as assessed by 95% CI overlap. Reference Appendix D for data values presented in this figure.

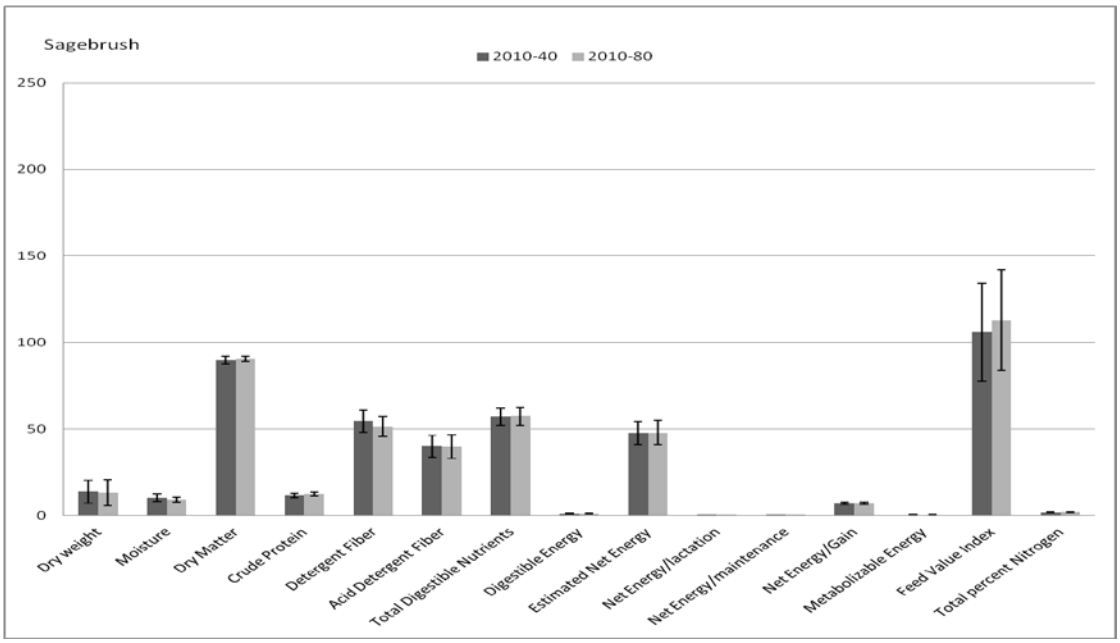


Figure 17. Nutrient values of sagebrush measured in areas fertilized in 2010 at a rate of 40 lb/acre to vegetation measured in areas fertilized in 2010 at a rate of 80 lb/acre (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Error bars represent 95% confidence intervals (95% CI). None of vegetation measured differed significantly between treatments as assessed by 95% CI overlap. Reference Appendix D for data values presented in this figure.

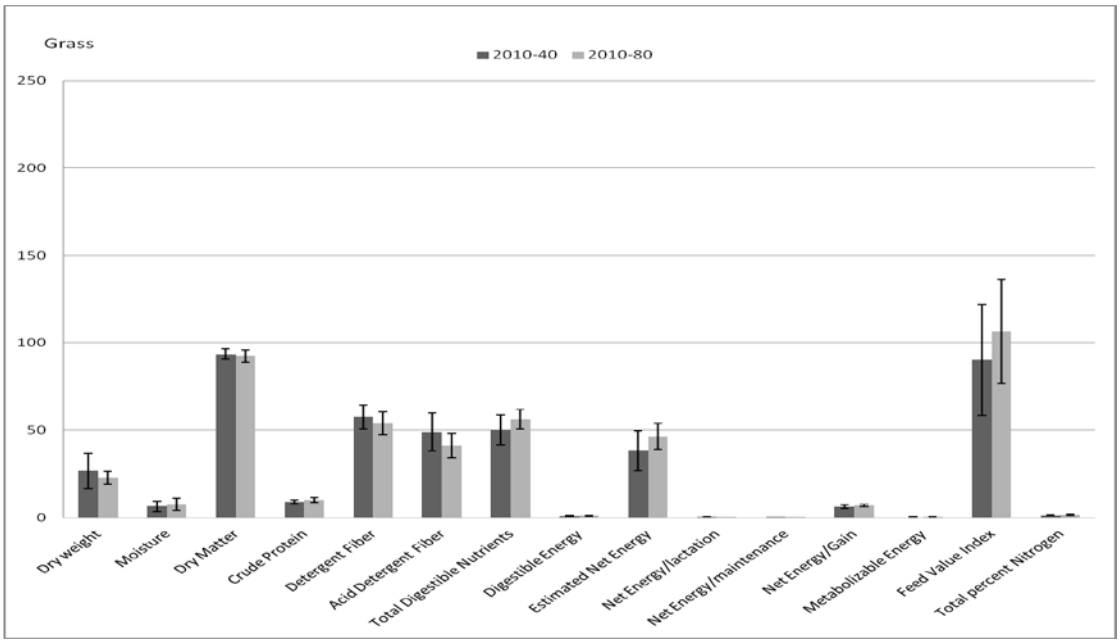


Figure 18. Nutrient values of grass measured in areas fertilized in 2010 at a rate of 40 lb/acre to vegetation measured in areas fertilized in 2010 at a rate of 80 lb/acre (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Error bars represent 95% confidence intervals (95% CI). None of vegetation measured differed significantly between treatments as assessed by 95% CI overlap. Reference Appendix D for data values presented in this figure.

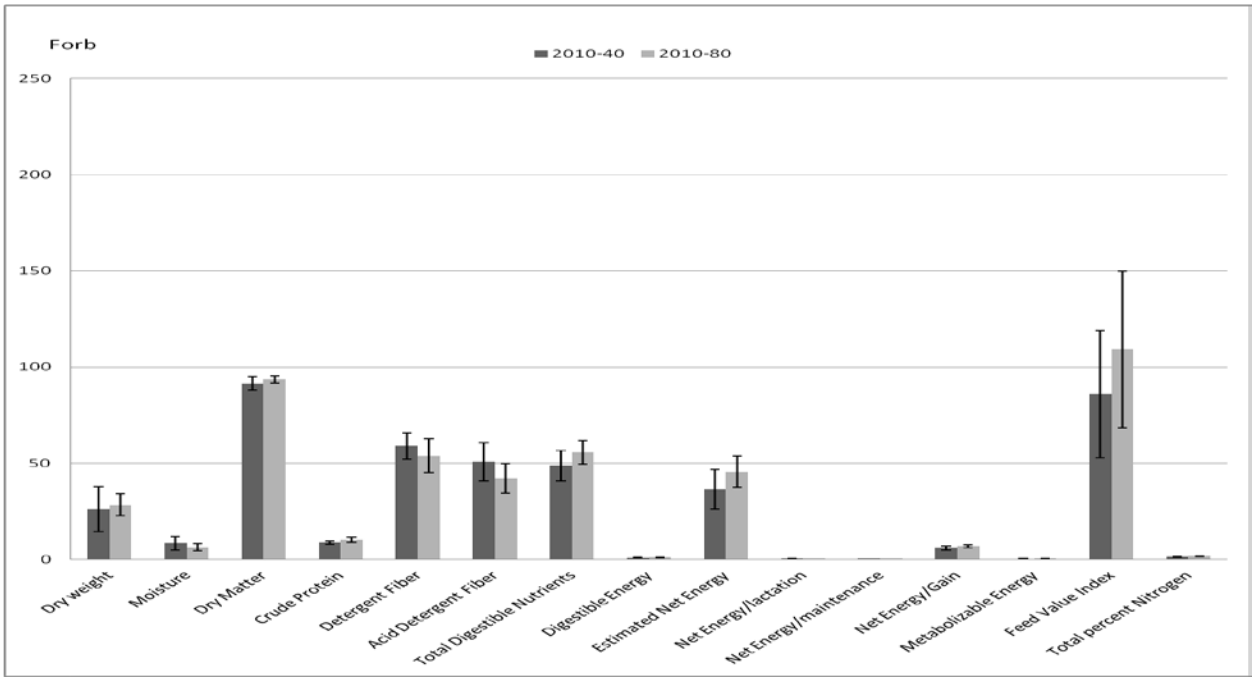


Figure 19. Nutrient values of forbs measured in areas fertilized in 2010 at a rate of 40 lb/acre to vegetation measured in areas fertilized in 2010 at a rate of 80 lb/acre (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Error bars represent 95% confidence intervals (95% CI). None of vegetation measured differed significantly between treatments as assessed by 95% CI overlap. Reference Appendix D for data values presented in this figure.

3.5 Utilization Comparison

Measurements of the amount of utilization in treatments vs. controls indicated no significant differences, e.g., the confidence intervals overlap 0 (zero). Reference Appendix C for these results. These results suggest that wintering mule deer were not selectively feeding in, nor avoiding areas on the Mesa treated with fertilizer.

3.6 Invasive Species

The potential release of invasive plant species is of particular concern within manipulated sagebrush habitats. No individuals of invasive plants were found within blocks on either year of field work. These results suggest that fertilization did not result in invasive annual grass proliferation in mule deer winter ranges on the Mesa.

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Appendix A

Variance Within Blocks

Table A.1 Variance comparisons within sample blocks measured in 2012 in areas fertilized in 2010 at a rate of 40 lb/acre (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Within block comparisons were made by investigating if values by transect were within 2 standard deviations of the mean value of all transects.

Vegetation Measure	Sample Block	Year Measured	Transect 1	Transect 2	Transect 3	Transect 4	Transect 5	Standard Deviation (SD)	Mean - 2 SD	Mean + 2 SD
Total Grass Cover (%)	2010-40 B1	2012	18.9	13.7	25.4	17.4	19.2	4.2	10.5	27.4
Total Forb Cover (%)	2010-40 B1	2012	4.5	3.5	3.4	3.8	3.9	0.4	3.0	4.7
Bunchgrass Cover (%)	2010-40 B1	2012	8.2	4.3	18.7	11.7	14.6	5.6	0.4	22.6
Rhizomatous Grass Cover (%)	2010-40 B1	2012	8.6	9.4	12.6	5.6	5.7	2.9	2.6	14.2
Annual Forb Cover (%)	2010-40 B1	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-40 B1	2012	4.5	3.5	3.4	3.8	3.9	0.4	3.0	4.7
Invasive Annual Grass Cover (%)	2010-40 B1	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-40 B1	2012	26.5	33.3	34.9	30.5	34.3	3.5	25.0	38.8
Bare Ground (%)	2010-40 B1	2012	41.3	50.6	65.3	65.6	67.6	11.6	34.9	81.2
Sagebrush Canopy Cover (%)	2010-40 B1	2012	29.9	28.0	27.9	35.4	29.2	3.1	23.9	36.3
Other Shrub Canopy Cover (%)	2010-40 B1	2012	0.0	0.0	0.1	1.1	0.0	0.5	-0.7	1.2
Total Grass Cover (%)	2010-40 B2	2012	25.4	29.7	27.5	39.1	33.4	5.4	20.2	41.8
Total Forb Cover (%)	2010-40 B2	2012	4.1	4.4	6.8	3.1	2.8	1.6	1.1	7.4
Bunchgrass Cover (%)	2010-40 B2	2012	14.6	15.5	13.2	21.2	18.8	3.3	10.1	23.2
Rhizomatous Grass Cover (%)	2010-40 B2	2012	14.5	17.7	17.1	25.5	18.5	4.1	10.4	26.9
Annual Forb Cover (%)	2010-40 B2	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-40 B2	2012	4.1	4.4	6.8	3.1	2.8	1.6	1.1	7.4
Invasive Annual Grass Cover (%)	2010-40 B2	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-40 B2	2012	27.9	30.0	28.6	33.2	37.1	3.8	23.8	39.0
Bare Ground (%)	2010-40 B2	2012	55.9	57.5	58.2	48.3	56.9	4.0	47.3	63.4
Sagebrush Canopy Cover (%)	2010-40 B2	2012	24.0	26.6	22.0	31.2	22.4	3.8	17.7	32.8
Other Shrub Canopy Cover (%)	2010-40 B2	2012	0.9	0.0	0.3	0.7	1.0	0.4	-0.3	1.5
Total Grass Cover (%)	2010-40 B4	2012	37.7	37.8	41.4	47.9	46.7	4.8	32.7	51.9
Total Forb Cover (%)	2010-40 B4	2012	1.5	1.0	0.7	1.0	1.4	0.3	0.5	1.8
Bunchgrass Cover (%)	2010-40 B4	2012	23.3	26.2	21.3	17.0	14.2	4.8	10.8	30.0
Rhizomatous Grass Cover (%)	2010-40 B4	2012	16.6	15.5	30.3	35.1	36.6	10.1	6.6	47.0
Annual Forb Cover (%)	2010-40 B4	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-40 B4	2012	1.5	1.0	0.7	1.0	1.4	0.3	0.5	1.8
Invasive Annual Grass Cover (%)	2010-40 B4	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-40 B4	2012	57.1	58.2	62.7	62.6	58.6	2.6	54.6	65.1
Bare Ground (%)	2010-40 B4	2012	51.7	43.1	43.7	38.1	36.1	6.1	30.4	54.7
Sagebrush Canopy Cover (%)	2010-40 B4	2012	24.6	25.7	27.2	31.8	20.0	4.3	17.3	34.4
Other Shrub Canopy Cover (%)	2010-40 B4	2012	0.6	0.4	0.0	1.8	2.6	1.1	-1.1	3.3
Total Grass Cover (%)	2010-40 B5	2012	32.4	37.3	31.0	33.6	33.8	2.3	28.9	38.3
Total Forb Cover (%)	2010-40 B5	2012	1.7	1.6	1.3	2.2	2.6	0.5	0.8	2.9
Bunchgrass Cover (%)	2010-40 B5	2012	13.8	22.0	18.4	20.4	17.2	3.1	12.1	24.6
Rhizomatous Grass Cover (%)	2010-40 B5	2012	24.4	29.5	17.9	18.2	18.9	5.1	11.6	31.9
Annual Forb Cover (%)	2010-40 B5	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-40 B5	2012	1.7	1.6	1.3	2.2	2.6	0.5	0.8	2.9
Invasive Annual Grass Cover (%)	2010-40 B5	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-40 B5	2012	37.7	51.6	29.1	28.2	26.3	10.5	13.6	55.5
Bare Ground (%)	2010-40 B5	2012	51.0	49.9	45.1	61.7	51.8	6.1	39.8	64.0
Sagebrush Canopy Cover (%)	2010-40 B5	2012	30.7	25.5	25.7	24.8	27.3	2.4	22.1	31.5
Other Shrub Canopy Cover (%)	2010-40 B5	2012	0.3	3.1	1.4	1.8	6.8	2.5	-2.3	7.7

Table A.2 Variance comparisons within sample blocks measured in 2012 in areas fertilized in 2010 at a rate of 80 lb/acre (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Within block comparisons were made by investigating if values by transect were within 2 standard deviations of the mean value of all transects.

Vegetation Measure	Sample Block	Year Measured	Transect 1	Transect 2	Transect 3	Transect 4	Transect 5	Standard Deviation (SD)	Mean - 2 SD	Mean + 2 SD
Total Grass Cover (%)	2010-80 B1	2012	33.4	43.3	35.8	37.2	34.9	3.8	29.3	44.6
Total Forb Cover (%)	2010-80 B1	2012	5.1	3.4	2.2	1.6	0.9	1.7	-0.7	5.9
Bunchgrass Cover (%)	2010-80 B1	2012	17.1	22.0	23.5	18.1	24.5	3.3	14.5	27.6
Rhizomatous Grass Cover (%)	2010-80 B1	2012	23.6	32.3	19.8	27.7	22.0	5.0	15.2	35.0
Annual Forb Cover (%)	2010-80 B1	2012	0.0	0.0	0.0	0.0	0.9	0.4	-0.6	1.0
Perennial Forb Cover (%)	2010-80 B1	2012	5.1	3.4	2.2	1.6	0.0	1.9	-1.4	6.3
Invasive Annual Grass Cover (%)	2010-80 B1	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-80 B1	2012	47.6	30.9	40.9	56.8	54.6	10.6	25.0	67.3
Bare Ground (%)	2010-80 B1	2012	42.9	45.9	38.7	37.9	45.8	3.8	34.6	49.8
Sagebrush Canopy Cover (%)	2010-80 B1	2012	27.4	23.3	22.2	31.3	32.8	4.7	18.0	36.8
Other Shrub Canopy Cover (%)	2010-80 B1	2012	1.3	1.6	1.4	1.2	1.7	0.2	1.0	1.9
Total Grass Cover (%)	2010-80 B2	2012	16.9	18.5	14.7	24.5	19.3	3.6	11.5	26.1
Total Forb Cover (%)	2010-80 B2	2012	4.6	4.6	5.9	4.9	3.4	0.9	2.9	6.5
Bunchgrass Cover (%)	2010-80 B2	2012	18.8	12.0	9.1	17.2	13.6	3.9	6.3	22.0
Rhizomatous Grass Cover (%)	2010-80 B2	2012	4.5	7.3	5.9	10.1	8.2	2.1	2.9	11.5
Annual Forb Cover (%)	2010-80 B2	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-80 B2	2012	4.6	4.6	6.0	4.9	3.4	0.9	2.8	6.6
Invasive Annual Grass Cover (%)	2010-80 B2	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-80 B2	2012	27.2	27.2	20.3	28.9	27.1	3.4	19.4	32.8
Bare Ground (%)	2010-80 B2	2012	59.8	63.1	61.6	63.0	61.2	1.4	59.0	64.5
Sagebrush Canopy Cover (%)	2010-80 B2	2012	27.0	25.7	24.0	25.3	29.4	2.0	22.2	30.3
Other Shrub Canopy Cover (%)	2010-80 B2	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Grass Cover (%)	2010-80 B3	2012	35.6	26.6	26.4	34.0	45.2	7.7	18.1	49.0
Total Forb Cover (%)	2010-80 B3	2012	3.0	7.5	6.0	5.6	18.2	5.9	-3.7	19.9
Bunchgrass Cover (%)	2010-80 B3	2012	21.5	11.6	18.4	15.9	16.0	3.6	9.4	24.0
Rhizomatous Grass Cover (%)	2010-80 B3	2012	17.1	16.7	10.3	22.6	42.8	12.5	-3.0	46.8
Annual Forb Cover (%)	2010-80 B3	2012	0.0	0.0	0.0	0.0	3.2	1.4	-2.2	3.5
Perennial Forb Cover (%)	2010-80 B3	2012	3.0	7.5	6.0	5.6	9.3	2.3	1.6	11.0
Invasive Annual Grass Cover (%)	2010-80 B3	2012	0.0	0.0	0.0	0.0	2.2	1.0	-1.5	2.4
Litter Cover (%)	2010-80 B3	2012	36.1	31.4	49.8	42.0	46.4	7.5	26.2	56.1
Bare Ground (%)	2010-80 B3	2012	51.8	54.8	42.5	40.9	34.9	8.2	28.6	61.3
Sagebrush Canopy Cover (%)	2010-80 B3	2012	29.5	26.8	25.0	21.3	27.0	3.1	19.8	32.0
Other Shrub Canopy Cover (%)	2010-80 B3	2012	2.4	1.4	1.0	2.0	1.0	0.6	0.3	2.8
Total Grass Cover (%)	2010-80 B4	2012	35.6	26.6	26.4	34.0	45.2	7.7	18.1	49.0
Total Forb Cover (%)	2010-80 B4	2012	3.0	7.5	6.0	5.6	18.2	5.9	-3.7	19.9
Bunchgrass Cover (%)	2010-80 B4	2012	21.5	11.6	18.4	15.9	16.0	3.6	9.4	24.0
Rhizomatous Grass Cover (%)	2010-80 B4	2012	17.1	16.7	10.3	22.6	42.8	12.5	-3.0	46.8
Annual Forb Cover (%)	2010-80 B4	2012	0.0	0.0	0.0	0.0	3.2	1.4	-2.2	3.5
Perennial Forb Cover (%)	2010-80 B4	2012	3.0	7.5	6.0	5.6	9.3	2.3	1.6	11.0
Invasive Annual Grass Cover (%)	2010-80 B4	2012	0.0	0.0	0.0	0.0	2.2	1.0	-1.5	2.4
Litter Cover (%)	2010-80 B4	2012	36.1	31.4	49.8	42.0	46.4	7.5	26.2	56.1
Bare Ground (%)	2010-80 B4	2012	51.8	54.8	42.5	40.9	34.9	8.2	28.6	61.3
Sagebrush Canopy Cover (%)	2010-80 B4	2012	28.5	25.8	26.3	28.7	23.0	2.3	21.8	31.1
Other Shrub Canopy Cover (%)	2010-80 B4	2012	2.3	7.6	0.7	1.0	1.8	2.8	-3.0	8.4

Table A.3 Variance comparisons within sample blocks measured in 2012 in the 2010 control area (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Within block comparisons were made by investigating if values by transect were within 2 standard deviations of the mean value of all transects.

Vegetation Measure	Sample Block	Year Measured	Transect 1	Transect 2	Transect 3	Transect 4	Transect 5	Standard Deviation (SD)	Mean - 2 SD	Mean + 2 SD
Total Grass Cover (%)	2010-Control B1	2012	17.3	19.9	21.9	27.7	24.8	4.1	14.2	30.5
Total Forb Cover (%)	2010-Control B1	2012	4.8	5.0	6.5	9.1	5.7	1.7	2.7	9.7
Bunchgrass Cover (%)	2010-Control B1	2012	11.3	12.8	11.3	14.1	14.3	1.5	9.9	15.7
Rhizomatous Grass Cover (%)	2010-Control B1	2012	8.5	9.3	12.0	15.5	13.4	2.9	6.0	17.5
Annual Forb Cover (%)	2010-Control B1	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-Control B1	2012	4.8	5.0	6.5	9.1	5.7	1.7	2.7	9.7
Invasive Annual Grass Cover (%)	2010-Control B1	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-Control B1	2012	33.6	39.4	30.3	34.9	33.2	3.3	27.6	40.9
Bare Ground (%)	2010-Control B1	2012	64.2	58.9	65.0	52.8	59.5	4.9	50.3	69.9
Sagebrush Canopy Cover (%)	2010-Control B1	2012	19.4	27.2	25.3	18.3	16.1	4.7	11.8	30.7
Other Shrub Canopy Cover (%)	2010-Control B1	2012	6.3	2.5	2.2	5.3	3.2	1.8	0.3	7.5
Total Grass Cover (%)	2010-Control B2	2012	45.6	23.7	30.9	31.0	32.3	8.0	16.8	48.6
Total Forb Cover (%)	2010-Control B2	2012	2.7	3.2	4.6	6.6	4.4	1.5	1.3	7.3
Bunchgrass Cover (%)	2010-Control B2	2012	23.0	10.5	15.0	13.7	15.9	4.6	6.4	24.8
Rhizomatous Grass Cover (%)	2010-Control B2	2012	25.8	16.0	17.1	19.0	18.4	3.8	11.6	26.9
Annual Forb Cover (%)	2010-Control B2	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-Control B2	2012	2.7	3.2	4.6	6.6	4.4	1.5	1.3	7.3
Invasive Annual Grass Cover (%)	2010-Control B2	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-Control B2	2012	47.0	42.5	51.1	41.4	66.2	10.0	29.6	69.7
Bare Ground (%)	2010-Control B2	2012	47.6	57.8	55.0	48.8	33.1	9.6	29.3	67.6
Sagebrush Canopy Cover (%)	2010-Control B2	2012	18.4	20.1	17.3	15.4	25.4	3.8	11.8	26.9
Other Shrub Canopy Cover (%)	2010-Control B2	2012	1.3	3.4	1.5	1.9	2.1	0.8	0.4	3.7
Total Grass Cover (%)	2010-Control B3	2012	22.8	22.1	22.9	21.6	18.9	1.6	18.4	24.9
Total Forb Cover (%)	2010-Control B3	2012	7.7	9.2	7.9	9.1	6.1	1.3	5.5	10.5
Bunchgrass Cover (%)	2010-Control B3	2012	9.5	14.6	10.9	6.3	7.3	3.3	3.2	16.3
Rhizomatous Grass Cover (%)	2010-Control B3	2012	15.4	11.1	15.5	18.2	13.6	2.6	9.5	20.0
Annual Forb Cover (%)	2010-Control B3	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-Control B3	2012	7.7	9.2	7.9	9.1	6.1	1.3	5.5	10.5
Invasive Annual Grass Cover (%)	2010-Control B3	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-Control B3	2012	22.6	16.9	19.5	17.5	22.5	2.7	14.4	25.2
Bare Ground (%)	2010-Control B3	2012	62.5	61.9	65.4	71.2	62.8	3.8	57.1	72.4
Sagebrush Canopy Cover (%)	2010-Control B3	2012	28.5	21.5	24.3	28.9	21.6	3.6	17.8	32.1
Other Shrub Canopy Cover (%)	2010-Control B3	2012	5.2	1.7	2.1	3.4	7.1	2.3	-0.6	8.4
Total Grass Cover (%)	2010-Control B5	2012	20.2	23.7	22.8	21.5	21.7	1.3	19.3	24.6
Total Forb Cover (%)	2010-Control B5	2012	5.0	8.5	6.1	5.9	8.2	1.5	3.7	9.8
Bunchgrass Cover (%)	2010-Control B5	2012	12.6	15.2	10.6	9.4	7.6	2.9	5.2	16.9
Rhizomatous Grass Cover (%)	2010-Control B5	2012	9.1	12.2	14.9	15.6	14.7	2.7	7.9	18.7
Annual Forb Cover (%)	2010-Control B5	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-Control B5	2012	5.0	8.5	6.1	5.0	8.2	1.7	3.2	10.0
Invasive Annual Grass Cover (%)	2010-Control B5	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-Control B5	2012	32.4	34.7	39.1	34.9	17.8	8.2	15.4	48.1
Bare Ground (%)	2010-Control B5	2012	64.6	64.0	49.7	59.7	69.3	7.4	46.7	76.3
Sagebrush Canopy Cover (%)	2010-Control B5	2012	25.4	22.6	28.7	24.4	25.8	2.2	20.9	29.8
Other Shrub Canopy Cover (%)	2010-Control B5	2012	4.0	4.8	5.2	5.0	2.9	0.9	2.5	6.3

Table A.4 Variance comparisons within sample blocks measured in 2012 in areas fertilized in 2011 at a rate of 40 lb/acre (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Within block comparisons were made by investigating if values by transect were within 2 standard deviations of the mean value of all transects.

Vegetation Measure	Sample Block	Year Measured	Transect 1	Transect 2	Transect 3	Transect 4	Transect 5	Standard Deviation (SD)	Mean - 2 SD	Mean + 2 SD
Total Grass Cover (%)	2011-40 B1	2012	29.7	31.2	30.9	37.1	34.7	3.1	26.6	38.9
Total Forb Cover (%)	2011-40 B1	2012	13.5	6.1	6.5	9.3	4.2	3.6	0.7	15.1
Bunchgrass Cover (%)	2011-40 B1	2012	9.3	17.7	13.7	16.6	14.1	3.2	7.8	20.8
Rhizomatous Grass Cover (%)	2011-40 B1	2012	23.0	18.3	22.9	27.4	30.1	4.6	15.2	33.4
Annual Forb Cover (%)	2011-40 B1	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2011-40 B1	2012	13.5	6.1	6.5	9.3	4.2	3.6	0.7	15.1
Invasive Annual Grass Cover (%)	2011-40 B1	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2011-40 B1	2012	19.9	25.5	22.3	23.3	45.9	10.5	6.3	48.5
Bare Ground (%)	2011-40 B1	2012	56.6	55.3	53.7	46.3	39.2	7.3	35.5	64.9
Sagebrush Canopy Cover (%)	2011-40 B1	2012	20.7	32.5	28.8	25.9	24.0	4.5	17.4	35.4
Other Shrub Canopy Cover (%)	2011-40 B1	2012	2.1	1.2	0.5	3.0	2.3	1.0	-0.2	3.8
Total Grass Cover (%)	2011-40 B2	2012	38.3	32.5	29.0	38.4	30.6	4.4	25.0	42.5
Total Forb Cover (%)	2011-40 B2	2012	3.4	6.1	4.6	3.0	4.0	1.2	1.8	6.6
Bunchgrass Cover (%)	2011-40 B2	2012	10.3	12.3	8.5	14.2	9.0	2.4	6.1	15.6
Rhizomatous Grass Cover (%)	2011-40 B2	2012	32.4	24.8	23.1	30.3	22.2	4.5	17.5	35.6
Annual Forb Cover (%)	2011-40 B2	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2011-40 B2	2012	3.4	6.1	4.6	3.0	4.0	1.2	1.8	6.6
Invasive Annual Grass Cover (%)	2011-40 B2	2012	0.0	0.0	0.0	0.0	0.2	0.1	-0.1	0.2
Litter Cover (%)	2011-40 B2	2012	35.0	33.1	32.5	45.0	41.9	5.6	26.3	48.7
Bare Ground (%)	2011-40 B2	2012	49.8	54.6	49.3	37.1	54.8	7.2	34.7	63.5
Sagebrush Canopy Cover (%)	2011-40 B2	2012	25.2	23.0	33.6	23.5	22.3	4.6	16.3	34.8
Other Shrub Canopy Cover (%)	2011-40 B2	2012	1.1	1.0	1.5	1.7	0.9	0.3	0.6	1.9
Total Grass Cover (%)	2011-40 B3	2012	23.0	29.5	36.2	32.3	33.0	5.0	20.9	40.7
Total Forb Cover (%)	2011-40 B3	2012	4.7	5.4	4.0	4.1	4.3	0.6	3.4	5.6
Bunchgrass Cover (%)	2011-40 B3	2012	8.6	12.3	12.4	10.1	13.2	1.9	7.5	15.1
Rhizomatous Grass Cover (%)	2011-40 B3	2012	17.7	20.3	26.1	28.0	26.1	4.4	14.8	32.4
Annual Forb Cover (%)	2011-40 B3	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2011-40 B3	2012	4.7	5.4	4.0	4.1	4.3	0.6	3.4	5.6
Invasive Annual Grass Cover (%)	2011-40 B3	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2011-40 B3	2012	31.4	30.1	36.0	31.1	30.2	2.4	26.9	36.6
Bare Ground (%)	2011-40 B3	2012	59.9	58.3	45.4	62.5	60.5	6.8	43.7	71.0
Sagebrush Canopy Cover (%)	2011-40 B3	2012	25.8	31.8	31.4	24.6	24.7	3.6	20.4	34.9
Other Shrub Canopy Cover (%)	2011-40 B3	2012	2.0	1.8	0.4	0.0	0.6	0.9	-0.8	2.8
Total Grass Cover (%)	2011-40 B4	2012	38.2	29.9	32.1	35.4	28.2	4.1	24.6	40.9
Total Forb Cover (%)	2011-40 B4	2012	3.2	5.2	4.2	6.8	7.2	1.7	1.9	8.7
Bunchgrass Cover (%)	2011-40 B4	2012	15.4	11.1	18.3	17.1	13.8	2.8	9.5	20.8
Rhizomatous Grass Cover (%)	2011-40 B4	2012	27.5	22.9	18.2	23.3	20.9	3.4	15.7	29.4
Annual Forb Cover (%)	2011-40 B4	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2011-40 B4	2012	3.2	5.2	4.2	6.8	7.2	1.7	1.9	8.7
Invasive Annual Grass Cover (%)	2011-40 B4	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2011-40 B4	2012	25.3	33.8	30.3	33.0	43.5	6.7	19.9	46.5
Bare Ground (%)	2011-40 B4	2012	60.6	57.7	55.6	60.7	55.4	2.6	52.8	63.2
Sagebrush Canopy Cover (%)	2011-40 B4	2012	23.7	23.3	22.2	21.7	29.2	3.0	18.0	30.0
Other Shrub Canopy Cover (%)	2011-40 B4	2012	1.4	0.6	1.0	0.7	0.3	0.4	0.0	1.6

Table A.5 Variance comparisons within sample blocks measured in 2012 in 2011 control area (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Within block comparisons were made by investigating if values by transect were within 2 standard deviations of the mean value of all transects.

Vegetation Measure	Sample Block	Year Measured	Transect 1	Transect 2	Transect 3	Transect 4	Transect 5	Standard Deviation (SD)	Mean - 2 SD	Mean + 2 SD
Total Grass Cover (%)	2011-Control B1	2012	31.2	36.9	29.5	29.5	27.9	3.5	24.0	38.0
Total Forb Cover (%)	2011-Control B1	2012	5.1	11.6	6.5	7.7	12.6	3.3	2.2	15.2
Bunchgrass Cover (%)	2011-Control B1	2012	11.6	12.8	10.4	16.9	13.4	2.5	8.1	17.9
Rhizomatous Grass Cover (%)	2011-Control B1	2012	22.0	27.7	22.1	17.7	18.5	4.0	13.7	29.5
Annual Forb Cover (%)	2011-Control B1	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2011-Control B1	2012	5.1	11.6	6.5	7.7	12.6	3.3	2.2	15.2
Invasive Annual Grass Cover (%)	2011-Control B1	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2011-Control B1	2012	31.5	23.9	21.3	26.9	21.2	4.3	16.3	33.6
Bare Ground (%)	2011-Control B1	2012	50.7	59.9	66.6	55.7	70.7	8.1	44.6	76.9
Sagebrush Canopy Cover (%)	2011-Control B1	2012	31.4	21.9	23.7	20.3	20.6	4.6	14.5	32.7
Other Shrub Canopy Cover (%)	2011-Control B1	2012	1.0	0.5	4.1	1.2	0.9	1.5	-1.4	4.4
Total Grass Cover (%)	2011-Control B2	2012	25.3	27.6	28.2	28.2	27.4	1.2	25.0	29.7
Total Forb Cover (%)	2011-Control B2	2012	8.7	10.4	11.2	7.4	6.0	2.1	4.5	13.0
Bunchgrass Cover (%)	2011-Control B2	2012	13.7	10.4	14.3	13.8	13.4	1.6	10.0	16.2
Rhizomatous Grass Cover (%)	2011-Control B2	2012	16.0	18.9	17.1	16.0	17.9	1.3	14.7	19.7
Annual Forb Cover (%)	2011-Control B2	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2011-Control B2	2012	8.7	10.4	11.2	7.4	6.0	2.1	4.5	13.0
Invasive Annual Grass Cover (%)	2011-Control B2	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2011-Control B2	2012	27.9	20.7	19.3	24.0	37.9	7.4	11.1	40.9
Bare Ground (%)	2011-Control B2	2012	50.6	54.4	43.6	49.6	43.4	4.7	38.8	57.8
Sagebrush Canopy Cover (%)	2011-Control B2	2012	24.8	22.8	24.7	27.5	33.4	4.1	18.4	34.9
Other Shrub Canopy Cover (%)	2011-Control B2	2012	0.9	0.4	1.1	0.8	0.5	0.3	0.2	1.3
Total Grass Cover (%)	2011-Control B3	2012	24.4	30.2	35.3	28.9	27.8	4.0	21.4	37.3
Total Forb Cover (%)	2011-Control B3	2012	2.7	5.8	7.5	4.6	7.5	2.0	1.5	9.7
Bunchgrass Cover (%)	2011-Control B3	2012	12.1	13.5	11.5	11.9	15.5	1.6	9.6	16.2
Rhizomatous Grass Cover (%)	2011-Control B3	2012	13.8	19.8	25.7	20.3	18.7	4.2	11.2	28.2
Annual Forb Cover (%)	2011-Control B3	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2011-Control B3	2012	2.7	5.8	7.5	4.6	7.5	2.0	1.5	9.7
Invasive Annual Grass Cover (%)	2011-Control B3	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2011-Control B3	2012	28.2	23.1	31.9	33.9	34.3	4.7	20.9	39.6
Bare Ground (%)	2011-Control B3	2012	49.5	57.7	45.9	50.3	55.4	4.7	42.3	61.3
Sagebrush Canopy Cover (%)	2011-Control B3	2012	35.1	28.1	29.7	30.8	30.9	2.6	25.7	36.1
Other Shrub Canopy Cover (%)	2011-Control B3	2012	2.1	2.0	1.1	0.5	1.8	0.7	0.1	2.9
Total Grass Cover (%)	2011-Control B4	2012	34.8	39.2	32.6	26.9	37.0	4.7	24.7	43.5
Total Forb Cover (%)	2011-Control B4	2012	2.8	2.9	1.6	5.0	7.3	2.3	-0.6	8.4
Bunchgrass Cover (%)	2011-Control B4	2012	13.8	19.7	17.1	13.7	7.2	4.7	4.9	23.7
Rhizomatous Grass Cover (%)	2011-Control B4	2012	23.4	23.8	18.3	16.3	32.6	6.3	10.2	35.5
Annual Forb Cover (%)	2011-Control B4	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2011-Control B4	2012	2.8	2.9	1.6	5.0	7.3	2.3	-0.6	8.4
Invasive Annual Grass Cover (%)	2011-Control B4	2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2011-Control B4	2012	27.5	27.2	28.1	32.1	36.4	4.0	22.3	38.2
Bare Ground (%)	2011-Control B4	2012	51.4	58.2	51.0	55.3	42.0	6.1	39.3	63.8
Sagebrush Canopy Cover (%)	2011-Control B4	2012	25.1	25.8	27.7	25.9	29.4	1.7	23.3	30.3
Other Shrub Canopy Cover (%)	2011-Control B4	2012	0.8	0.8	0.5	2.6	1.0	0.8	-0.5	2.8

Table A.6 Variance comparisons within sample blocks measured in 2013 in areas fertilized in 2010 at a rate of 40 lb/acre (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Within block comparisons were made by investigating if values by transect were within 2 standard deviations of the mean value of all transects.

Vegetation Measure	Sample Block	Year Measured	Transect 1	Transect 2	Transect 3	Transect 4	Transect 5	Standard Deviation (SD)	Mean - 2 SD	Mean + 2 SD
Total Grass Cover (%)	2010-40 B1	2013	28.8	31.9	32.1	40.4	37.5	4.7	24.8	43.5
Total Forb Cover (%)	2010-40 B1	2013	6.5	11.4	10.1	8.6	7.8	1.9	5.0	12.7
Bunchgrass Cover (%)	2010-40 B1	2013	11.3	20.2	21.5	16.3	24.5	5.1	8.6	29.0
Rhizomatous Grass Cover (%)	2010-40 B1	2013	22.8	19.4	11.9	29.8	21.5	6.4	8.2	34.0
Annual Forb Cover (%)	2010-40 B1	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-40 B1	2013	6.5	11.4	10.1	8.6	7.8	1.9	5.0	12.7
Invasive Annual Grass Cover (%)	2010-40 B1	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-40 B1	2013	42.1	46.8	31.0	31.8	25.7	8.7	18.1	52.8
Bare Ground (%)	2010-40 B1	2013	35.1	31.9	34.1	32.9	37.4	2.1	30.0	38.5
Sagebrush Canopy Cover (%)	2010-40 B1	2013	29.6	45.6	35.5	36.9	30.0	6.5	22.5	48.6
Other Shrub Canopy Cover (%)	2010-40 B1	2013	0.5	3.1	1.6	2.3	0.2	1.2	-0.9	3.9
Total Grass Cover (%)	2010-40 B2	2013	31.2	26.2	29.6	29.7	25.9	2.3	23.8	33.2
Total Forb Cover (%)	2010-40 B2	2013	3.8	3.4	2.9	4.6	3.0	0.7	2.2	4.9
Bunchgrass Cover (%)	2010-40 B2	2013	21.3	19.5	19.4	17.9	13.2	3.1	12.1	24.4
Rhizomatous Grass Cover (%)	2010-40 B2	2013	14.3	10.6	13.5	17.8	16.4	2.8	9.0	20.1
Annual Forb Cover (%)	2010-40 B2	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-40 B2	2013	3.8	3.4	2.9	4.6	3.0	0.7	2.2	4.9
Invasive Annual Grass Cover (%)	2010-40 B2	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-40 B2	2013	31.2	38.1	44.7	37.5	31.4	5.6	25.4	47.8
Bare Ground (%)	2010-40 B2	2013	31.1	31.7	20.6	35.6	37.9	6.6	18.1	44.7
Sagebrush Canopy Cover (%)	2010-40 B2	2013	35.5	32.4	29.4	36.5	30.0	3.2	26.4	39.2
Other Shrub Canopy Cover (%)	2010-40 B2	2013	2.6	0.0	1.2	0.8	0.0	1.1	-1.2	3.0
Total Grass Cover (%)	2010-40 B3	2013	40.1	34.6	42.2	39.7	40.1	2.8	33.7	45.0
Total Forb Cover (%)	2010-40 B3	2013	1.4	2.2	2.5	3.2	2.8	0.7	1.1	3.8
Bunchgrass Cover (%)	2010-40 B3	2013	23.4	24.8	13.7	13.5	21.8	5.4	8.6	30.3
Rhizomatous Grass Cover (%)	2010-40 B3	2013	23.9	14.3	34.4	31.6	23.3	7.9	9.7	41.3
Annual Forb Cover (%)	2010-40 B3	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-40 B3	2013	1.4	2.2	2.5	3.2	2.8	0.7	1.1	3.8
Invasive Annual Grass Cover (%)	2010-40 B3	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-40 B3	2013	40.7	55.2	44.0	42.4	38.3	6.5	31.0	57.2
Bare Ground (%)	2010-40 B3	2013	26.6	39.7	28.8	39.1	37.2	6.1	22.0	46.5
Sagebrush Canopy Cover (%)	2010-40 B3	2013	30.5	35.3	39.8	35.6	33.8	3.3	28.3	41.7
Other Shrub Canopy Cover (%)	2010-40 B3	2013	2.2	2.3	0.2	2.4	0.2	1.1	-0.8	3.7
Total Grass Cover (%)	2010-40 B4	2013	24.2	25.2	32.9	28.6	22.9	4.0	18.7	34.8
Total Forb Cover (%)	2010-40 B4	2013	2.1	2.5	1.4	2.2	1.0	0.6	0.6	3.1
Bunchgrass Cover (%)	2010-40 B4	2013	13.6	16.6	19.5	16.9	16.7	2.1	12.5	20.8
Rhizomatous Grass Cover (%)	2010-40 B4	2013	17.6	11.8	17.3	17.2	9.9	3.6	7.5	22.0
Annual Forb Cover (%)	2010-40 B4	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-40 B4	2013	2.1	2.5	1.4	2.2	1.0	0.6	0.6	3.1
Invasive Annual Grass Cover (%)	2010-40 B4	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-40 B4	2013	40.1	32.9	37.1	28.8	41.2	5.2	25.7	46.3
Bare Ground (%)	2010-40 B4	2013	26.5	31.8	23.4	34.9	20.8	5.8	15.8	39.1
Sagebrush Canopy Cover (%)	2010-40 B4	2013	33.8	29.1	27.3	33.2	38.5	4.4	23.7	41.1
Other Shrub Canopy Cover (%)	2010-40 B4	2013	1.8	2.4	1.2	3.2	3.1	0.9	0.6	4.0
Total Grass Cover (%)	2010-40 B5	2013	30.6	29.2	25.6	28.2	30.7	2.1	24.7	33.1
Total Forb Cover (%)	2010-40 B5	2013	9.0	12.4	15.3	6.5	7.1	3.7	2.6	17.5
Bunchgrass Cover (%)	2010-40 B5	2013	17.4	17.0	9.9	15.5	19.0	3.5	8.8	22.8
Rhizomatous Grass Cover (%)	2010-40 B5	2013	21.2	19.8	21.3	19.5	18.2	1.3	17.4	22.6
Annual Forb Cover (%)	2010-40 B5	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-40 B5	2013	9.0	12.4	15.3	6.5	7.1	3.7	2.6	17.5
Invasive Annual Grass Cover (%)	2010-40 B5	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-40 B5	2013	31.4	26.7	28.3	33.9	43.3	6.5	19.6	45.8
Bare Ground (%)	2010-40 B5	2013	40.7	36.8	39.5	39.6	32.0	3.5	30.7	44.7
Sagebrush Canopy Cover (%)	2010-40 B5	2013	21.6	25.2	25.7	31.5	32.5	4.6	18.2	36.4
Other Shrub Canopy Cover (%)	2010-40 B5	2013	5.9	7.2	11.9	7.6	5.9	2.4	2.8	12.6

Table A.7 Variance comparisons within sample blocks measured in 2013 in areas fertilized in 2010 at a rate of 80 lb/acre (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Within block comparisons were made by investigating if values by transect were within 2 standard deviations of the mean value of all transects.

Vegetation Measure	Sample Block	Year Measured	Transect 1	Transect 2	Transect 3	Transect 4	Transect 5	Standard Deviation (SD)	Mean - 2 SD	Mean + 2 SD
Total Grass Cover (%)	2010-80 B1	2013	33.4	40.5	40.6	35.3	39.5	3.3	31.3	44.5
Total Forb Cover (%)	2010-80 B1	2013	10.1	17.2	13.0	11.9	2.1	5.5	-0.2	22.0
Bunchgrass Cover (%)	2010-80 B1	2013	13.8	14.7	16.5	14.9	26.3	5.2	6.9	27.6
Rhizomatous Grass Cover (%)	2010-80 B1	2013	22.2	28.6	27.7	22.9	19.8	3.8	16.7	31.8
Annual Forb Cover (%)	2010-80 B1	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-80 B1	2013	10.1	17.2	13.0	11.9	2.1	5.5	-0.2	22.0
Invasive Annual Grass Cover (%)	2010-80 B1	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-80 B1	2013	19.8	15.7	24.7	18.0	27.1	4.7	11.6	30.5
Bare Ground (%)	2010-80 B1	2013	45.2	48.0	36.0	46.4	32.7	6.8	28.0	55.4
Sagebrush Canopy Cover (%)	2010-80 B1	2013	39.9	42.2	40.8	39.5	40.8	1.1	38.5	42.8
Other Shrub Canopy Cover (%)	2010-80 B1	2013	2.3	1.6	3.7	0.3	4.7	1.7	-0.9	6.0
Total Grass Cover (%)	2010-80 B2	2013	33.0	38.7	34.6	37.6	36.8	2.3	31.5	40.8
Total Forb Cover (%)	2010-80 B2	2013	9.6	6.7	6.7	9.9	11.7	2.2	4.6	13.3
Bunchgrass Cover (%)	2010-80 B2	2013	20.8	32.1	23.8	25.3	31.3	4.9	16.9	36.4
Rhizomatous Grass Cover (%)	2010-80 B2	2013	16.7	8.6	14.2	15.1	11.4	3.2	6.8	19.6
Annual Forb Cover (%)	2010-80 B2	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-80 B2	2013	9.6	6.7	6.7	9.9	11.7	2.2	4.6	13.3
Invasive Annual Grass Cover (%)	2010-80 B2	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-80 B2	2013	27.5	28.9	27.9	22.4	22.1	3.2	19.3	32.3
Bare Ground (%)	2010-80 B2	2013	32.5	33.7	35.1	40.0	33.7	2.9	29.1	40.9
Sagebrush Canopy Cover (%)	2010-80 B2	2013	29.9	33.5	30.4	28.9	36.6	3.1	25.6	38.1
Other Shrub Canopy Cover (%)	2010-80 B2	2013	1.6	1.4	1.0	0.6	1.3	0.4	0.4	1.9
Total Grass Cover (%)	2010-80 B3	2013	36.7	36.3	36.4	36.1	37.5	0.5	35.5	37.7
Total Forb Cover (%)	2010-80 B3	2013	6.7	6.4	6.5	4.5	13.4	3.4	0.7	14.3
Bunchgrass Cover (%)	2010-80 B3	2013	30.7	22.8	28.8	25.0	28.3	3.2	20.8	33.5
Rhizomatous Grass Cover (%)	2010-80 B3	2013	12.2	19.8	16.8	20.7	16.3	3.4	10.5	23.9
Annual Forb Cover (%)	2010-80 B3	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-80 B3	2013	6.7	6.4	6.5	4.5	13.4	3.4	0.7	14.3
Invasive Annual Grass Cover (%)	2010-80 B3	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-80 B3	2013	33.8	40.9	32.6	37.6	36.7	3.3	29.8	42.9
Bare Ground (%)	2010-80 B3	2013	27.0	26.7	32.3	33.2	31.9	3.1	24.0	36.4
Sagebrush Canopy Cover (%)	2010-80 B3	2013	24.8	30.6	29.3	25.0	20.4	4.0	17.9	34.1
Other Shrub Canopy Cover (%)	2010-80 B3	2013	5.2	1.1	0.0	1.0	0.4	2.1	-2.6	5.7
Total Grass Cover (%)	2010-80 B4	2013	22.7	23.0	19.2	18.2	26.4	3.3	15.3	28.5
Total Forb Cover (%)	2010-80 B4	2013	9.5	11.2	8.5	9.0	8.2	1.2	6.9	11.6
Bunchgrass Cover (%)	2010-80 B4	2013	16.5	15.1	12.6	12.2	17.9	2.5	9.9	19.8
Rhizomatous Grass Cover (%)	2010-80 B4	2013	8.5	9.0	9.9	8.2	11.7	1.4	6.6	12.3
Annual Forb Cover (%)	2010-80 B4	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-80 B4	2013	9.5	11.2	8.5	9.0	8.2	1.2	6.9	11.6
Invasive Annual Grass Cover (%)	2010-80 B4	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-80 B4	2013	29.7	27.9	35.7	33.9	26.5	3.9	22.9	38.6
Bare Ground (%)	2010-80 B4	2013	31.4	35.3	26.1	28.2	36.2	4.4	22.7	40.2
Sagebrush Canopy Cover (%)	2010-80 B4	2013	39.3	38.5	41.4	37.2	26.3	5.9	24.7	48.4
Other Shrub Canopy Cover (%)	2010-80 B4	2013	7.3	4.7	2.3	4.7	5.5	1.8	1.3	8.5
Total Grass Cover (%)	2010-80 B5	2013	29.9	27.1	25.2	19.6	25.8	3.8	18.0	33.1
Total Forb Cover (%)	2010-80 B5	2013	9.1	6.1	8.0	4.7	2.9	2.5	1.2	11.1
Bunchgrass Cover (%)	2010-80 B5	2013	17.1	16.9	20.2	13.2	10.8	3.7	8.3	23.0
Rhizomatous Grass Cover (%)	2010-80 B5	2013	16.8	13.5	7.2	8.1	17.9	4.9	2.9	22.5
Annual Forb Cover (%)	2010-80 B5	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-80 B5	2013	9.1	6.1	8.0	4.7	2.9	2.5	1.2	11.1
Invasive Annual Grass Cover (%)	2010-80 B5	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-80 B5	2013	30.0	34.8	32.6	39.0	42.4	5.0	25.8	45.7
Bare Ground (%)	2010-80 B5	2013	32.7	33.9	28.1	25.9	28.2	3.4	23.0	36.5
Sagebrush Canopy Cover (%)	2010-80 B5	2013	29.6	34.7	28.7	36.9	37.4	4.1	25.3	41.7
Other Shrub Canopy Cover (%)	2010-80 B5	2013	3.9	0.1	4.0	4.1	3.0	1.7	-0.3	6.4

Table A.8 Variance comparisons within sample blocks measured in 2013 in the 2010 control area (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Within block comparisons were made by investigating if values by transect were within 2 standard deviations of the mean value of all transects.

Vegetation Measure	Sample Block	Year Measured	Transect 1	Transect 2	Transect 3	Transect 4	Transect 5	Standard Deviation (SD)	Mean - 2 SD	Mean + 2 SD
Total Grass Cover (%)	2010-Control B1	2013	23.7	32.6	37.0	27.6	23.0	6.0	16.8	40.7
Total Forb Cover (%)	2010-Control B1	2013	4.1	4.3	4.7	2.7	2.6	1.0	1.7	5.6
Bunchgrass Cover (%)	2010-Control B1	2013	14.8	23.1	13.2	12.2	13.0	4.5	6.3	24.2
Rhizomatous Grass Cover (%)	2010-Control B1	2013	11.2	15.4	29.6	19.2	14.6	7.1	3.8	32.2
Annual Forb Cover (%)	2010-Control B1	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-Control B1	2013	4.1	4.3	4.7	2.7	2.6	1.0	1.7	5.6
Invasive Annual Grass Cover (%)	2010-Control B1	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-Control B1	2013	19.6	15.1	20.6	30.4	31.7	7.2	9.0	37.9
Bare Ground (%)	2010-Control B1	2013	39.9	30.7	47.8	41.8	31.4	7.3	23.8	52.8
Sagebrush Canopy Cover (%)	2010-Control B1	2013	31.0	32.7	40.2	31.3	39.1	4.4	26.0	43.7
Other Shrub Canopy Cover (%)	2010-Control B1	2013	7.7	8.0	4.5	6.6	9.4	1.8	3.5	10.9
Total Grass Cover (%)	2010-Control B2	2013	27.2	24.3	24.2	27.4	29.3	2.2	22.1	30.9
Total Forb Cover (%)	2010-Control B2	2013	7.1	5.5	3.9	4.1	3.8	1.4	2.0	7.7
Bunchgrass Cover (%)	2010-Control B2	2013	22.4	17.8	17.5	17.7	16.2	2.4	13.6	23.1
Rhizomatous Grass Cover (%)	2010-Control B2	2013	7.4	9.4	8.9	15.7	15.7	4.0	3.5	19.4
Annual Forb Cover (%)	2010-Control B2	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-Control B2	2013	7.1	5.5	3.9	4.1	3.8	1.4	2.0	7.7
Invasive Annual Grass Cover (%)	2010-Control B2	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-Control B2	2013	29.3	48.2	33.7	36.4	28.6	7.9	19.4	51.1
Bare Ground (%)	2010-Control B2	2013	35.6	20.3	39.8	32.1	38.1	7.8	17.7	48.7
Sagebrush Canopy Cover (%)	2010-Control B2	2013	28.8	32.8	29.3	44.0	30.1	6.3	20.3	45.7
Other Shrub Canopy Cover (%)	2010-Control B2	2013	4.4	7.7	6.1	2.5	5.5	1.9	1.4	9.1
Total Grass Cover (%)	2010-Control B3	2013	32.4	39.5	34.7	27.3	32.0	4.4	24.3	42.1
Total Forb Cover (%)	2010-Control B3	2013	11.4	12.7	6.7	6.0	3.8	3.8	0.6	15.7
Bunchgrass Cover (%)	2010-Control B3	2013	23.3	19.6	13.2	18.9	24.7	4.5	11.0	28.9
Rhizomatous Grass Cover (%)	2010-Control B3	2013	11.8	24.4	26.0	10.6	11.0	7.7	1.3	32.2
Annual Forb Cover (%)	2010-Control B3	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-Control B3	2013	11.4	12.7	6.7	6.0	3.8	3.8	0.6	15.7
Invasive Annual Grass Cover (%)	2010-Control B3	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-Control B3	2013	26.9	26.4	29.9	27.3	27.0	1.4	24.7	30.3
Bare Ground (%)	2010-Control B3	2013	34.3	37.0	38.2	41.2	30.3	4.1	28.0	44.4
Sagebrush Canopy Cover (%)	2010-Control B3	2013	23.9	34.6	36.2	28.6	29.9	4.9	20.8	40.5
Other Shrub Canopy Cover (%)	2010-Control B3	2013	2.6	2.9	3.0	5.6	4.3	1.2	1.2	6.2
Total Grass Cover (%)	2010-Control B4	2013	25.5	29.8	23.7	20.9	31.2	4.3	17.7	34.8
Total Forb Cover (%)	2010-Control B4	2013	7.1	6.2	7.8	5.0	5.0	1.2	3.7	8.7
Bunchgrass Cover (%)	2010-Control B4	2013	18.2	10.9	12.4	10.7	18.4	3.9	6.4	21.9
Rhizomatous Grass Cover (%)	2010-Control B4	2013	10.7	23.5	15.3	13.8	19.9	5.1	6.5	26.8
Annual Forb Cover (%)	2010-Control B4	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-Control B4	2013	7.1	6.2	7.8	5.0	5.0	1.2	3.7	8.7
Invasive Annual Grass Cover (%)	2010-Control B4	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-Control B4	2013	37.0	31.9	33.7	36.4	34.4	2.1	30.5	38.8
Bare Ground (%)	2010-Control B4	2013	27.7	33.9	36.5	31.9	27.0	4.0	23.3	39.5
Sagebrush Canopy Cover (%)	2010-Control B4	2013	30.9	30.4	25.5	39.5	29.8	5.1	21.0	41.5
Other Shrub Canopy Cover (%)	2010-Control B4	2013	0.7	4.3	4.0	0.9	0.8	1.9	-1.6	5.9
Total Grass Cover (%)	2010-Control B5	2013	33.2	32.9	39.0	33.6	36.2	2.6	29.8	40.2
Total Forb Cover (%)	2010-Control B5	2013	19.3	17.1	14.9	14.2	12.3	2.7	10.1	21.0
Bunchgrass Cover (%)	2010-Control B5	2013	20.3	15.7	22.5	20.1	28.8	4.8	11.9	31.0
Rhizomatous Grass Cover (%)	2010-Control B5	2013	17.4	24.3	24.1	20.1	14.2	4.4	11.3	28.7
Annual Forb Cover (%)	2010-Control B5	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-Control B5	2013	19.3	17.1	14.9	14.2	12.3	2.7	10.1	21.0
Invasive Annual Grass Cover (%)	2010-Control B5	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-Control B5	2013	24.7	24.6	22.9	29.3	28.2	2.7	20.6	31.3
Bare Ground (%)	2010-Control B5	2013	28.4	36.4	34.4	31.6	30.0	3.2	25.7	38.6
Sagebrush Canopy Cover (%)	2010-Control B5	2013	15.2	20.3	27.4	22.4	22.6	4.4	12.7	30.4
Other Shrub Canopy Cover (%)	2010-Control B5	2013	4.6	5.7	3.6	3.1	9.4	2.5	0.2	10.3

Table A.9 Variance comparisons within sample blocks measured in 2013 in areas fertilized in 2011 at a rate of 40 lb/acre (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Within block comparisons were made by investigating if values by transect were within 2 standard deviations of the mean value of all transects.

Vegetation Measure	Sample Block	Year Measured	Transect 1	Transect 2	Transect 3	Transect 4	Transect 5	Standard Deviation (SD)	Mean - 2 SD	Mean + 2 SD
Total Grass Cover (%)	2011-40 B1	2013	28.4	21.0	18.4	17.6	20.1	4.3	12.5	29.7
Total Forb Cover (%)	2011-40 B1	2013	1.6	1.3	1.4	1.5	1.5	0.1	1.2	1.7
Bunchgrass Cover (%)	2011-40 B1	2013	7.3	9.0	9.8	9.1	7.8	1.0	6.6	10.6
Rhizomatous Grass Cover (%)	2011-40 B1	2013	25.2	14.6	10.7	10.9	15.1	5.9	3.5	27.1
Annual Forb Cover (%)	2011-40 B1	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2011-40 B1	2013	1.6	1.3	1.4	1.5	1.5	0.1	1.2	1.7
Invasive Annual Grass Cover (%)	2011-40 B1	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2011-40 B1	2013	35.1	29.1	33.9	31.1	34.2	2.5	27.7	37.7
Bare Ground (%)	2011-40 B1	2013	32.9	39.6	41.8	41.4	39.0	3.6	31.8	46.1
Sagebrush Canopy Cover (%)	2011-40 B1	2013	41.7	36.7	37.8	50.1	41.6	5.3	31.1	52.1
Other Shrub Canopy Cover (%)	2011-40 B1	2013	3.3	5.3	2.8	2.5	2.2	1.2	0.8	5.7
Total Grass Cover (%)	2011-40 B2	2013	36.0	35.2	25.5	31.5	28.9	4.4	22.7	40.2
Total Forb Cover (%)	2011-40 B2	2013	2.6	8.3	5.8	6.4	3.3	2.3	0.6	9.9
Bunchgrass Cover (%)	2011-40 B2	2013	21.9	22.2	21.2	22.9	19.6	1.3	19.1	24.1
Rhizomatous Grass Cover (%)	2011-40 B2	2013	18.4	14.9	6.7	12.2	13.9	4.3	4.6	21.8
Annual Forb Cover (%)	2011-40 B2	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2011-40 B2	2013	2.6	8.3	5.8	6.4	3.3	2.3	0.6	9.9
Invasive Annual Grass Cover (%)	2011-40 B2	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2011-40 B2	2013	26.7	23.2	33.2	24.1	37.5	6.2	16.6	41.3
Bare Ground (%)	2011-40 B2	2013	43.2	37.2	29.7	37.0	28.0	6.2	22.6	47.4
Sagebrush Canopy Cover (%)	2011-40 B2	2013	29.2	23.4	41.2	31.3	40.3	7.6	17.9	48.2
Other Shrub Canopy Cover (%)	2011-40 B2	2013	2.3	2.8	1.9	3.4	2.0	0.6	1.3	3.7
Total Grass Cover (%)	2011-40 B3	2013	28.7	32.7	27.7	36.1	28.7	3.5	23.7	37.9
Total Forb Cover (%)	2011-40 B3	2013	2.9	3.5	1.0	4.6	2.9	1.3	0.4	5.6
Bunchgrass Cover (%)	2011-40 B3	2013	11.6	17.2	18.7	12.2	11.6	3.4	7.4	21.1
Rhizomatous Grass Cover (%)	2011-40 B3	2013	21.4	22.1	15.4	29.0	21.4	4.8	12.2	31.5
Annual Forb Cover (%)	2011-40 B3	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2011-40 B3	2013	2.9	3.5	1.0	4.6	2.9	1.3	0.4	5.6
Invasive Annual Grass Cover (%)	2011-40 B3	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2011-40 B3	2013	32.8	45.1	38.2	27.0	32.8	6.8	21.6	48.8
Bare Ground (%)	2011-40 B3	2013	36.7	33.1	28.1	42.0	36.7	5.1	25.0	45.6
Sagebrush Canopy Cover (%)	2011-40 B3	2013	28.3	29.6	28.5	32.0	44.0	6.6	19.2	45.7
Other Shrub Canopy Cover (%)	2011-40 B3	2013	1.7	1.2	1.5	1.3	3.7	1.0	-0.2	4.0
Total Grass Cover (%)	2011-40 B4	2013	21.1	22.1	26.0	28.2	24.8	2.9	18.7	30.2
Total Forb Cover (%)	2011-40 B4	2013	3.6	2.4	3.0	3.6	6.0	1.4	1.0	6.5
Bunchgrass Cover (%)	2011-40 B4	2013	10.2	11.3	12.3	8.9	7.9	1.8	6.6	13.7
Rhizomatous Grass Cover (%)	2011-40 B4	2013	12.6	15.1	17.7	23.0	20.5	4.1	9.5	26.1
Annual Forb Cover (%)	2011-40 B4	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2011-40 B4	2013	3.6	2.4	3.0	3.6	6.0	1.4	1.0	6.5
Invasive Annual Grass Cover (%)	2011-40 B4	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2011-40 B4	2013	28.1	36.1	35.9	35.1	35.4	3.4	27.3	40.9
Bare Ground (%)	2011-40 B4	2013	42.7	37.4	35.0	36.6	35.1	3.2	31.1	43.7
Sagebrush Canopy Cover (%)	2011-40 B4	2013	37.9	49.0	39.5	47.3	48.3	5.3	33.9	54.9
Other Shrub Canopy Cover (%)	2011-40 B4	2013	0.8	0.8	0.1	0.2	1.0	0.4	-0.2	1.4
Total Grass Cover (%)	2011-40 B5	2013	39.2	27.0	20.9	28.0	33.3	6.9	15.9	43.5
Total Forb Cover (%)	2011-40 B5	2013	2.5	7.4	5.5	6.9	2.7	2.3	0.4	9.6
Bunchgrass Cover (%)	2011-40 B5	2013	21.1	13.4	11.2	15.6	18.7	4.0	8.0	24.0
Rhizomatous Grass Cover (%)	2011-40 B5	2013	23.8	16.9	13.4	16.4	19.3	3.9	10.2	25.7
Annual Forb Cover (%)	2011-40 B5	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2011-40 B5	2013	2.5	7.4	5.5	6.9	2.7	2.3	0.4	9.6
Invasive Annual Grass Cover (%)	2011-40 B5	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2011-40 B5	2013	38.9	31.5	37.4	38.0	31.9	3.5	28.4	42.6
Bare Ground (%)	2011-40 B5	2013	39.8	45.7	43.9	41.9	47.0	2.9	37.9	49.4
Sagebrush Canopy Cover (%)	2011-40 B5	2013	37.7	33.4	34.4	26.3	39.0	5.0	24.2	44.1
Other Shrub Canopy Cover (%)	2011-40 B5	2013	2.5	2.3	3.5	4.7	3.3	0.9	1.4	5.1

Table A.9 Variance comparisons within sample blocks measured in 2013 in areas within the 2011 control (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Within block comparisons were made by investigating if values by transect were within 2 standard deviations of the mean value of all transects.

Vegetation Measure	Sample Block	Year Measured	Transect 1	Transect 2	Transect 3	Transect 4	Transect 5	Standard Deviation (SD)	Mean - 2 SD	Mean + 2 SD
Total Grass Cover (%)	2011-Control B1	2013	26.0	29.8	24.9	30.6	15.7	5.9	13.5	37.3
Total Forb Cover (%)	2011-Control B1	2013	3.2	2.9	7.6	5.2	4.1	1.9	0.8	8.4
Bunchgrass Cover (%)	2011-Control B1	2013	12.5	19.0	5.6	19.5	7.7	6.3	0.2	25.6
Rhizomatous Grass Cover (%)	2011-Control B1	2013	17.1	17.6	22.6	14.5	9.6	4.7	6.8	25.8
Annual Forb Cover (%)	2011-Control B1	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2011-Control B1	2013	3.2	2.9	7.6	5.2	4.1	1.9	0.8	8.4
Invasive Annual Grass Cover (%)	2011-Control B1	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2011-Control B1	2013	35.3	31.1	21.1	27.7	37.1	6.4	17.7	43.2
Bare Ground (%)	2011-Control B1	2013	33.3	34.9	51.8	38.0	34.8	7.6	23.4	53.8
Sagebrush Canopy Cover (%)	2011-Control B1	2013	34.4	38.5	36.5	39.3	44.6	3.8	31.0	46.3
Other Shrub Canopy Cover (%)	2011-Control B1	2013	2.6	1.3	5.5	1.4	2.2	1.7	-0.8	6.0
Total Grass Cover (%)	2011-Control B2	2013	21.4	28.9	30.9	31.7	35.2	5.1	19.4	39.9
Total Forb Cover (%)	2011-Control B2	2013	12.5	11.7	12.8	10.7	6.3	2.6	5.5	16.1
Bunchgrass Cover (%)	2011-Control B2	2013	15.2	22.6	20.4	21.9	30.4	5.5	11.2	33.0
Rhizomatous Grass Cover (%)	2011-Control B2	2013	9.7	9.3	13.8	14.4	6.6	3.3	4.2	17.3
Annual Forb Cover (%)	2011-Control B2	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2011-Control B2	2013	12.5	11.7	12.8	10.7	6.3	2.6	5.5	16.1
Invasive Annual Grass Cover (%)	2011-Control B2	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2011-Control B2	2013	16.7	20.2	14.7	23.0	25.7	4.5	11.1	29.0
Bare Ground (%)	2011-Control B2	2013	54.4	45.5	49.1	41.1	37.0	6.8	31.9	59.0
Sagebrush Canopy Cover (%)	2011-Control B2	2013	28.1	32.0	33.7	35.1	53.2	9.8	16.9	55.9
Other Shrub Canopy Cover (%)	2011-Control B2	2013	0.9	1.0	0.0	2.6	1.1	0.9	-0.7	3.0
Total Grass Cover (%)	2011-Control B3	2013	32.0	40.2	27.2	29.5	21.1	7.0	16.0	44.0
Total Forb Cover (%)	2011-Control B3	2013	4.9	9.6	7.3	12.8	9.1	2.9	2.9	14.6
Bunchgrass Cover (%)	2011-Control B3	2013	29.9	25.7	19.6	17.4	14.6	6.2	8.9	33.9
Rhizomatous Grass Cover (%)	2011-Control B3	2013	3.8	17.8	9.8	17.1	8.5	6.0	-0.5	23.3
Annual Forb Cover (%)	2011-Control B3	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2011-Control B3	2013	4.9	9.6	7.3	12.8	9.1	2.9	2.9	14.6
Invasive Annual Grass Cover (%)	2011-Control B3	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2011-Control B3	2013	19.1	24.9	30.2	23.0	28.4	4.4	16.3	33.9
Bare Ground (%)	2011-Control B3	2013	38.0	40.2	31.0	43.1	39.1	4.5	29.3	47.3
Sagebrush Canopy Cover (%)	2011-Control B3	2013	38.5	28.7	33.5	34.6	34.5	3.5	26.9	41.0
Other Shrub Canopy Cover (%)	2011-Control B3	2013	2.2	1.5	2.6	4.6	2.2	1.2	0.3	5.0
Total Grass Cover (%)	2011-Control B4	2013	22.1	21.5	22.0	24.5	31.2	4.1	16.2	32.4
Total Forb Cover (%)	2011-Control B4	2013	6.6	3.4	6.2	4.3	8.2	1.9	1.9	9.6
Bunchgrass Cover (%)	2011-Control B4	2013	10.2	12.5	11.4	11.3	17.2	2.7	7.0	18.0
Rhizomatous Grass Cover (%)	2011-Control B4	2013	15.3	11.9	14.9	15.9	19.1	2.6	10.3	20.6
Annual Forb Cover (%)	2011-Control B4	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2011-Control B4	2013	6.6	3.4	6.2	4.3	8.2	1.9	1.9	9.6
Invasive Annual Grass Cover (%)	2011-Control B4	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2011-Control B4	2013	29.7	27.4	33.0	31.3	21.6	4.4	19.8	37.4
Bare Ground (%)	2011-Control B4	2013	36.7	43.0	31.8	35.8	39.8	4.2	29.0	45.9
Sagebrush Canopy Cover (%)	2011-Control B4	2013	37.0	41.6	39.3	43.2	39.1	2.4	35.2	44.9
Other Shrub Canopy Cover (%)	2011-Control B4	2013	4.2	2.2	3.6	1.4	1.7	1.2	0.2	5.0
Total Grass Cover (%)	2011-Control B5	2013	34.2	29.5	29.2	26.8	31.4	2.8	24.7	35.7
Total Forb Cover (%)	2011-Control B5	2013	15.6	18.0	5.6	2.6	4.7	7.0	-4.7	23.3
Bunchgrass Cover (%)	2011-Control B5	2013	14.5	18.2	19.5	17.0	21.5	2.6	12.9	23.4
Rhizomatous Grass Cover (%)	2011-Control B5	2013	24.2	18.0	12.4	13.2	14.3	4.8	6.7	26.1
Annual Forb Cover (%)	2011-Control B5	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2011-Control B5	2013	15.6	18.0	5.6	2.6	4.7	7.0	-4.7	23.3
Invasive Annual Grass Cover (%)	2011-Control B5	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litter Cover (%)	2011-Control B5	2013	24.3	15.8	41.7	44.1	34.5	11.9	8.2	55.9
Bare Ground (%)	2011-Control B5	2013	49.9	51.6	39.3	39.9	44.2	5.6	33.7	56.2
Sagebrush Canopy Cover (%)	2011-Control B5	2013	29.7	15.6	34.5	29.7	27.7	7.1	13.3	41.6
Other Shrub Canopy Cover (%)	2011-Control B5	2013	0.4	2.0	1.1	1.9	2.8	0.9	-0.2	3.4

Appendix B

Treatment Comparisons

2012-13 Measures Comparisons:

Table B.1 Comparison of sample blocks measured in areas fertilized in 2010 at a rate of 40 lb/acre and 2010 control blocks (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. None of vegetation measured differed significantly between treatment and control as assessed by 95% confidence intervals (95% CI).

			Standard	95% Confidence Interval				Standard	95% Confidence Interval	
Vegetation Measure	**Treatment**	**Mean**	**Error**	**Lower**	**Upper**	**Treatment**	**Mean**	**Error**	**Lower**	**Upper**
Total Grass Cover (%)	2010-40	31.5	2.3	26.3	36.7	2010-Control	27.6	1.7	23.7	31.5
Total Forb Cover (%)	2010-40	4.2	1.1	1.8	6.6	2010-Control	7.1	1.2	4.4	9.7
Bunchgrass Cover (%)	2010-40	17.3	0.9	15.3	19.3	2010-Control	15.4	1.3	12.4	18.4
Rhizomatous Grass Cover (%)	2010-40	19.1	1.9	14.7	23.4	2010-Control	15.8	1.0	13.4	18.1
Annual Forb Cover (%)	2010-40	0.0	0.0	0.0	0.0	2010-Control	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-40	4.2	1.1	1.8	6.6	2010-Control	7.1	1.2	4.4	9.7
Invasive Annual Grass Cover (%)	2010-40	0.0	0.0	0.0	0.0	2010-Control	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-40	38.1	3.0	31.3	44.9	2010-Control	31.4	2.9	24.8	37.9
Bare Ground (%)	2010-40	41.4	3.7	33.0	49.9	2010-Control	45.1	4.6	34.7	55.5
Sagebrush Canopy Cover (%)	2010-40	30.1	1.3	27.1	33.1	2010-Control	26.9	1.9	22.6	31.2
Other Shrub Canopy Cover (%)	2010-40	2.1	0.8	0.4	3.8	2010-Control	4.2	0.5	3.0	5.4
Sagebrush Height (cm)	2010-40	30.4	1.5	27.0	33.8	2010-Control	31.5	1.4	28.4	34.6
Sagebrush Leader Length (cm)	2010-40	2.6	0.4	1.7	3.5	2010-Control	1.8	0.2	1.3	2.4

Table B.2 Comparison of sample blocks measured in areas fertilized in 2010 at a rate of 80 lb/acre and 2010 control blocks (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. None of vegetation measured differed significantly between treatment and control as assessed by 95% confidence intervals (95% CI).

			Standard	95% Confidence Interval				Standard	95% Confidence Interval	
Vegetation Measure	**Treatment**	**Mean**	**Error**	**Lower**	**Upper**	**Treatment**	**Mean**	**Error**	**Lower**	**Upper**
Total Grass Cover (%)	2010-80	31.2	2.4	25.8	36.6	2010-Control	27.6	1.7	23.7	31.5
Total Forb Cover (%)	2010-80	7.4	0.8	5.5	9.2	2010-Control	7.1	1.2	4.4	9.7
Bunchgrass Cover (%)	2010-80	18.9	1.6	15.2	22.6	2010-Control	15.4	1.3	12.4	18.4
Rhizomatous Grass Cover (%)	2010-80	17.0	2.2	12.0	22.0	2010-Control	15.8	1.0	13.4	18.1
Annual Forb Cover (%)	2010-80	0.2	0.1	0.0	0.4	2010-Control	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-80	6.9	0.8	5.0	8.9	2010-Control	7.1	1.2	4.4	9.7
Invasive Annual Grass Cover (%)	2010-80	0.1	0.1	0.0	0.2	2010-Control	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-80	33.8	2.8	27.5	40.1	2010-Control	31.4	2.9	24.8	37.9
Bare Ground (%)	2010-80	40.2	3.4	32.6	47.9	2010-Control	45.1	4.6	34.7	55.5
Sagebrush Canopy Cover (%)	2010-80	30.5	1.8	26.4	34.6	2010-Control	26.9	1.9	22.6	31.2
Other Shrub Canopy Cover (%)	2010-80	2.1	0.5	1.0	3.1	2010-Control	4.2	0.5	3.0	5.4
Sagebrush Height (cm)	2010-80	28.9	1.5	25.4	32.4	2010-Control	31.5	1.4	28.4	34.6
Sagebrush Leader Length (cm)	2010-80	2.3	0.4	1.4	3.2	2010-Control	1.8	0.2	1.3	2.4

Table B.3 Comparison of sample blocks measured in areas fertilized in 2010 at a rate of 40 lb/acre and areas fertilized in 2010 at a rate of 80 lb/acre (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. None of vegetation measured differed significantly between treatments as assessed by 95% confidence intervals (95% CI).

			Standard	95% Confidence Interval				Standard	95% Confidence Interval	
Vegetation Measure	**Treatment**	**Mean**	**Error**	**Lower**	**Upper**	**Treatment**	**Mean**	**Error**	**Lower**	**Upper**
Total Grass Cover (%)	2010-40	31.5	2.3	26.3	36.7	2010-80	31.2	2.4	25.8	36.6
Total Forb Cover (%)	2010-40	4.2	1.1	1.8	6.6	2010-80	7.4	0.8	5.5	9.2
Bunchgrass Cover (%)	2010-40	17.3	0.9	15.3	19.3	2010-80	18.9	1.6	15.2	22.6
Rhizomatous Grass Cover (%)	2010-40	19.1	1.9	14.7	23.4	2010-80	17.0	2.2	12.0	22.0
Annual Forb Cover (%)	2010-40	0.0	0.0	0.0	0.0	2010-80	0.2	0.1	0.0	0.4
Perennial Forb Cover (%)	2010-40	4.2	1.1	1.8	6.6	2010-80	6.9	0.8	5.0	8.9
Invasive Annual Grass Cover (%)	2010-40	0.0	0.0	0.0	0.0	2010-80	0.1	0.1	0.0	0.2
Litter Cover (%)	2010-40	38.1	3.0	31.3	44.9	2010-80	33.8	2.8	27.5	40.1
Bare Ground (%)	2010-40	41.4	3.7	33.0	49.9	2010-80	40.2	3.4	32.6	47.9
Sagebrush Canopy Cover (%)	2010-40	30.1	1.3	27.1	33.1	2010-80	30.5	1.8	26.4	34.6
Other Shrub Canopy Cover (%)	2010-40	2.1	0.8	0.4	3.8	2010-80	2.1	0.5	1.0	3.1
Sagebrush Height (cm)	2010-40	30.4	1.5	27.0	33.8	2010-80	28.9	1.5	25.4	32.4
Sagebrush Leader Length (cm)	2010-40	2.6	0.4	1.7	3.5	2010-80	2.3	0.4	1.4	3.2

Table B.4 Comparison of sample blocks measured in areas fertilized in 2011 at a rate of 40 lb/acre and 2011 control blocks (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Litter cover was significantly higher in treated areas compared to control as assessed by 95% confidence intervals (95% CI).

			Standard	95% Confidence Interval				Standard	95% Confidence Interval	
Vegetation Measure	**Treatment**	**Mean**	**Error**	**Lower**	**Upper**	**Treatment**	**Mean**	**Error**	**Lower**	**Upper**
Total Grass Cover (%)	2011-40	29.7	1.4	26.5	32.9	2011-Control	29.0	1.0	26.8	31.3
Total Forb Cover (%)	2011-40	4.5	0.6	3.1	5.8	2011-Control	7.4	0.8	5.5	9.2
Bunchgrass Cover (%)	2011-40	13.6	1.3	10.6	16.5	2011-Control	15.6	1.3	12.7	18.5
Rhizomatous Grass Cover (%)	2011-40	20.4	1.5	17.0	23.7	2011-Control	16.8	1.4	13.7	20.0
Annual Forb Cover (%)	2011-40	0.0	0.0	0.0	0.0	2011-Control	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2011-40	4.5	0.6	3.1	5.8	2011-Control	7.4	0.8	5.5	9.2
Invasive Annual Grass Cover (%)	2011-40	0.0	0.0	0.0	0.0	2011-Control	0.0	0.0	0.0	0.0
Litter Cover (%)	2011-40	32.9	1.1	30.5	35.3	2011-Control	27.5	1.3	24.6	30.4
Bare Ground (%)	2011-40	45.0	3.0	38.2	51.8	2011-Control	46.3	2.6	40.5	52.2
Sagebrush Canopy Cover (%)	2011-40	32.1	2.4	26.8	37.5	2011-Control	31.6	2.0	27.2	36.1
Other Shrub Canopy Cover (%)	2011-40	1.8	0.3	1.0	2.6	2011-Control	1.7	0.2	1.2	2.3
Sagebrush Height (cm)	2011-40	29.8	0.8	27.9	31.6	2011-Control	26.4	1.0	24.2	28.7
Sagebrush Leader Length (cm)	2011-40	1.8	0.3	1.2	2.4	2011-Control	1.7	0.2	1.2	2.2

Table B.5 Comparison of sample blocks measured in areas fertilized in 2010 at a rate of 40 lb/acre and areas fertilized in 2011 at a rate of 40 lb/acre (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. None of vegetation measured differed significantly between treatments as assessed by 95% confidence intervals (95% CI).

			Standard	95% Confidence Interval				Standard	95% Confidence Interval	
Vegetation Measure	**Treatment**	**Mean**	**Error**	**Lower**	**Upper**	**Treatment**	**Mean**	**Error**	**Lower**	**Upper**
Total Grass Cover (%)	2010-40	31.5	2.3	26.3	36.7	2011-40	29.7	1.4	26.5	32.9
Total Forb Cover (%)	2010-40	4.2	1.1	1.8	6.6	2011-40	4.5	0.6	3.1	5.8
Bunchgrass Cover (%)	2010-40	17.3	0.9	15.3	19.3	2011-40	13.6	1.3	10.6	16.5
Rhizomatous Grass Cover (%)	2010-40	19.1	1.9	14.7	23.4	2011-40	20.4	1.5	17.0	23.7
Annual Forb Cover (%)	2010-40	0.0	0.0	0.0	0.0	2011-40	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-40	4.2	1.1	1.8	6.6	2011-40	4.5	0.6	3.1	5.8
Invasive Annual Grass Cover (%)	2010-40	0.0	0.0	0.0	0.0	2011-40	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-40	38.1	3.0	31.3	44.9	2011-40	32.9	1.1	30.5	35.3
Bare Ground (%)	2010-40	41.4	3.7	33.0	49.9	2011-40	45.0	3.0	38.2	51.8
Sagebrush Canopy Cover (%)	2010-40	30.1	1.3	27.1	33.1	2011-40	32.1	2.4	26.8	37.5
Other Shrub Canopy Cover (%)	2010-40	2.1	0.8	0.4	3.8	2011-40	1.8	0.3	1.0	2.6
Sagebrush Height (cm)	2010-40	30.4	1.5	27.0	33.8	2011-40	29.8	0.8	27.9	31.6
Sagebrush Leader Length (cm)	2010-40	2.6	0.4	1.7	3.5	2011-40	1.8	0.3	1.2	2.4

Table B.6 Comparison of sample blocks measured in areas fertilized in 2010 at a rate of 80 lb/acre and areas fertilized in 2011 at a rate of 40 lb/acre (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. None of vegetation measured differed significantly between treatments as assessed by 95% confidence intervals (95% CI).

			Standard	95% Confidence Interval				Standard	95% Confidence Interval	
Vegetation Measure	**Treatment**	**Mean**	**Error**	**Lower**	**Upper**	**Treatment**	**Mean**	**Error**	**Lower**	**Upper**
Total Grass Cover (%)	2010-80	31.2	2.4	25.8	36.6	2011-40	29.7	1.4	26.5	32.9
Total Forb Cover (%)	2010-80	7.4	0.8	5.5	9.2	2011-40	4.5	0.6	3.1	5.8
Bunchgrass Cover (%)	2010-80	18.9	1.6	15.2	22.6	2011-40	13.6	1.3	10.6	16.5
Rhizomatous Grass Cover (%)	2010-80	17.0	2.2	12.0	22.0	2011-40	20.4	1.5	17.0	23.7
Annual Forb Cover (%)	2010-80	0.2	0.1	0.0	0.4	2011-40	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-80	6.9	0.8	5.0	8.9	2011-40	4.5	0.6	3.1	5.8
Invasive Annual Grass Cover (%)	2010-80	0.1	0.1	0.0	0.2	2011-40	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-80	33.8	2.8	27.5	40.1	2011-40	32.9	1.1	30.5	35.3
Bare Ground (%)	2010-80	40.2	3.4	32.6	47.9	2011-40	45.0	3.0	38.2	51.8
Sagebrush Canopy Cover (%)	2010-80	30.5	1.8	26.4	34.6	2011-40	32.1	2.4	26.8	37.5
Other Shrub Canopy Cover (%)	2010-80	2.1	0.5	1.0	3.1	2011-40	1.8	0.3	1.0	2.6
Sagebrush Height (cm)	2010-80	28.9	1.5	25.4	32.4	2011-40	29.8	0.8	27.9	31.6
Sagebrush Leader Length (cm)	2010-80	2.3	0.4	1.4	3.2	2011-40	1.8	0.3	1.2	2.4

2012 Measures Comparisons:

Table B.7 Comparison of sample blocks measured in areas fertilized in 2010 at a rate of 40 lb/acre and 2010 control blocks (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012. None of vegetation measured differed significantly between treatment and controls as assessed by 95% confidence intervals (95% CI).

				95% Confidence Interval					95% Confidence Interval	
Vegetation Measure	**Treatment**	**Mean**	**Standard Error**	**Lower**	**Upper**	**Treatment**	**Mean**	**Standard Error**	**Lower**	**Upper**
Total Grass Cover (%)	2010-40	31.5	4.8	18.1	44.9	2010-Control	24.7	2.7	17.2	32.1
Total Forb Cover (%)	2010-40	2.8	0.8	0.7	4.9	2010-Control	6.3	0.8	4.2	8.4
Bunchgrass Cover (%)	2010-40	16.7	1.9	11.4	22.0	2010-Control	12.3	1.3	8.8	15.8
Rhizomatous Grass Cover (%)	2010-40	18.9	3.9	8.1	29.7	2010-Control	14.8	1.6	10.3	19.3
Succulent Forb Cover (%)	2010-40	0.0	0.0	0.0	0.0	2010-Control	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-40	2.8	0.8	0.7	4.9	2010-Control	6.3	0.8	4.2	8.4
Invasive Annual Grass Cover (%)	2010-40	0.0	0.0	0.0	0.0	2010-Control	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-40	39.4	6.8	20.4	58.4	2010-Control	33.9	6.1	16.9	50.9
Bare Ground (%)	2010-40	52.0	3.4	42.6	61.4	2010-Control	58.7	3.5	48.8	68.5
Sagebrush Canopy Cover (%)	2010-40	27.0	1.1	24.0	30.0	2010-Control	22.7	1.5	18.7	26.8
Other Shrub Canopy Cover (%)	2010-40	1.2	0.5	-0.4	2.7	2010-Control	3.6	0.5	2.1	5.0
Sagebrush Height (cm)	2010-40	33.5	2.4	26.9	40.1	2010-Control	32.1	3.0	23.7	40.6
Sagebrush Leader Length (cm)	2010-40	3.8	0.3	2.8	4.7	2010-Control	2.5	0.3	1.5	3.5

Table B.8 Comparison of sample blocks measured in areas fertilized in 2010 at a rate of 80 lb/acre and 2010 control blocks (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012. None of vegetation measured differed significantly between treatment and controls as assessed by 95% confidence intervals (95% CI).

				95% Confidence Interval					95% Confidence Interval	
Vegetation Measure	**Treatment**	**Mean**	**Standard Error**	**Lower**	**Upper**	**Treatment**	**Mean**	**Standard Error**	**Lower**	**Upper**
Total Grass Cover (%)	2010-80	30.7	4.1	19.5	42.0	2010-Control	24.7	2.7	17.2	32.1
Total Forb Cover (%)	2010-80	5.9	1.3	2.1	9.6	2010-Control	6.3	0.8	4.2	8.4
Bunchgrass Cover (%)	2010-80	17.1	1.4	13.2	21.1	2010-Control	12.3	1.3	8.8	15.8
Rhizomatous Grass Cover (%)	2010-80	19.0	4.0	7.9	30.2	2010-Control	14.8	1.6	10.3	19.3
Succulent Forb Cover (%)	2010-80	0.4	0.2	-0.1	0.8	2010-Control	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-80	4.9	0.9	2.4	7.4	2010-Control	6.3	0.8	4.2	8.4
Invasive Annual Grass Cover (%)	2010-80	0.2	0.1	-0.1	0.6	2010-Control	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-80	38.6	4.3	26.6	50.7	2010-Control	33.9	6.1	16.9	50.9
Bare Ground (%)	2010-80	48.5	4.5	36.1	60.9	2010-Control	58.7	3.5	48.8	68.5
Sagebrush Canopy Cover (%)	2010-80	26.5	0.3	25.6	27.4	2010-Control	22.7	1.5	18.7	26.8
Other Shrub Canopy Cover (%)	2010-80	1.4	0.6	-0.1	3.0	2010-Control	3.6	0.5	2.1	5.0
Sagebrush Height (cm)	2010-80	32.1	2.3	25.8	38.5	2010-Control	32.1	3.0	23.7	40.6
Sagebrush Leader Length (cm)	2010-80	3.5	0.4	2.5	4.5	2010-Control	2.5	0.3	1.5	3.5

Table B.9 Comparison of sample blocks measured in areas fertilized in 2011 at a rate of 40 lb/acre and 2011 control blocks (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012. None of vegetation measured differed significantly between treatment and controls as assessed by 95% confidence intervals (95% CI).

				95% Confidence Interval					95% Confidence Interval	
Vegetation Measure	**Treatment**	**Mean**	**Standard Error**	**Lower**	**Upper**	**Treatment**	**Mean**	**Standard Error**	**Lower**	**Upper**
Total Grass Cover (%)	2011-40	32.5	0.6	30.8	34.2	2011-Control	30.4	1.4	26.5	34.4
Total Forb Cover (%)	2011-40	5.5	0.8	3.1	7.8	2011-Control	6.8	1.2	3.4	10.1
Bunchgrass Cover (%)	2011-40	12.9	1.1	9.9	15.9	2011-Control	13.3	0.3	12.4	14.2
Rhizomatous Grass Cover (%)	2011-40	24.3	0.8	21.9	26.6	2011-Control	20.3	1.2	16.9	23.8
Succulent Forb Cover (%)	2011-40	0.0	0.0	0.0	0.0	2011-Control	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2011-40	5.5	0.8	3.1	7.8	2011-Control	6.8	1.2	3.4	10.1
Invasive Annual Grass Cover (%)	2011-40	0.0	0.0	0.0	0.0	2011-Control	0.0	0.0	0.0	0.0
Litter Cover (%)	2011-40	32.5	2.1	26.7	38.2	2011-Control	27.8	1.4	23.8	31.8
Bare Ground (%)	2011-40	53.7	2.3	47.2	60.1	2011-Control	53.1	2.6	45.8	60.5
Sagebrush Canopy Cover (%)	2011-40	25.9	0.8	23.8	28.0	2011-Control	27.0	1.5	22.8	31.2
Other Shrub Canopy Cover (%)	2011-40	1.2	0.2	0.6	1.8	2011-Control	1.2	0.2	0.7	1.7
Sagebrush Height (cm)	2011-40	31.7	0.8	29.4	33.9	2011-Control	27.9	1.4	23.9	32.0
Sagebrush Leader Length (cm)	2011-40	2.6	0.1	2.3	3.0	2011-Control	2.4	0.1	2.1	2.7

2013 Measures Comparisons:

Table B.10 Comparison of sample blocks measured in areas fertilized in 2010 at a rate of 40 lb/acre and 2010 control blocks (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2013. None of vegetation measured differed significantly between treatment and controls as assessed by 95% confidence intervals (95% CI).

				95% Confidence Interval					95% Confidence Interval	
Vegetation Measure	**Treatment**	**Mean**	**Standard Error**	**Lower**	**Upper**	**Treatment**	**Mean**	**Standard Error**	**Lower**	**Upper**
Total Grass Cover (%)	2010-40	31.5	2.3	25.6	37.5	2010-Control	29.9	1.8	25.4	34.5
Total Forb Cover (%)	2010-40	5.3	1.7	0.9	9.8	2010-Control	7.7	2.1	2.3	13.1
Bunchgrass Cover (%)	2010-40	17.8	0.7	16.0	19.5	2010-Control	17.8	1.4	14.3	21.4
Rhizomatous Grass Cover (%)	2010-40	19.2	2.1	13.9	24.5	2010-Control	16.6	1.4	12.9	20.2
Succulent Forb Cover (%)	2010-40	0.0	0.0	0.0	0.0	2010-Control	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-40	5.3	1.7	0.9	9.8	2010-Control	7.7	2.1	2.3	13.1
Invasive Annual Grass Cover (%)	2010-40	0.0	0.0	0.0	0.0	2010-Control	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-40	37.0	1.9	32.1	41.9	2010-Control	29.4	2.4	23.3	35.5
Bare Ground (%)	2010-40	33.0	1.7	28.6	37.4	2010-Control	34.3	1.3	30.9	37.6
Sagebrush Canopy Cover (%)	2010-40	32.6	1.5	28.8	36.3	2010-Control	30.3	2.3	24.4	36.2
Other Shrub Canopy Cover (%)	2010-40	2.8	1.2	-0.4	6.0	2010-Control	4.7	0.9	2.5	6.9
Sagebrush Height (cm)	2010-40	27.9	1.1	25.1	30.7	2010-Control	31.0	1.1	28.2	33.7
Sagebrush Leader Length (cm)	2010-40	1.6	0.1	1.5	1.8	2010-Control	1.4	0.1	1.2	1.6

Table B.11 Comparison of sample blocks measured in areas fertilized in 2010 at a rate of 80 lb/acre and 2010 control blocks (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2013. Sagebrush leader length was significantly higher in treated areas compared to control in 2013 as assessed by 95% confidence intervals (95% CI).

				95% Confidence Interval					95% Confidence Interval	
Vegetation Measure	**Treatment**	**Mean**	**Standard Error**	**Lower**	**Upper**	**Treatment**	**Mean**	**Standard Error**	**Lower**	**Upper**
Total Grass Cover (%)	2010-80	31.5	2.3	25.6	37.5	2010-Control	31.6	3.3	23.2	40.1
Total Forb Cover (%)	2010-80	5.3	1.7	0.9	9.8	2010-Control	8.5	0.8	6.5	10.6
Bunchgrass Cover (%)	2010-80	17.8	0.7	16.0	19.5	2010-Control	20.3	2.7	13.3	27.3
Rhizomatous Grass Cover (%)	2010-80	19.2	2.1	13.9	24.5	2010-Control	15.4	2.5	8.8	21.9
Succulent Forb Cover (%)	2010-80	0.0	0.0	0.0	0.0	2010-Control	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2010-80	5.3	1.7	0.9	9.8	2010-Control	8.5	0.8	6.5	10.6
Invasive Annual Grass Cover (%)	2010-80	0.0	0.0	0.0	0.0	2010-Control	0.0	0.0	0.0	0.0
Litter Cover (%)	2010-80	37.0	1.9	32.1	41.9	2010-Control	29.9	2.9	22.4	37.5
Bare Ground (%)	2010-80	33.0	1.7	28.6	37.4	2010-Control	33.6	2.2	27.9	39.3
Sagebrush Canopy Cover (%)	2010-80	32.6	1.5	28.8	36.3	2010-Control	33.7	2.4	27.4	40.0
Other Shrub Canopy Cover (%)	2010-80	2.8	1.2	-0.4	6.0	2010-Control	2.6	0.7	0.9	4.3
Sagebrush Height (cm)	2010-80	27.9	1.1	25.1	30.7	2010-Control	26.3	1.3	23.0	29.6
Sagebrush Leader Length (cm)	2010-80	1.6	0.1	1.5	1.8	2010-Control	1.3	0.0	1.3	1.4

Table B.12 Comparison of sample blocks measured in areas fertilized in 2011 at a rate of 40 lb/acre and 2011 control blocks (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2013. None of vegetation measured differed significantly between treatment and controls as assessed by 95% confidence intervals (95% CI).

				95% Confidence Interval					95% Confidence Interval	
Vegetation Measure	**Treatment**	**Mean**	**Standard Error**	**Lower**	**Upper**	**Treatment**	**Mean**	**Standard Error**	**Lower**	**Upper**
Total Grass Cover (%)	2011-40	27.5	2.0	22.3	32.7	2011-Control	27.9	1.3	24.6	31.2
Total Forb Cover (%)	2011-40	3.7	0.7	1.9	5.5	2011-Control	7.8	1.2	4.9	10.8
Bunchgrass Cover (%)	2011-40	14.1	2.3	8.2	20.0	2011-Control	17.4	2.0	12.2	22.7
Rhizomatous Grass Cover (%)	2011-40	17.2	1.5	13.5	21.0	2011-Control	14.1	1.2	10.9	17.2
Succulent Forb Cover (%)	2011-40	0.0	0.0	0.0	0.0	2011-Control	0.0	0.0	0.0	0.0
Perennial Forb Cover (%)	2011-40	3.7	0.7	1.9	5.5	2011-Control	7.8	1.2	4.9	10.8
Invasive Annual Grass Cover (%)	2011-40	0.0	0.0	0.0	0.0	2011-Control	0.0	0.0	0.0	0.0
Litter Cover (%)	2011-40	33.3	1.2	30.2	36.4	2011-Control	27.3	2.1	21.8	32.8
Bare Ground (%)	2011-40	38.1	1.6	34.0	42.1	2011-Control	40.9	1.8	36.4	45.4
Sagebrush Canopy Cover (%)	2011-40	37.1	2.4	30.9	43.4	2011-Control	35.3	2.2	29.6	41.0
Other Shrub Canopy Cover (%)	2011-40	2.3	0.5	1.0	3.6	2011-Control	2.1	0.3	1.3	2.9
Sagebrush Height (cm)	2011-40	28.3	0.8	26.2	30.3	2011-Control	25.2	1.2	22.0	28.4
Sagebrush Leader Length (cm)	2011-40	1.1	0.0	1.0	1.3	2011-Control	1.1	0.0	1.0	1.2

Appendix C

Utilization Comparisons

Table C1. Comparison of utilization as the difference between caged and available forage across all fertilized areas and control areas combined, (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Utilization did not differ between treatment and control areas as assessed by 95% confidence intervals (95% CI).

					95% Confidence Interval	
Vegetation Measure	**Availability**	**Treatment**	**Mean**	**Standard Error**	**Lower**	**Upper**
Sagebrush Weight (oz)	Utilized (Caged - Available)	Treated	3.61	5.06	-7.85	15.06
Herbaceous Weight (oz)	Utilized (Caged - Available)	Treated	-0.78	0.87	-2.83	1.26
Sagebrush Weight (oz)	Utilized (Caged - Available)	Control	0.37	3.67	-8.61	9.34
Herbaceous Weight (oz)	Utilized (Caged - Available)	Control	-0.02	0.59	-1.45	1.42

Table C2. Utilization levels by block on the Pinedale Mesa in southwestern Wyoming, 2012-13.

								95% Confidence Interval	
Vegetation Measure	**Treatment**	**Availability**	**Block 1**	**Block 2**	**Block 3**	**Mean**	**Standard Error**	**Lower**	**Upper**
Sagebrush Weight (oz)	2010-40	Available	80.71	97.39	86.99	88.4	4.9	72.9	103.8
Herbaceous Weight (oz)	2010-40	Available	7.82	3.85	11.22	7.6	2.1	0.9	14.4
Sagebrush Weight (oz)	2010-40	Caged	76.20	91.27	63.20	76.9	8.1	51.1	102.7
Herbaceous Weight (oz)	2010-40	Caged	3.99	4.67	12.82	7.2	2.8	-1.9	16.2
Sagebrush Weight (oz)	2010-40	Utilized (Caged - Available)	-4.51	-6.12	-23.79	-11.5	6.2	-31.1	8.2
Herbaceous Weight (oz)	2010-40	Utilized (Caged - Available)	-3.83	0.82	1.60	-0.5	1.7	-5.9	4.9
Sagebrush Weight (oz)	2010-80	Available	56.85	53.51	47.88	52.7	2.6	44.4	61.1
Herbaceous Weight (oz)	2010-80	Available	8.12	2.08	4.36	4.9	1.8	-0.8	10.5
Sagebrush Weight (oz)	2010-80	Caged	53.08	65.65	66.00	61.6	4.2	48.1	75.1
Herbaceous Weight (oz)	2010-80	Caged	4.03	2.32	3.53	3.3	0.5	1.7	4.9
Sagebrush Weight (oz)	2010-80	Utilized (Caged - Available)	-3.77	12.14	18.12	8.8	6.5	-12.0	29.6
Herbaceous Weight (oz)	2010-80	Utilized (Caged - Available)	-4.09	0.24	-0.83	-1.6	1.3	-5.7	2.6
Sagebrush Weight (oz)	2010-Control	Available	82.66	84.94	73.99	80.5	3.3	69.9	91.1
Herbaceous Weight (oz)	2010-Control	Available	3.92	3.66	3.70	3.8	0.1	3.5	4.0
Sagebrush Weight (oz)	2010-Control	Caged	79.86	101.25	69.07	83.4	9.5	53.3	113.5
Herbaceous Weight (oz)	2010-Control	Caged	3.98	3.43	1.79	3.1	0.7	1.0	5.2
Sagebrush Weight (oz)	2010-Control	Utilized (Caged - Available)	-2.80	16.31	-4.92	2.9	6.8	-18.6	24.3
Herbaceous Weight (oz)	2010-Control	Utilized (Caged - Available)	0.06	-0.23	-1.91	-0.7	0.6	-2.6	1.3
Sagebrush Weight (oz)	2011-40	Available	112.39	95.04	128.79	112.1	9.7	81.1	143.1
Herbaceous Weight (oz)	2011-40	Available	1.56			n/a	n/a	n/a	n/a
Sagebrush Weight (oz)	2011-40	Caged	140.01	103.12	133.49	125.5	11.4	89.4	161.7
Herbaceous Weight (oz)	2011-40	Caged	2.17			n/a	n/a	n/a	n/a
Sagebrush Weight (oz)	2011-40	Utilized (Caged - Available)	27.62	8.08	4.70	13.5	7.1	-9.3	36.2
Herbaceous Weight (oz)	2011-40	Utilized (Caged - Available)	0.61			n/a	n/a	n/a	n/a
Sagebrush Weight (oz)	2011-Control	Available	78.31	93.31	99.09	90.2	6.2	70.5	109.9
Herbaceous Weight (oz)	2011-Control	Available	4.70	1.22	1.55	2.5	1.1	-1.0	6.0
Sagebrush Weight (oz)	2011-Control	Caged	83.98	88.16	92.17	88.1	2.4	80.6	95.6
Herbaceous Weight (oz)	2011-Control	Caged	4.22	3.74	1.50	3.2	0.8	0.5	5.8
Sagebrush Weight (oz)	2011-Control	Utilized (Caged - Available)	5.67	-5.15	-6.92	-2.1	3.9	-14.7	10.4
Herbaceous Weight (oz)	2011-Control	Utilized (Caged - Available)	-0.48	2.52	-0.05	0.7	0.9	-2.3	3.6

Appendix D

Nutrient Values

Table D.1 Nutrient values and 95% confidence intervals (95% CI) of sagebrush measured in 2012 and 2013 in areas fertilized in 2010 at a rate of 40 lb/acre (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13.

			2012				2013						Standard	95% Confidence Interval	
Nutrient Measure	**Treatment**	**Plant Type**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 5**	**Mean**	**Error**	**Lower**	**Upper**
Dry weight	2010-40	Sagebrush	2.106	2.712	2.020	16.464	19.172	22.278	20.262	19.018	20.128	13.8	2.9	7.2	20.4
Moisture	2010-40	Sagebrush	12.973	7.621	10.036	4.040	11.288	13.031	11.855	11.031	10.595	10.3	1.0	8.1	12.4
Dry Matter	2010-40	Sagebrush	87.027	92.379	89.964	95.960	88.712	86.969	88.145	88.969	89.405	89.7	1.0	87.6	91.9
Crude Protein	2010-40	Sagebrush	14.045	11.925	14.446	9.995	10.650	10.684	10.286	12.000	11.433	11.7	0.5	10.5	12.9
Detergent Fiber	2010-40	Sagebrush	57.088	38.431	50.424	42.737	58.726	61.540	59.961	60.693	60.563	54.5	2.9	48.0	60.9
Acid Detergent Fiber	2010-40	Sagebrush	45.936	23.257	37.859	29.447	44.414	45.773	44.730	45.329	44.768	40.2	2.8	33.9	46.5
Total Digestible Nutrients	2010-40	Sagebrush	52.611	70.527	58.992	65.637	53.813	52.739	53.563	53.090	53.533	57.2	2.2	52.2	62.1
Digestible Energy	2010-40	Sagebrush	1.055	1.414	1.183	1.316	1.079	1.057	1.074	1.064	1.073	1.1	0.0	1.0	1.2
Estimated Net Energy	2010-40	Sagebrush	41.598	65.389	50.072	58.896	43.195	41.769	42.863	42.235	42.824	47.6	2.9	41.0	54.3
Net Energy/lactation	2010-40	Sagebrush	0.504	0.792	0.606	0.713	0.523	0.506	0.519	0.511	0.518	0.6	0.0	0.5	0.7
Net Energy/maintenance	2010-40	Sagebrush	0.562	0.798	0.646	0.733	0.578	0.563	0.574	0.568	0.574	0.6	0.0	0.6	0.7
Net Energy/Gain	2010-40	Sagebrush	6.476	8.838	7.317	8.193	6.634	6.493	6.601	6.539	6.598	7.1	0.3	6.4	7.7
Metabolizable Energy	2010-40	Sagebrush	0.393	0.527	0.441	0.490	0.402	0.394	0.400	0.397	0.400	0.4	0.0	0.4	0.5
Feed Value Index	2010-40	Sagebrush	88.542	183.276	111.600	153.937	86.207	80.797	83.880	82.276	83.636	106.0	12.5	77.8	134.2
Total percent Nitrogen	2010-40	Sagebrush	2.247	1.908	2.311	1.599	1.704	1.709	1.646	1.920	1.829	1.9	0.1	1.7	2.1

Table D.2 Nutrient values and 95% confidence intervals (95% CI) of grass measured in 2012 and 2013 in areas fertilized in 2010 at a rate of 40 lb/acre (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13.

			2012				2013						Standard	95% Confidence Interval	
Nutrient Measure	**Treatment**	**Plant Type**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 5**	**Mean**	**Error**	**Lower**	**Upper**
Dry weight	2010-40	Grass	12.312	14.614	10.746	16.404	33.816	34.198	43.466	33.140	42.650	26.8	4.4	16.9	36.8
Moisture	2010-40	Grass	3.952	3.488	3.069	5.768	8.123	6.317	5.535	16.105	5.958	6.5	1.3	3.5	9.4
Dry Matter	2010-40	Grass	96.048	96.512	96.931	94.232	91.877	93.683	94.465	83.895	94.042	93.5	1.3	90.6	96.5
Crude Protein	2010-40	Grass	10.158	10.565	8.934	10.795	8.413	7.883	7.251	7.846	8.204	8.9	0.4	7.9	9.9
Detergent Fiber	2010-40	Grass	66.955	40.121	51.306	47.689	62.785	63.089	64.549	60.246	62.149	57.7	3.0	50.8	64.5
Acid Detergent Fiber	2010-40	Grass	50.033	24.569	38.279	30.080	59.824	61.231	59.976	58.986	58.634	49.1	4.8	38.2	59.9
Total Digestible Nutrients	2010-40	Grass	49.374	69.490	58.660	65.137	41.639	40.528	41.519	42.301	42.579	50.1	3.8	41.6	58.7
Digestible Energy	2010-40	Grass	0.990	1.393	1.176	1.306	0.835	0.812	0.832	0.848	0.854	1.0	0.1	0.8	1.2
Estimated Net Energy	2010-40	Grass	37.300	64.013	49.631	58.232	27.030	25.554	26.870	27.909	28.278	38.3	5.0	27.0	49.7
Net Energy/lactation	2010-40	Grass	0.452	0.775	0.601	0.705	0.327	0.309	0.325	0.338	0.342	0.5	0.1	0.3	0.6
Net Energy/maintenance	2010-40	Grass	0.519	0.784	0.641	0.727	0.417	0.402	0.415	0.426	0.429	0.5	0.0	0.4	0.6
Net Energy/Gain	2010-40	Grass	6.049	8.701	7.273	8.127	5.030	4.883	5.014	5.117	5.154	6.1	0.5	5.0	7.3
Metabolizable Energy	2010-40	Grass	0.369	0.519	0.438	0.487	0.311	0.303	0.310	0.316	0.318	0.4	0.0	0.3	0.4
Feed Value Index	2010-40	Grass	69.744	174.238	108.282	141.851	62.843	61.313	61.343	66.623	65.463	90.2	14.0	58.6	121.8
Total percent Nitrogen	2010-40	Grass	1.625	1.690	1.429	1.727	1.346	1.261	1.160	1.255	1.313	1.4	0.1	1.3	1.6

Table D.3 Nutrient values and 95% confidence intervals (95% CI) of forbs measured in 2012 and 2013 in areas fertilized in 2010 at a rate of 40 lb/acre (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13.

			2012				2013						Standard	95% Confidence Interval	
Nutrient Measure	**Treatment**	**Plant Type**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 5**	**Mean**	**Error**	**Lower**	**Upper**
Dry weight	2010-40	Forb	8.702	9.618	11.130	10.506	38.222	39.076	35.618	40.002	42.466	26.1	5.1	14.5	37.8
Moisture	2010-40	Forb	5.094	3.728	10.266	5.438	6.146	5.788	7.926	16.527	15.241	8.5	1.5	5.0	11.9
Dry Matter	2010-40	Forb	94.906	96.272	89.734	94.562	93.854	94.212	92.074	83.473	84.759	91.5	1.5	88.1	95.0
Crude Protein	2010-40	Forb	10.036	10.530	8.683	10.021	8.225	7.719	7.944	7.554	7.735	8.7	0.4	7.8	9.6
Detergent Fiber	2010-40	Forb	69.011	38.303	55.324	52.291	63.739	64.281	62.771	61.737	63.609	59.0	3.1	52.1	66.0
Acid Detergent Fiber	2010-40	Forb	54.807	25.770	39.943	37.518	59.912	59.805	59.770	59.371	60.246	50.8	4.3	41.0	60.6
Total Digestible Nutrients	2010-40	Forb	45.603	68.542	57.345	59.261	41.569	41.654	41.682	41.997	41.306	48.8	3.4	41.1	56.5
Digestible Energy	2010-40	Forb	0.914	1.374	1.149	1.188	0.833	0.835	0.836	0.842	0.828	1.0	0.1	0.8	1.1
Estimated Net Energy	2010-40	Forb	32.293	62.753	47.885	50.429	26.937	27.050	27.086	27.505	26.587	36.5	4.5	26.3	46.8
Net Energy/lactation	2010-40	Forb	0.391	0.760	0.580	0.611	0.326	0.327	0.328	0.333	0.322	0.4	0.1	0.3	0.6
Net Energy/maintenance	2010-40	Forb	0.469	0.772	0.624	0.649	0.416	0.417	0.418	0.422	0.413	0.5	0.0	0.4	0.6
Net Energy/Gain	2010-40	Forb	5.552	8.576	7.100	7.353	5.020	5.032	5.035	5.077	4.986	6.0	0.4	5.0	7.0
Metabolizable Energy	2010-40	Forb	0.341	0.512	0.428	0.443	0.311	0.311	0.311	0.314	0.309	0.4	0.0	0.3	0.4
Feed Value Index	2010-40	Forb	62.727	192.940	97.756	107.007	62.202	61.447	63.364	64.401	61.621	85.9	14.6	53.0	118.9
Total percent Nitrogen	2010-40	Forb	1.606	1.685	1.389	1.603	1.316	1.235	1.271	1.209	1.238	1.4	0.1	1.3	1.5

Table D.4 Nutrient values and 95% confidence intervals (95% CI) of sagebrush measured in 2012 and 2013 in areas fertilized in 2010 at a rate of 80 lb/acre (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13.

			2012				2013						Standard	95% Confidence Interval	
Nutrient Measure	**Treatment**	**Plant Type**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 5**	**Mean**	**Error**	**Lower**	**Upper**
Dry weight	2010-80	Sagebrush	4.160	1.936	2.170	2.466	23.594	21.290	19.856	21.324	21.662	13.2	3.3	5.6	20.7
Moisture	2010-80	Sagebrush	8.170	7.324	13.399	10.832	8.270	8.576	9.089	9.129	9.209	9.3	0.6	8.0	10.7
Dry Matter	2010-80	Sagebrush	91.830	92.676	86.601	89.168	91.730	91.424	90.911	90.871	90.791	90.7	0.6	89.3	92.0
Crude Protein	2010-80	Sagebrush	13.674	13.939	14.229	13.520	11.206	11.274	11.284	12.071	11.435	12.5	0.4	11.5	13.5
Detergent Fiber	2010-80	Sagebrush	53.934	38.163	39.285	49.985	57.443	57.413	52.808	55.377	57.470	51.3	2.5	45.6	57.0
Acid Detergent Fiber	2010-80	Sagebrush	45.442	23.173	27.531	35.787	44.157	45.269	45.403	45.347	47.006	39.9	3.0	33.2	46.6
Total Digestible Nutrients	2010-80	Sagebrush	53.001	70.593	67.150	60.628	54.016	53.137	53.032	53.076	51.765	57.4	2.4	52.1	62.7
Digestible Energy	2010-80	Sagebrush	1.062	1.415	1.346	1.215	1.083	1.065	1.063	1.064	1.038	1.2	0.0	1.0	1.3
Estimated Net Energy	2010-80	Sagebrush	42.117	65.477	60.905	52.245	43.465	42.298	42.158	42.216	40.476	47.9	3.1	40.9	55.0
Net Energy/lactation	2010-80	Sagebrush	0.510	0.793	0.737	0.633	0.526	0.512	0.510	0.511	0.490	0.6	0.0	0.5	0.7
Net Energy/maintenance	2010-80	Sagebrush	0.567	0.799	0.753	0.667	0.580	0.569	0.567	0.568	0.551	0.6	0.0	0.6	0.7
Net Energy/Gain	2010-80	Sagebrush	6.527	8.846	8.393	7.533	6.661	6.545	6.531	6.537	6.364	7.1	0.3	6.4	7.8
Metabolizable Energy	2010-80	Sagebrush	0.396	0.527	0.502	0.453	0.404	0.397	0.396	0.397	0.387	0.4	0.0	0.4	0.5
Feed Value Index	2010-80	Sagebrush	94.600	182.108	176.549	115.026	88.981	87.510	94.598	91.264	84.846	112.8	12.9	83.6	142.0
Total percent Nitrogen	2010-80	Sagebrush	2.188	2.230	2.277	2.163	1.793	1.804	1.805	1.931	1.830	2.0	0.1	1.8	2.2

Table D.5 Nutrient values and 95% confidence intervals (95% CI) of grass measured in 2012 and 2013 in areas fertilized in 2010 at a rate of 80 lb/acre (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13.

			2012				2013						Standard	95% Confidence Interval	
Nutrient Measure	**Treatment**	**Plant Type**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 5**	**Mean**	**Error**	**Lower**	**Upper**
Dry weight	2010-80	Grass	22.288	24.590	18.320	15.038	26.132	32.416	24.784	20.102	21.208	22.8	1.7	19.0	26.5
Moisture	2010-80	Grass	3.622	3.300	4.932	3.207	7.849	7.926	9.340	10.692	17.157	7.6	1.5	4.1	11.0
Dry Matter	2010-80	Grass	96.378	96.700	95.068	96.793	92.151	92.074	90.660	89.308	82.843	92.4	1.5	89.0	95.9
Crude Protein	2010-80	Grass	8.143	12.641	8.029	7.649	11.375	9.346	11.650	10.025	11.395	10.0	0.6	8.6	11.4
Detergent Fiber	2010-80	Grass	63.566	37.392	43.061	53.260	56.877	60.053	58.293	58.844	54.319	54.0	2.8	47.6	60.4
Acid Detergent Fiber	2010-80	Grass	48.316	22.335	29.810	39.022	46.877	47.076	47.517	44.978	45.378	41.3	3.1	34.3	48.2
Total Digestible Nutrients	2010-80	Grass	50.730	71.255	65.350	58.073	51.867	51.710	51.362	53.367	53.052	56.3	2.4	50.8	61.8
Digestible Energy	2010-80	Grass	1.017	1.428	1.310	1.164	1.040	1.037	1.030	1.070	1.063	1.1	0.0	1.0	1.2
Estimated Net Energy	2010-80	Grass	39.102	66.356	58.515	48.852	40.611	40.402	39.940	42.603	42.184	46.5	3.2	39.2	53.8
Net Energy/lactation	2010-80	Grass	0.473	0.803	0.708	0.591	0.492	0.489	0.484	0.516	0.511	0.6	0.0	0.5	0.7
Net Energy/maintenance	2010-80	Grass	0.537	0.807	0.730	0.634	0.552	0.550	0.545	0.572	0.568	0.6	0.0	0.5	0.7
Net Energy/Gain	2010-80	Grass	6.228	8.934	8.155	7.196	6.378	6.357	6.311	6.576	6.534	7.0	0.3	6.2	7.7
Metabolizable Energy	2010-80	Grass	0.379	0.532	0.488	0.434	0.388	0.386	0.384	0.399	0.396	0.4	0.0	0.4	0.5
Feed Value Index	2010-80	Grass	75.285	185.321	162.501	102.923	86.837	81.865	83.923	86.252	92.031	106.3	13.2	76.6	136.1
Total percent Nitrogen	2010-80	Grass	1.303	2.023	1.285	1.224	1.820	1.495	1.864	1.604	1.823	1.6	0.1	1.4	1.8

Table D.6 Nutrient values and 95% confidence intervals (95% CI) of forbs measured in 2012 and 2013 in areas fertilized in 2010 at a rate of 80 lb/acre (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13.

			2012				2013						Standard	95% Confidence Interval	
Nutrient Measure	**Treatment**	**Plant Type**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 5**	**Mean**	**Error**	**Lower**	**Upper**
Dry weight	2010-80	Forb	21.138	37.576	27.484	44.298	24.302	26.332	23.176	23.930	26.686	28.3	2.5	22.6	34.1
Moisture	2010-80	Forb	3.842	3.637	4.362	3.148	8.422	8.474	9.426	8.690	7.829	6.4	0.9	4.5	8.4
Dry Matter	2010-80	Forb	96.158	96.363	95.638	96.852	91.578	91.526	90.574	91.310	92.171	93.6	0.9	91.6	95.5
Crude Protein	2010-80	Forb	7.989	11.610	7.745	7.713	10.453	12.089	11.534	10.989	11.623	10.2	0.6	8.8	11.6
Detergent Fiber	2010-80	Forb	66.032	29.829	40.441	51.907	60.016	61.207	57.972	59.273	59.306	54.0	3.9	45.2	62.7
Acid Detergent Fiber	2010-80	Forb	52.992	22.232	29.328	38.171	47.089	49.625	45.942	46.735	46.517	42.1	3.4	34.4	49.7
Total Digestible Nutrients	2010-80	Forb	47.036	71.336	65.731	58.745	51.700	49.696	52.606	51.979	52.152	55.7	2.7	49.6	61.7
Digestible Energy	2010-80	Forb	0.943	1.430	1.318	1.178	1.036	0.996	1.055	1.042	1.045	1.1	0.1	1.0	1.2
Estimated Net Energy	2010-80	Forb	34.196	66.464	59.021	49.744	40.389	37.729	41.592	40.760	40.989	45.7	3.6	37.6	53.7
Net Energy/lactation	2010-80	Forb	0.414	0.805	0.715	0.602	0.489	0.457	0.504	0.493	0.496	0.6	0.0	0.5	0.7
Net Energy/maintenance	2010-80	Forb	0.488	0.809	0.735	0.643	0.550	0.523	0.562	0.553	0.556	0.6	0.0	0.5	0.7
Net Energy/Gain	2010-80	Forb	5.741	8.944	8.205	7.285	6.356	6.092	6.475	6.393	6.415	6.9	0.4	6.1	7.7
Metabolizable Energy	2010-80	Forb	0.351	0.533	0.491	0.439	0.386	0.371	0.393	0.388	0.390	0.4	0.0	0.4	0.5
Feed Value Index	2010-80	Forb	67.553	231.465	163.877	109.908	81.236	76.506	85.695	82.981	83.348	109.2	18.0	68.4	150.0
Total percent Nitrogen	2010-80	Forb	1.278	1.858	1.239	1.234	1.672	1.934	1.845	1.758	1.860	1.6	0.1	1.4	1.9

Table D.7 Nutrient values and 95% confidence intervals (95% CI) of sagebrush measured in 2012 and 2013 in the 2010 control area (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13.

			2012				2013						Standard	95% Confidence Interval	
Nutrient Measure	**Treatment**	**Plant Type**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 5**	**Mean**	**Error**	**Lower**	**Upper**
Dry weight	2010-Control	Sagebrush	2.050	2.058	1.240	5.466	0.630	0.696	0.748	0.718	1.378	1.7	0.5	0.5	2.8
Moisture	2010-Control	Sagebrush	10.168	8.990	15.627	8.804	35.622	32.861	29.286	32.913	31.858	22.9	3.9	14.1	31.7
Dry Matter	2010-Control	Sagebrush	89.832	91.010	84.373	91.196	64.378	67.139	70.714	67.087	68.142	77.1	3.9	68.3	85.9
Crude Protein	2010-Control	Sagebrush	12.964	14.115	12.338	13.494	11.507	11.228	11.597	11.846	11.473	12.3	0.3	11.5	13.1
Detergent Fiber	2010-Control	Sagebrush	58.697	32.359	45.722	47.878	27.337	27.620	27.224	28.563	25.575	35.7	4.0	26.6	44.7
Acid Detergent Fiber	2010-Control	Sagebrush	50.720	21.951	30.075	32.094	23.049	23.893	24.380	23.864	24.619	28.3	3.0	21.5	35.1
Total Digestible Nutrients	2010-Control	Sagebrush	48.831	71.559	65.140	63.545	70.691	70.024	69.640	70.048	69.451	66.5	2.4	61.2	71.9
Digestible Energy	2010-Control	Sagebrush	0.979	1.434	1.306	1.274	1.417	1.404	1.396	1.404	1.392	1.3	0.0	1.2	1.4
Estimated Net Energy	2010-Control	Sagebrush	36.580	66.759	58.236	56.119	65.608	64.722	64.211	64.753	63.960	60.1	3.2	52.9	67.3
Net Energy/lactation	2010-Control	Sagebrush	0.443	0.808	0.705	0.679	0.794	0.784	0.777	0.784	0.774	0.7	0.0	0.6	0.8
Net Energy/maintenance	2010-Control	Sagebrush	0.512	0.811	0.727	0.706	0.800	0.791	0.786	0.792	0.784	0.7	0.0	0.7	0.8
Net Energy/Gain	2010-Control	Sagebrush	5.978	8.974	8.128	7.917	8.859	8.771	8.721	8.774	8.696	8.3	0.3	7.6	9.0
Metabolizable Energy	2010-Control	Sagebrush	0.365	0.535	0.487	0.475	0.528	0.523	0.520	0.523	0.519	0.5	0.0	0.5	0.5
Feed Value Index	2010-Control	Sagebrush	79.789	218.385	143.266	131.141	242.043	237.330	239.836	234.212	254.698	197.9	21.0	150.5	245.3
Total percent Nitrogen	2010-Control	Sagebrush	2.074	2.258	1.974	2.159	1.841	1.796	1.855	1.895	1.836	2.0	0.1	1.8	2.1

Table D.8 Nutrient values and 95% confidence intervals (95% CI) of grass measured in 2012 and 2013 in the 2010 control area (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13.

			2012				2013						Standard	95% Confidence Interval	
Nutrient Measure	**Treatment**	**Plant Type**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 5**	**Mean**	**Error**	**Lower**	**Upper**
Dry weight	2010-Control	Grass	16.360	7.428	7.006	11.836	0.708	0.726	0.714	0.688	0.840	5.1	2.0	0.7	9.6
Moisture	2010-Control	Grass	3.387	4.475	4.512	3.024	31.991	29.538	30.345	32.579	29.606	18.8	4.8	8.1	29.6
Dry Matter	2010-Control	Grass	96.613	95.525	95.488	96.976	68.009	70.462	69.655	67.421	70.394	81.2	4.8	70.4	91.9
Crude Protein	2010-Control	Grass	6.821	12.726	6.923	6.860	11.278	10.873	10.889	11.488	11.344	9.9	0.8	8.1	11.7
Detergent Fiber	2010-Control	Grass	64.442	38.736	49.637	49.918	28.718	27.814	27.670	28.967	28.083	38.2	4.5	28.1	48.4
Acid Detergent Fiber	2010-Control	Grass	51.940	25.655	34.222	34.290	24.162	23.945	23.676	24.911	24.336	29.7	3.1	22.6	36.8
Total Digestible Nutrients	2010-Control	Grass	47.867	68.633	61.865	61.811	69.812	69.983	70.196	69.220	69.675	65.5	2.5	59.9	71.0
Digestible Energy	2010-Control	Grass	0.960	1.376	1.240	1.239	1.399	1.403	1.407	1.388	1.397	1.3	0.0	1.2	1.4
Estimated Net Energy	2010-Control	Grass	35.300	62.874	53.887	53.816	64.439	64.667	64.950	63.654	64.258	58.6	3.3	51.2	66.1
Net Energy/lactation	2010-Control	Grass	0.427	0.761	0.652	0.652	0.780	0.783	0.786	0.771	0.778	0.7	0.0	0.6	0.8
Net Energy/maintenance	2010-Control	Grass	0.499	0.773	0.684	0.683	0.788	0.791	0.793	0.781	0.787	0.7	0.0	0.7	0.8
Net Energy/Gain	2010-Control	Grass	5.851	8.588	7.696	7.689	8.743	8.766	8.794	8.665	8.725	8.2	0.3	7.4	8.9
Metabolizable Energy	2010-Control	Grass	0.358	0.513	0.462	0.462	0.522	0.523	0.524	0.517	0.521	0.5	0.0	0.4	0.5
Feed Value Index	2010-Control	Grass	71.317	185.005	117.257	116.766	228.555	236.621	238.592	223.811	233.995	183.5	21.6	134.8	232.3
Total percent Nitrogen	2010-Control	Grass	1.091	2.036	1.108	1.098	1.805	1.740	1.742	1.838	1.815	1.6	0.1	1.3	1.9

Table D.9 Nutrient values and 95% confidence intervals (95% CI) of forbs measured in 2012 and 2013 in the 2010 control area (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13.

			2012				2013						Standard	95% Confidence Interval	
Nutrient Measure	**Treatment**	**Plant Type**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 5**	**Mean**	**Error**	**Lower**	**Upper**
Dry weight	2010-Control	Forb	43.668	31.908	49.348	40.366	13.030	10.768	17.424	15.500	17.612	26.6	4.9	15.5	37.8
Moisture	2010-Control	Forb	3.821	3.886	3.765	3.068	11.457	11.076	8.861	12.224	8.873	7.4	1.3	4.6	10.3
Dry Matter	2010-Control	Forb	96.179	96.114	96.235	96.932	88.543	88.924	91.139	87.776	91.127	92.6	1.3	89.7	95.4
Crude Protein	2010-Control	Forb	6.635	12.060	6.811	7.223	14.010	12.874	12.094	11.820	12.591	10.7	1.0	8.5	12.9
Detergent Fiber	2010-Control	Forb	53.565	40.934	52.728	46.200	51.277	53.219	53.408	52.592	52.560	50.7	1.4	47.5	54.0
Acid Detergent Fiber	2010-Control	Forb	39.035	24.895	35.263	33.016	41.123	39.996	41.872	40.048	38.945	37.1	1.8	33.1	41.2
Total Digestible Nutrients	2010-Control	Forb	58.063	69.233	61.042	62.817	56.413	57.303	55.821	57.262	58.133	59.6	1.4	56.4	62.8
Digestible Energy	2010-Control	Forb	1.164	1.388	1.224	1.259	1.131	1.149	1.119	1.148	1.165	1.2	0.0	1.1	1.3
Estimated Net Energy	2010-Control	Forb	48.838	63.671	52.795	55.151	46.647	47.830	45.862	47.775	48.932	50.8	1.9	46.6	55.1
Net Energy/lactation	2010-Control	Forb	0.591	0.771	0.639	0.668	0.565	0.579	0.555	0.578	0.592	0.6	0.0	0.6	0.7
Net Energy/maintenance	2010-Control	Forb	0.634	0.781	0.673	0.696	0.612	0.624	0.604	0.623	0.634	0.7	0.0	0.6	0.7
Net Energy/Gain	2010-Control	Forb	7.195	8.667	7.587	7.821	6.977	7.095	6.899	7.089	7.204	7.4	0.2	7.0	7.8
Metabolizable Energy	2010-Control	Forb	0.434	0.517	0.456	0.469	0.421	0.428	0.417	0.428	0.434	0.4	0.0	0.4	0.5
Feed Value Index	2010-Control	Forb	108.365	163.014	108.508	130.102	105.653	102.468	99.841	103.956	106.440	114.3	6.8	99.0	129.5
Total percent Nitrogen	2010-Control	Forb	1.062	1.930	1.090	1.156	2.242	2.060	1.935	1.891	2.015	1.7	0.2	1.4	2.1

Table E.10 Nutrient values and 95% confidence intervals (95% CI) of sagebrush measured in 2012 and 2013 within areas fertilized in 2011 at a rate of 40 lb/acre (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13.

			2012				2013						Standard	95% Confidence Interval	
Nutrient Measure	**Treatment**	**Plant Type**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 5**	**Mean**	**Error**	**Lower**	**Upper**
Dry weight	2011-40	Sagebrush	1.414	1.750	1.908	1.752	41.662	27.410	20.668	35.038	35.180	18.5	5.7	5.7	31.3
Moisture	2011-40	Sagebrush	10.703	10.640	12.756	11.247	6.463	9.465	9.376	16.932	5.850	10.4	1.1	7.9	12.9
Dry Matter	2011-40	Sagebrush	89.297	89.360	87.244	88.753	93.537	90.535	90.624	83.068	94.150	89.6	1.1	87.1	92.1
Crude Protein	2011-40	Sagebrush	14.439	18.143	15.598	15.395	8.469	8.886	8.506	8.140	8.408	11.8	1.3	8.7	14.8
Detergent Fiber	2011-40	Sagebrush	47.106	43.878	55.073	47.687	66.110	63.957	63.103	65.158	65.960	57.6	3.1	50.6	64.5
Acid Detergent Fiber	2011-40	Sagebrush	34.844	26.378	42.535	31.063	60.425	59.467	58.930	59.340	62.337	48.4	4.9	37.4	59.3
Total Digestible Nutrients	2011-40	Sagebrush	61.373	68.061	55.297	64.360	41.164	41.921	42.345	42.022	39.653	50.7	3.8	42.0	59.4
Digestible Energy	2011-40	Sagebrush	1.230	1.364	1.108	1.290	0.825	0.840	0.849	0.842	0.795	1.0	0.1	0.8	1.2
Estimated Net Energy	2011-40	Sagebrush	53.234	62.115	45.166	57.200	26.399	27.404	27.967	27.538	24.393	39.0	5.1	27.5	50.6
Net Energy/lactation	2011-40	Sagebrush	0.644	0.752	0.547	0.692	0.320	0.332	0.339	0.333	0.295	0.5	0.1	0.3	0.6
Net Energy/maintenance	2011-40	Sagebrush	0.677	0.765	0.597	0.717	0.411	0.421	0.426	0.422	0.391	0.5	0.1	0.4	0.7
Net Energy/Gain	2011-40	Sagebrush	7.631	8.513	6.830	8.025	4.967	5.067	5.123	5.080	4.768	6.2	0.5	5.1	7.4
Metabolizable Energy	2011-40	Sagebrush	0.459	0.509	0.413	0.481	0.308	0.313	0.316	0.314	0.296	0.4	0.0	0.3	0.4
Feed Value Index	2011-40	Sagebrush	125.326	146.118	96.289	136.352	58.964	61.928	63.488	61.101	56.925	89.6	12.3	61.7	117.5
Total percent Nitrogen	2011-40	Sagebrush	2.310	2.903	2.496	2.463	1.355	1.422	1.361	1.302	1.345	1.9	0.2	1.4	2.4

Table D.11 Nutrient values and 95% confidence intervals (95% CI) of grass measured in 2012 and 2013 within areas fertilized in 2011 at a rate of 40 lb/acre (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13.

			2012				2013						Standard	95% Confidence Interval	
Nutrient Measure	**Treatment**	**Plant Type**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 5**	**Mean**	**Error**	**Lower**	**Upper**
Dry weight	2011-40	Grass	10.796	9.668	10.910	11.290	33.710	33.714	37.864	27.908	36.404	23.6	4.2	14.1	33.1
Moisture	2011-40	Grass	3.901	6.926	3.313	3.386	7.414	13.922	7.123	8.831	7.547	6.9	1.1	4.4	9.4
Dry Matter	2011-40	Grass	96.099	93.074	96.687	96.614	92.586	86.078	92.877	91.169	92.453	93.1	1.1	90.6	95.6
Crude Protein	2011-40	Grass	9.161	12.644	9.409	10.250	7.528	7.576	7.590	7.903	7.896	8.9	0.6	7.6	10.2
Detergent Fiber	2011-40	Grass	62.481	43.718	47.617	52.717	65.117	63.976	64.048	62.602	62.858	58.3	2.7	52.2	64.5
Acid Detergent Fiber	2011-40	Grass	48.116	27.905	38.922	35.246	60.699	59.853	60.767	60.008	59.459	50.1	4.3	40.3	59.9
Total Digestible Nutrients	2011-40	Grass	50.888	66.855	58.152	61.055	40.947	41.616	40.894	41.494	41.927	49.3	3.4	41.6	57.0
Digestible Energy	2011-40	Grass	1.020	1.340	1.166	1.224	0.821	0.834	0.820	0.832	0.840	1.0	0.1	0.8	1.1
Estimated Net Energy	2011-40	Grass	39.311	60.514	48.957	52.812	26.111	27.000	26.040	26.837	27.412	37.2	4.5	26.9	47.5
Net Energy/lactation	2011-40	Grass	0.476	0.733	0.593	0.639	0.316	0.327	0.315	0.325	0.332	0.5	0.1	0.3	0.6
Net Energy/maintenance	2011-40	Grass	0.539	0.749	0.635	0.673	0.408	0.417	0.407	0.415	0.421	0.5	0.0	0.4	0.6
Net Energy/Gain	2011-40	Grass	6.249	8.354	7.206	7.589	4.939	5.027	4.931	5.011	5.068	6.0	0.5	5.0	7.1
Metabolizable Energy	2011-40	Grass	0.380	0.500	0.434	0.456	0.306	0.311	0.306	0.310	0.313	0.4	0.0	0.3	0.4
Feed Value Index	2011-40	Grass	81.619	144.594	117.344	108.567	59.605	61.605	60.383	62.649	63.106	84.4	10.5	60.6	108.1
Total percent Nitrogen	2011-40	Grass	1.466	2.023	1.505	1.640	1.204	1.212	1.214	1.264	1.263	1.4	0.1	1.2	1.6

Table D.12 Nutrient values and 95% confidence intervals (95% CI) of forbs measured in 2012 and 2013 within areas fertilized in 2011 at a rate of 40 lb/acre (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13.

			2012				2013						Standard	95% Confidence Interval	
Nutrient Measure	**Treatment**	**Plant Type**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 5**	**Mean**	**Error**	**Lower**	**Upper**
Dry weight	2011-40	Forb	32.938	20.738	23.960	12.770	34.038	43.272	45.978	42.126	28.626	31.6	3.7	23.2	40.0
Moisture	2011-40	Forb	3.601	3.630	5.345	3.383	8.644	8.354	15.147	7.671	10.322	7.3	1.3	4.4	10.3
Dry Matter	2011-40	Forb	96.399	96.370	94.655	96.617	91.356	91.646	84.853	92.329	89.678	92.7	1.3	89.7	95.6
Crude Protein	2011-40	Forb	11.083	11.435	8.056	8.966	8.264	8.275	7.585	7.960	8.101	8.9	0.5	7.8	9.9
Detergent Fiber	2011-40	Forb	56.030	44.104	48.657	54.961	61.729	63.423	64.872	63.088	65.583	58.0	2.5	52.3	63.8
Acid Detergent Fiber	2011-40	Forb	44.094	26.223	37.924	33.911	58.084	59.205	61.741	60.131	59.642	49.0	4.5	38.7	59.2
Total Digestible Nutrients	2011-40	Forb	54.065	68.184	58.940	62.110	43.014	42.128	40.125	41.397	41.783	50.2	3.6	42.1	58.3
Digestible Energy	2011-40	Forb	1.084	1.367	1.181	1.245	0.862	0.844	0.804	0.830	0.838	1.0	0.1	0.8	1.2
Estimated Net Energy	2011-40	Forb	43.530	62.278	50.003	54.213	28.855	27.679	25.019	26.708	27.221	38.4	4.8	27.6	49.1
Net Energy/lactation	2011-40	Forb	0.527	0.754	0.605	0.656	0.349	0.335	0.303	0.323	0.330	0.5	0.1	0.3	0.6
Net Energy/maintenance	2011-40	Forb	0.581	0.767	0.645	0.687	0.435	0.424	0.397	0.414	0.419	0.5	0.0	0.4	0.6
Net Energy/Gain	2011-40	Forb	6.668	8.529	7.310	7.728	5.211	5.094	4.830	4.998	5.049	6.2	0.5	5.1	7.2
Metabolizable Energy	2011-40	Forb	0.404	0.509	0.440	0.464	0.321	0.315	0.300	0.309	0.312	0.4	0.0	0.3	0.4
Feed Value Index	2011-40	Forb	101.364	146.296	116.095	106.211	66.028	62.751	58.696	62.556	60.299	86.7	10.6	62.7	110.7
Total percent Nitrogen	2011-40	Forb	1.773	1.830	1.289	1.435	1.322	1.324	1.214	1.274	1.296	1.4	0.1	1.2	1.6

Table D.13 Nutrient values and 95% confidence intervals (95% CI) of sagebrush measured in 2012 and 2013 within the 2011 control area (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13.

			2012				2013						Standard	95% Confidence Interval	
Nutrient Measure	**Treatment**	**Plant Type**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 5**	**Mean**	**Error**	**Lower**	**Upper**
Dry weight	2011-Control	Sagebrush	1.402	0.970	1.698	1.566	0.552	0.532	0.614	0.752	0.628	1.0	0.2	0.6	1.3
Moisture	2011-Control	Sagebrush	12.164	16.316	14.584	12.705	34.717	34.123	31.788	28.868	31.311	24.1	3.3	16.7	31.5
Dry Matter	2011-Control	Sagebrush	87.836	83.684	85.416	87.295	65.283	65.877	68.212	71.132	68.689	75.9	3.3	68.5	83.3
Crude Protein	2011-Control	Sagebrush	12.058	12.804	11.403	11.954	14.271	14.235	14.005	13.712	14.060	13.2	0.4	12.3	14.0
Detergent Fiber	2011-Control	Sagebrush	54.998	42.858	51.173	46.250	25.519	28.709	24.023	25.379	24.864	36.0	4.2	26.4	45.5
Acid Detergent Fiber	2011-Control	Sagebrush	37.995	25.690	33.590	35.825	22.333	22.711	20.902	23.705	23.426	27.4	2.2	22.4	32.3
Total Digestible Nutrients	2011-Control	Sagebrush	58.884	68.605	62.364	60.598	71.257	70.959	72.388	70.173	70.393	67.3	1.7	63.4	71.2
Digestible Energy	2011-Control	Sagebrush	1.180	1.375	1.250	1.215	1.428	1.422	1.451	1.407	1.411	1.3	0.0	1.3	1.4
Estimated Net Energy	2011-Control	Sagebrush	49.928	62.837	54.550	52.205	66.359	65.962	67.860	64.920	65.212	61.1	2.3	55.9	66.3
Net Energy/lactation	2011-Control	Sagebrush	0.604	0.761	0.660	0.632	0.803	0.799	0.822	0.786	0.789	0.7	0.0	0.7	0.8
Net Energy/maintenance	2011-Control	Sagebrush	0.644	0.773	0.690	0.667	0.807	0.804	0.822	0.793	0.796	0.8	0.0	0.7	0.8
Net Energy/Gain	2011-Control	Sagebrush	7.303	8.584	7.762	7.529	8.934	8.895	9.083	8.791	8.820	8.4	0.2	7.9	8.9
Metabolizable Energy	2011-Control	Sagebrush	0.440	0.513	0.466	0.453	0.532	0.530	0.541	0.524	0.526	0.5	0.0	0.5	0.5
Feed Value Index	2011-Control	Sagebrush	102.375	150.718	114.890	127.212	261.664	238.249	281.515	259.376	264.594	200.1	24.8	144.1	256.1
Total percent Nitrogen	2011-Control	Sagebrush	1.929	2.049	1.824	1.913	2.283	2.278	2.241	2.194	2.250	2.1	0.1	2.0	2.2

Table D.14 Nutrient values and 95% confidence intervals (95% CI) of grass measured in 2012 and 2013 within the 2011 control area (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13.

			2012				2013						Standard	95% Confidence Interval	
Nutrient Measure	**Treatment**	**Plant Type**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 5**	**Mean**	**Error**	**Lower**	**Upper**
Dry weight	2011-Control	Grass	10.778	9.486	10.726	14.402	0.724	0.778	0.672	0.690	0.762	5.4	1.9	1.1	9.8
Moisture	2011-Control	Grass	3.764	4.384	4.316	3.358	29.194	28.872	31.987	31.221	29.148	18.5	4.6	8.1	28.9
Dry Matter	2011-Control	Grass	96.236	95.616	95.684	96.642	70.806	71.128	68.013	68.779	70.852	81.5	4.6	71.1	91.9
Crude Protein	2011-Control	Grass	7.423	9.965	7.295	6.789	16.675	14.141	13.947	13.511	14.256	11.6	1.2	8.8	14.4
Detergent Fiber	2011-Control	Grass	64.237	43.204	46.159	52.413	25.520	24.557	24.886	25.834	25.784	37.0	5.0	25.7	48.2
Acid Detergent Fiber	2011-Control	Grass	48.667	26.322	31.085	39.571	23.854	23.824	22.154	23.893	22.472	29.1	3.1	22.1	36.0
Total Digestible Nutrients	2011-Control	Grass	50.453	68.105	64.343	57.639	70.056	70.079	71.398	70.024	71.147	65.9	2.4	60.4	71.4
Digestible Energy	2011-Control	Grass	1.011	1.365	1.290	1.155	1.404	1.405	1.431	1.404	1.426	1.3	0.0	1.2	1.4
Estimated Net Energy	2011-Control	Grass	38.734	62.173	57.177	48.276	64.763	64.795	66.546	64.722	66.213	59.3	3.2	52.0	66.6
Net Energy/lactation	2011-Control	Grass	0.469	0.753	0.692	0.584	0.784	0.784	0.806	0.784	0.802	0.7	0.0	0.6	0.8
Net Energy/maintenance	2011-Control	Grass	0.533	0.766	0.716	0.628	0.792	0.792	0.809	0.791	0.806	0.7	0.0	0.7	0.8
Net Energy/Gain	2011-Control	Grass	6.192	8.518	8.022	7.139	8.776	8.779	8.953	8.771	8.919	8.2	0.3	7.5	9.0
Metabolizable Energy	2011-Control	Grass	0.377	0.509	0.481	0.431	0.523	0.524	0.533	0.523	0.532	0.5	0.0	0.5	0.5
Feed Value Index	2011-Control	Grass	79.259	148.094	134.686	103.979	257.992	266.991	269.229	254.985	257.951	197.0	26.3	137.6	256.5
Total percent Nitrogen	2011-Control	Grass	1.188	1.594	1.167	1.086	2.668	2.263	2.231	2.162	2.281	1.8	0.2	1.4	2.3

Table D.15 Nutrient values and 95% confidence intervals (95% CI) of forbs measured in 2012 and 2013 within the 2011 control area (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13.

			2012				2013						Standard	95% Confidence Interval	
Nutrient Measure	**Treatment**	**Plant Type**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 5**	**Mean**	**Error**	**Lower**	**Upper**
Dry weight	2011-Control	Forb	27.076	15.158	19.470	15.212	0.676	0.650	0.700	0.718	0.700	8.9	3.5	1.1	16.7
Moisture	2011-Control	Forb	4.123	4.400	4.323	3.618	33.364	33.339	32.365	35.903	30.802	20.2	5.1	8.7	31.8
Dry Matter	2011-Control	Forb	95.877	95.600	95.677	96.382	66.636	66.661	67.635	64.097	69.198	79.8	5.1	68.2	91.3
Crude Protein	2011-Control	Forb	8.091	10.123	6.710	6.900	12.882	14.685	14.813	14.723	14.618	11.5	1.2	8.8	14.2
Detergent Fiber	2011-Control	Forb	51.077	41.676	49.667	49.759	25.295	25.597	27.127	35.801	26.175	36.9	3.8	28.4	45.4
Acid Detergent Fiber	2011-Control	Forb	40.759	25.014	33.137	37.205	22.949	22.969	24.440	24.221	25.215	28.4	2.3	23.3	33.5
Total Digestible Nutrients	2011-Control	Forb	56.700	69.139	62.722	59.508	70.770	70.754	69.592	69.765	68.980	66.4	1.8	62.4	70.5
Digestible Energy	2011-Control	Forb	1.137	1.386	1.257	1.193	1.419	1.418	1.395	1.398	1.383	1.3	0.0	1.3	1.4
Estimated Net Energy	2011-Control	Forb	47.029	63.546	55.025	50.758	65.712	65.691	64.148	64.378	63.335	60.0	2.4	54.6	65.3
Net Energy/lactation	2011-Control	Forb	0.569	0.769	0.666	0.614	0.796	0.795	0.777	0.779	0.767	0.7	0.0	0.7	0.8
Net Energy/maintenance	2011-Control	Forb	0.616	0.780	0.695	0.653	0.801	0.801	0.786	0.788	0.777	0.7	0.0	0.7	0.8
Net Energy/Gain	2011-Control	Forb	7.015	8.655	7.809	7.385	8.870	8.868	8.714	8.737	8.634	8.3	0.2	7.8	8.8
Metabolizable Energy	2011-Control	Forb	0.424	0.517	0.469	0.445	0.529	0.529	0.520	0.521	0.515	0.5	0.0	0.5	0.5
Feed Value Index	2011-Control	Forb	130.277	157.328	128.125	116.388	262.594	259.058	242.703	219.904	246.707	195.9	20.6	149.3	242.5
Total percent Nitrogen	2011-Control	Forb	1.295	1.620	1.074	1.104	2.061	2.350	2.370	2.356	2.339	1.8	0.2	1.4	2.3

Appendix E

Nutrient Comparison Values

Table E.1 Nutrient values comparison between vegetation measured in areas fertilized in 2010 at a rate of 40 lb/acre and the 2010 control area (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Grey cells indicate row values that differ significantly between the treatment and control areas as assessed by 95% confidence intervals (95% CI).

				Standard	95% Confidence Interval				Standard	95% Confidence Interval	
Nutrient Measure	**Plant Type**	**Treatmen**	**Mean**	**Error**	**Lower**	**Upper**	**Treatment**	**Mean**	**Error**	**Lower**	**Upper**
Dry weight	Sagebrush	2010-40	13.796	2.923	7.183	20.408	2010-Control	1.665	0.510	0.510	2.820
Moisture	Sagebrush	2010-40	10.275	0.951	8.124	12.425	2010-Control	22.903	3.890	14.104	31.702
Dry Matter	Sagebrush	2010-40	89.725	0.951	87.575	91.876	2010-Control	77.097	3.890	68.298	85.896
Crude Protein	Sagebrush	2010-40	11.718	0.531	10.517	12.919	2010-Control	12.284	0.340	11.515	13.054
Detergent Fiber	Sagebrush	2010-40	54.462	2.868	47.975	60.950	2010-Control	35.664	3.995	26.626	44.701
Acid Detergent Fiber	Sagebrush	2010-40	40.168	2.783	33.873	46.463	2010-Control	28.294	3.019	21.466	35.122
Total Digestible Nutrients	Sagebrush	2010-40	57.167	2.198	52.194	62.140	2010-Control	66.548	2.385	61.153	71.942
Digestible Energy	Sagebrush	2010-40	1.146	0.044	1.046	1.246	2010-Control	1.334	0.048	1.226	1.442
Estimated Net Energy	Sagebrush	2010-40	47.649	2.919	41.046	54.252	2010-Control	60.105	3.167	52.942	67.268
Net Energy/lactation	Sagebrush	2010-40	0.577	0.035	0.497	0.657	2010-Control	0.728	0.038	0.641	0.814
Net Energy/maintenance	Sagebrush	2010-40	0.622	0.029	0.556	0.687	2010-Control	0.745	0.031	0.674	0.817
Net Energy/Gain	Sagebrush	2010-40	7.077	0.290	6.421	7.732	2010-Control	8.313	0.314	7.602	9.024
Metabolizable Energy	Sagebrush	2010-40	0.427	0.016	0.390	0.464	2010-Control	0.497	0.018	0.457	0.538
Feed Value Index	Sagebrush	2010-40	106.017	12.464	77.824	134.210	2010-Control	197.856	20.956	150.454	245.257
Total percent Nitrogen	Sagebrush	2010-40	1.875	0.085	1.683	2.067	2010-Control	1.966	0.054	1.842	2.089
Dry weight	Grass	2010-40	26.816	4.405	16.851	36.781	2010-Control	5.145	1.960	0.713	9.578
Moisture	Grass	2010-40	6.479	1.312	3.511	9.448	2010-Control	18.828	4.751	8.082	29.575
Dry Matter	Grass	2010-40	93.521	1.312	90.552	96.489	2010-Control	81.172	4.751	70.425	91.918
Crude Protein	Grass	2010-40	8.894	0.434	7.913	9.875	2010-Control	9.911	0.782	8.143	11.680
Detergent Fiber	Grass	2010-40	57.654	3.036	50.786	64.523	2010-Control	38.221	4.493	28.058	48.383
Acid Detergent Fiber	Grass	2010-40	49.068	4.788	38.238	59.898	2010-Control	29.682	3.128	22.607	36.756
Total Digestible Nutrients	Grass	2010-40	50.136	3.782	41.580	58.692	2010-Control	65.451	2.471	59.863	71.040
Digestible Energy	Grass	2010-40	1.005	0.076	0.833	1.177	2010-Control	1.312	0.050	1.200	1.424
Estimated Net Energy	Grass	2010-40	38.313	5.023	26.952	49.674	2010-Control	58.649	3.281	51.228	66.071
Net Energy/lactation	Grass	2010-40	0.464	0.061	0.326	0.601	2010-Control	0.710	0.040	0.620	0.800
Net Energy/maintenance	Grass	2010-40	0.529	0.050	0.416	0.642	2010-Control	0.731	0.033	0.657	0.805
Net Energy/Gain	Grass	2010-40	6.150	0.499	5.022	7.278	2010-Control	8.169	0.326	7.432	8.905
Metabolizable Energy	Grass	2010-40	0.375	0.028	0.311	0.439	2010-Control	0.489	0.018	0.447	0.531
Feed Value Index	Grass	2010-40	90.189	13.974	58.581	121.797	2010-Control	183.547	21.567	134.762	232.332
Total percent Nitrogen	Grass	2010-40	1.423	0.069	1.266	1.580	2010-Control	1.586	0.125	1.303	1.869
Dry weight	Forb	2010-40	26.149	5.149	14.503	37.795	2010-Control	26.625	4.929	15.475	37.775
Moisture	Forb	2010-40	8.462	1.536	4.986	11.937	2010-Control	7.448	1.262	4.593	10.302
Dry Matter	Forb	2010-40	91.538	1.536	88.063	95.014	2010-Control	92.552	1.262	89.698	95.407
Crude Protein	Forb	2010-40	8.716	0.389	7.837	9.596	2010-Control	10.680	0.972	8.481	12.879
Detergent Fiber	Forb	2010-40	59.007	3.074	52.054	65.961	2010-Control	50.720	1.439	47.466	53.974
Acid Detergent Fiber	Forb	2010-40	50.794	4.321	41.020	60.567	2010-Control	37.133	1.796	33.071	41.195
Total Digestible Nutrients	Forb	2010-40	48.773	3.413	41.052	56.494	2010-Control	59.565	1.419	56.356	62.774
Digestible Energy	Forb	2010-40	0.978	0.068	0.823	1.132	2010-Control	1.194	0.028	1.130	1.258
Estimated Net Energy	Forb	2010-40	36.503	4.532	26.250	46.755	2010-Control	50.833	1.884	46.572	55.094
Net Energy/lactation	Forb	2010-40	0.442	0.055	0.318	0.566	2010-Control	0.615	0.023	0.564	0.667
Net Energy/maintenance	Forb	2010-40	0.511	0.045	0.409	0.613	2010-Control	0.653	0.019	0.611	0.696
Net Energy/Gain	Forb	2010-40	5.970	0.450	4.952	6.988	2010-Control	7.393	0.187	6.970	7.816
Metabolizable Energy	Forb	2010-40	0.364	0.026	0.307	0.422	2010-Control	0.445	0.011	0.421	0.469
Feed Value Index	Forb	2010-40	85.940	14.577	52.967	118.914	2010-Control	114.261	6.754	98.984	129.538
Total percent Nitrogen	Forb	2010-40	1.395	0.062	1.254	1.535	2010-Control	1.709	0.156	1.357	2.061

Table E.2 Nutrient values comparison between vegetation measured in areas fertilized in 2010 at a rate of 80 lb/acre and the 2010 control area (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Grey cells indicate row values that differ significantly between the treatment and control areas as assessed by 95% confidence intervals (95% CI).

				Standard	95% Confidence Interval				Standard	95% Confidence Interval	
Nutrient Measure	**Plant Type**	**Treatment**	**Mean**	**Error**	**Lower**	**Upper**	**Treatment**	**Mean**	**Error**	**Lower**	**Upper**
Dry weight	Sagebrush	2010-80	13.162	3.335	5.618	20.706	2010-Control	1.665	0.510	0.510	2.820
Moisture	Sagebrush	2010-80	9.333	0.601	7.974	10.692	2010-Control	22.903	3.890	14.104	31.702
Dry Matter	Sagebrush	2010-80	90.667	0.601	89.308	92.026	2010-Control	77.097	3.890	68.298	85.896
Crude Protein	Sagebrush	2010-80	12.515	0.432	11.537	13.492	2010-Control	12.284	0.340	11.515	13.054
Detergent Fiber	Sagebrush	2010-80	51.320	2.521	45.617	57.023	2010-Control	35.664	3.995	26.626	44.701
Acid Detergent Fiber	Sagebrush	2010-80	39.902	2.976	33.169	46.634	2010-Control	28.294	3.019	21.466	35.122
Total Digestible Nutrients	Sagebrush	2010-80	57.378	2.351	52.059	62.696	2010-Control	66.548	2.385	61.153	71.942
Digestible Energy	Sagebrush	2010-80	1.150	0.047	1.044	1.257	2010-Control	1.334	0.048	1.226	1.442
Estimated Net Energy	Sagebrush	2010-80	47.929	3.122	40.866	54.991	2010-Control	60.105	3.167	52.942	67.268
Net Energy/lactation	Sagebrush	2010-80	0.580	0.038	0.495	0.666	2010-Control	0.728	0.038	0.641	0.814
Net Energy/maintenance	Sagebrush	2010-80	0.625	0.031	0.554	0.695	2010-Control	0.745	0.031	0.674	0.817
Net Energy/Gain	Sagebrush	2010-80	7.104	0.310	6.403	7.805	2010-Control	8.313	0.314	7.602	9.024
Metabolizable Energy	Sagebrush	2010-80	0.429	0.018	0.389	0.468	2010-Control	0.497	0.018	0.457	0.538
Feed Value Index	Sagebrush	2010-80	112.831	12.903	83.644	142.018	2010-Control	197.856	20.956	150.454	245.257
Total percent Nitrogen	Sagebrush	2010-80	2.002	0.069	1.846	2.159	2010-Control	1.966	0.054	1.842	2.089
Dry weight	Grass	2010-80	22.764	1.671	18.984	26.545	2010-Control	5.145	1.960	0.713	9.578
Moisture	Grass	2010-80	7.558	1.513	4.136	10.981	2010-Control	18.828	4.751	8.082	29.575
Dry Matter	Grass	2010-80	92.442	1.513	89.019	95.864	2010-Control	81.172	4.751	70.425	91.918
Crude Protein	Grass	2010-80	10.028	0.610	8.647	11.409	2010-Control	9.911	0.782	8.143	11.680
Detergent Fiber	Grass	2010-80	53.963	2.825	47.573	60.352	2010-Control	38.221	4.493	28.058	48.383
Acid Detergent Fiber	Grass	2010-80	41.256	3.072	34.308	48.205	2010-Control	29.682	3.128	22.607	36.756
Total Digestible Nutrients	Grass	2010-80	56.307	2.427	50.818	61.797	2010-Control	65.451	2.471	59.863	71.040
Digestible Energy	Grass	2010-80	1.129	0.049	1.019	1.239	2010-Control	1.312	0.050	1.200	1.424
Estimated Net Energy	Grass	2010-80	46.507	3.222	39.219	53.796	2010-Control	58.649	3.281	51.228	66.071
Net Energy/lactation	Grass	2010-80	0.563	0.039	0.475	0.651	2010-Control	0.710	0.040	0.620	0.800
Net Energy/maintenance	Grass	2010-80	0.610	0.032	0.538	0.683	2010-Control	0.731	0.033	0.657	0.805
Net Energy/Gain	Grass	2010-80	6.963	0.320	6.240	7.687	2010-Control	8.169	0.326	7.432	8.905
Metabolizable Energy	Grass	2010-80	0.421	0.018	0.380	0.462	2010-Control	0.489	0.018	0.447	0.531
Feed Value Index	Grass	2010-80	106.327	13.154	76.572	136.081	2010-Control	183.547	21.567	134.762	232.332
Total percent Nitrogen	Grass	2010-80	1.604	0.098	1.384	1.825	2010-Control	1.586	0.125	1.303	1.869
Dry weight	Forb	2010-80	28.325	2.532	22.596	34.053	2010-Control	26.625	4.929	15.475	37.775
Moisture	Forb	2010-80	6.426	0.864	4.472	8.379	2010-Control	7.448	1.262	4.593	10.302
Dry Matter	Forb	2010-80	93.574	0.864	91.621	95.528	2010-Control	92.552	1.262	89.698	95.407
Crude Protein	Forb	2010-80	10.194	0.614	8.805	11.583	2010-Control	10.680	0.972	8.481	12.879
Detergent Fiber	Forb	2010-80	53.998	3.868	45.249	62.747	2010-Control	50.720	1.439	47.466	53.974
Acid Detergent Fiber	Forb	2010-80	42.070	3.394	34.394	49.746	2010-Control	37.133	1.796	33.071	41.195
Total Digestible Nutrients	Forb	2010-80	55.665	2.681	49.600	61.729	2010-Control	59.565	1.419	56.356	62.774
Digestible Energy	Forb	2010-80	1.116	0.054	0.994	1.237	2010-Control	1.194	0.028	1.130	1.258
Estimated Net Energy	Forb	2010-80	45.654	3.560	37.601	53.706	2010-Control	50.833	1.884	46.572	55.094
Net Energy/lactation	Forb	2010-80	0.553	0.043	0.455	0.650	2010-Control	0.615	0.023	0.564	0.667
Net Energy/maintenance	Forb	2010-80	0.602	0.035	0.522	0.682	2010-Control	0.653	0.019	0.611	0.696
Net Energy/Gain	Forb	2010-80	6.879	0.353	6.079	7.678	2010-Control	7.393	0.187	6.970	7.816
Metabolizable Energy	Forb	2010-80	0.416	0.020	0.371	0.461	2010-Control	0.445	0.011	0.421	0.469
Feed Value Index	Forb	2010-80	109.174	18.040	68.367	149.982	2010-Control	114.261	6.754	98.984	129.538
Total percent Nitrogen	Forb	2010-80	1.631	0.098	1.409	1.853	2010-Control	1.709	0.156	1.357	2.061

Table E.3 Nutrient values comparison between vegetation measured in areas fertilized in 2011 at a rate of 40 lb/acre and the 2011 control area (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. Grey cells indicate row values that differ significantly between the treatment and control areas as assessed by 95% confidence intervals (95% CI).

				Standard	95% Confidence Interval				Standard	95% Confidence Interval	
Nutrient Measure	**Plant Type**	**Treatment**	**Mean**	**Error**	**Lower**	**Upper**	**Treatment**	**Mean**	**Error**	**Lower**	**Upper**
Dry weight	Sagebrush	2011-40	18.531	5.653	5.745	31.318	2011-Control	0.968	0.155	0.618	1.319
Moisture	Sagebrush	2011-40	10.381	1.101	7.892	12.871	2011-Control	24.064	3.271	16.665	31.463
Dry Matter	Sagebrush	2011-40	89.619	1.101	87.129	92.108	2011-Control	75.936	3.271	68.537	83.335
Crude Protein	Sagebrush	2011-40	11.776	1.343	8.738	14.814	2011-Control	13.167	0.375	12.319	14.014
Detergent Fiber	Sagebrush	2011-40	57.559	3.058	50.642	64.476	2011-Control	35.975	4.227	26.413	45.536
Acid Detergent Fiber	Sagebrush	2011-40	48.369	4.853	37.392	59.346	2011-Control	27.353	2.185	22.410	32.296
Total Digestible Nutrients	Sagebrush	2011-40	50.689	3.834	42.017	59.360	2011-Control	67.291	1.726	63.386	71.196
Digestible Energy	Sagebrush	2011-40	1.016	0.077	0.842	1.190	2011-Control	1.349	0.035	1.271	1.427
Estimated Net Energy	Sagebrush	2011-40	39.046	5.091	27.531	50.561	2011-Control	61.092	2.292	55.907	66.278
Net Energy/lactation	Sagebrush	2011-40	0.473	0.062	0.333	0.612	2011-Control	0.740	0.028	0.677	0.802
Net Energy/maintenance	Sagebrush	2011-40	0.536	0.051	0.422	0.651	2011-Control	0.755	0.023	0.704	0.807
Net Energy/Gain	Sagebrush	2011-40	6.223	0.505	5.079	7.366	2011-Control	8.411	0.228	7.896	8.926
Metabolizable Energy	Sagebrush	2011-40	0.379	0.029	0.314	0.444	2011-Control	0.503	0.013	0.474	0.532
Feed Value Index	Sagebrush	2011-40	89.610	12.342	61.693	117.527	2011-Control	200.066	24.751	144.079	256.053
Total percent Nitrogen	Sagebrush	2011-40	1.884	0.215	1.398	2.370	2011-Control	2.107	0.060	1.971	2.242
Dry weight	Grass	2011-40	23.585	4.185	14.118	33.052	2011-Control	5.446	1.916	1.113	9.780
Moisture	Grass	2011-40	6.929	1.105	4.429	9.429	2011-Control	18.472	4.604	8.058	28.885
Dry Matter	Grass	2011-40	93.071	1.105	90.571	95.571	2011-Control	81.528	4.604	71.115	91.942
Crude Protein	Grass	2011-40	8.884	0.572	7.591	10.177	2011-Control	11.556	1.237	8.757	14.354
Detergent Fiber	Grass	2011-40	58.348	2.704	52.232	64.464	2011-Control	36.955	4.980	25.690	48.220
Acid Detergent Fiber	Grass	2011-40	50.108	4.329	40.317	59.900	2011-Control	29.094	3.070	22.148	36.039
Total Digestible Nutrients	Grass	2011-40	49.314	3.420	41.579	57.050	2011-Control	65.916	2.426	60.429	71.403
Digestible Energy	Grass	2011-40	0.989	0.069	0.833	1.144	2011-Control	1.321	0.049	1.211	1.431
Estimated Net Energy	Grass	2011-40	37.222	4.541	26.950	47.493	2011-Control	59.266	3.221	51.981	66.552
Net Energy/lactation	Grass	2011-40	0.451	0.055	0.326	0.575	2011-Control	0.718	0.039	0.629	0.806
Net Energy/maintenance	Grass	2011-40	0.518	0.045	0.416	0.620	2011-Control	0.737	0.032	0.665	0.809
Net Energy/Gain	Grass	2011-40	6.041	0.451	5.022	7.061	2011-Control	8.230	0.320	7.507	8.953
Metabolizable Energy	Grass	2011-40	0.368	0.026	0.311	0.426	2011-Control	0.492	0.018	0.451	0.533
Feed Value Index	Grass	2011-40	84.386	10.500	60.635	108.137	2011-Control	197.018	26.274	137.586	256.450
Total percent Nitrogen	Grass	2011-40	1.421	0.091	1.215	1.628	2011-Control	1.849	0.198	1.401	2.297
Dry weight	Forb	2011-40	31.605	3.729	23.170	40.040	2011-Control	8.929	3.452	1.119	16.738
Moisture	Forb	2011-40	7.344	1.291	4.423	10.265	2011-Control	20.249	5.121	8.665	31.832
Dry Matter	Forb	2011-40	92.656	1.291	89.735	95.577	2011-Control	79.751	5.121	68.168	91.335
Crude Protein	Forb	2011-40	8.858	0.470	7.794	9.923	2011-Control	11.505	1.183	8.829	14.181
Detergent Fiber	Forb	2011-40	58.049	2.548	52.286	63.813	2011-Control	36.908	3.776	28.368	45.448
Acid Detergent Fiber	Forb	2011-40	48.995	4.533	38.742	59.248	2011-Control	28.435	2.257	23.330	33.539
Total Digestible Nutrients	Forb	2011-40	50.194	3.581	42.094	58.294	2011-Control	66.437	1.783	62.404	70.469
Digestible Energy	Forb	2011-40	1.006	0.072	0.844	1.169	2011-Control	1.332	0.036	1.251	1.413
Estimated Net Energy	Forb	2011-40	38.389	4.755	27.634	49.145	2011-Control	59.958	2.367	54.603	65.313
Net Energy/lactation	Forb	2011-40	0.465	0.058	0.335	0.595	2011-Control	0.726	0.029	0.661	0.791
Net Energy/maintenance	Forb	2011-40	0.530	0.047	0.423	0.637	2011-Control	0.744	0.024	0.691	0.797
Net Energy/Gain	Forb	2011-40	6.157	0.472	5.090	7.225	2011-Control	8.298	0.235	7.767	8.830
Metabolizable Energy	Forb	2011-40	0.375	0.027	0.315	0.436	2011-Control	0.496	0.013	0.466	0.527
Feed Value Index	Forb	2011-40	86.699	10.591	62.742	110.657	2011-Control	195.898	20.580	149.346	242.450
Total percent Nitrogen	Forb	2011-40	1.417	0.075	1.247	1.588	2011-Control	1.841	0.189	1.413	2.269

Table E.4 Nutrient values comparison between vegetation measured in areas fertilized in 2010 at a rate of 40 lb/acre and areas fertilized in 2010 at a rate of 80 lb/acre (reference Map 1) on the Pinedale Mesa in southwestern Wyoming, 2012-13. No values differ significantly between the two treatments as assessed by 95% confidence intervals (95% CI).

				Standard	95% Confidence Interval				Standard	95% Confidence Interval	
Nutrient Measure	**Plant Type**	**Treatment**	**Mean**	**Error**	**Lower**	**Upper**	**Treatment**	**Mean**	**Error**	**Lower**	**Upper**
Dry weight	Sagebrush	2010-40	13.796	2.923	7.183	20.408	2010-80	13.162	3.335	5.618	20.706
Moisture	Sagebrush	2010-40	10.275	0.951	8.124	12.425	2010-80	9.333	0.601	7.974	10.692
Dry Matter	Sagebrush	2010-40	89.725	0.951	87.575	91.876	2010-80	90.667	0.601	89.308	92.026
Crude Protein	Sagebrush	2010-40	11.718	0.531	10.517	12.919	2010-80	12.515	0.432	11.537	13.492
Detergent Fiber	Sagebrush	2010-40	54.462	2.868	47.975	60.950	2010-80	51.320	2.521	45.617	57.023
Acid Detergent Fiber	Sagebrush	2010-40	40.168	2.783	33.873	46.463	2010-80	39.902	2.976	33.169	46.634
Total Digestible Nutrients	Sagebrush	2010-40	57.167	2.198	52.194	62.140	2010-80	57.378	2.351	52.059	62.696
Digestible Energy	Sagebrush	2010-40	1.146	0.044	1.046	1.246	2010-80	1.150	0.047	1.044	1.257
Estimated Net Energy	Sagebrush	2010-40	47.649	2.919	41.046	54.252	2010-80	47.929	3.122	40.866	54.991
Net Energy/lactation	Sagebrush	2010-40	0.577	0.035	0.497	0.657	2010-80	0.580	0.038	0.495	0.666
Net Energy/maintenance	Sagebrush	2010-40	0.622	0.029	0.556	0.687	2010-80	0.625	0.031	0.554	0.695
Net Energy/Gain	Sagebrush	2010-40	7.077	0.290	6.421	7.732	2010-80	7.104	0.310	6.403	7.805
Metabolizable Energy	Sagebrush	2010-40	0.427	0.016	0.390	0.464	2010-80	0.429	0.018	0.389	0.468
Feed Value Index	Sagebrush	2010-40	106.017	12.464	77.824	134.210	2010-80	112.831	12.903	83.644	142.018
Total percent Nitrogen	Sagebrush	2010-40	1.875	0.085	1.683	2.067	2010-80	2.002	0.069	1.846	2.159
Dry weight	Grass	2010-40	26.816	4.405	16.851	36.781	2010-80	22.764	1.671	18.984	26.545
Moisture	Grass	2010-40	6.479	1.312	3.511	9.448	2010-80	7.558	1.513	4.136	10.981
Dry Matter	Grass	2010-40	93.521	1.312	90.552	96.489	2010-80	92.442	1.513	89.019	95.864
Crude Protein	Grass	2010-40	8.894	0.434	7.913	9.875	2010-80	10.028	0.610	8.647	11.409
Detergent Fiber	Grass	2010-40	57.654	3.036	50.786	64.523	2010-80	53.963	2.825	47.573	60.352
Acid Detergent Fiber	Grass	2010-40	49.068	4.788	38.238	59.898	2010-80	41.256	3.072	34.308	48.205
Total Digestible Nutrients	Grass	2010-40	50.136	3.782	41.580	58.692	2010-80	56.307	2.427	50.818	61.797
Digestible Energy	Grass	2010-40	1.005	0.076	0.833	1.177	2010-80	1.129	0.049	1.019	1.239
Estimated Net Energy	Grass	2010-40	38.313	5.023	26.952	49.674	2010-80	46.507	3.222	39.219	53.796
Net Energy/lactation	Grass	2010-40	0.464	0.061	0.326	0.601	2010-80	0.563	0.039	0.475	0.651
Net Energy/maintenance	Grass	2010-40	0.529	0.050	0.416	0.642	2010-80	0.610	0.032	0.538	0.683
Net Energy/Gain	Grass	2010-40	6.150	0.499	5.022	7.278	2010-80	6.963	0.320	6.240	7.687
Metabolizable Energy	Grass	2010-40	0.375	0.028	0.311	0.439	2010-80	0.421	0.018	0.380	0.462
Feed Value Index	Grass	2010-40	90.189	13.974	58.581	121.797	2010-80	106.327	13.154	76.572	136.081
Total percent Nitrogen	Grass	2010-40	1.423	0.069	1.266	1.580	2010-80	1.604	0.098	1.384	1.825
Dry weight	Forb	2010-40	26.149	5.149	14.503	37.795	2010-80	28.325	2.532	22.596	34.053
Moisture	Forb	2010-40	8.462	1.536	4.986	11.937	2010-80	6.426	0.864	4.472	8.379
Dry Matter	Forb	2010-40	91.538	1.536	88.063	95.014	2010-80	93.574	0.864	91.621	95.528
Crude Protein	Forb	2010-40	8.716	0.389	7.837	9.596	2010-80	10.194	0.614	8.805	11.583
Detergent Fiber	Forb	2010-40	59.007	3.074	52.054	65.961	2010-80	53.998	3.868	45.249	62.747
Acid Detergent Fiber	Forb	2010-40	50.794	4.321	41.020	60.567	2010-80	42.070	3.394	34.394	49.746
Total Digestible Nutrients	Forb	2010-40	48.773	3.413	41.052	56.494	2010-80	55.665	2.681	49.600	61.729
Digestible Energy	Forb	2010-40	0.978	0.068	0.823	1.132	2010-80	1.116	0.054	0.994	1.237
Estimated Net Energy	Forb	2010-40	36.503	4.532	26.250	46.755	2010-80	45.654	3.560	37.601	53.706
Net Energy/lactation	Forb	2010-40	0.442	0.055	0.318	0.566	2010-80	0.553	0.043	0.455	0.650
Net Energy/maintenance	Forb	2010-40	0.511	0.045	0.409	0.613	2010-80	0.602	0.035	0.522	0.682
Net Energy/Gain	Forb	2010-40	5.970	0.450	4.952	6.988	2010-80	6.879	0.353	6.079	7.678
Metabolizable Energy	Forb	2010-40	0.364	0.026	0.307	0.422	2010-80	0.416	0.020	0.371	0.461
Feed Value Index	Forb	2010-40	85.940	14.577	52.967	118.914	2010-80	109.174	18.040	68.367	149.982
Total percent Nitrogen	Forb	2010-40	1.395	0.062	1.254	1.535	2010-80	1.631	0.098	1.409	1.853