

June 9, 2023

Chad Hudson, Forest Supervisor
Bridger-Teton National Forest
340 N. Cache
P.O. Box 1888
Jackson, WY 83001



Re: Upper Green Study - Utilization v Retention - BTNF 2013/2014

VIA Email

Dear Mr. Hudson:

We previously submitted our report, [Surveys of Upper Green, Fisherman Creek, and Elk Ridge Allotment Complexes dated April 13, 2023](#) (April 13 Report) to you. A zoom meeting was held on April 21, 2013 to discuss the report. Randall Griebel, Kevin Khung, Jonathan Ratner, and John Carter participated. Following the discussion, Randall provided some reports and [data](#) prepared by the Bridger Teton NF. Randall was going to circulate our report to Gary Hayward, Mike Henn, and Albert Sommers, and discuss addressing the report and our proposal to do a simple joint effort of data validation in the summer of 2023.

The data Randall provided consisted of spreadsheets from a 2013 and 2014 study conducted by the Bridger Teton NF to compare utilization and retention based on caged plots (ungrazed) and grazed plots. This was similar to the methodology we employed in our study. We have analyzed that data and compared it to our study results, finding similar outcomes.

We have not heard back from your office regarding our request to do a validation study this summer and at this time, the livestock are near the entry date into the allotments unless delayed due to range ready conditions. In addition, the recent ruling in the Upper Green case remanded the decision back to the BTNF to address certain issues. We have three requests:

1. That you respond to our request for the validation study in a timely manner so this season is not lost.
2. That you incorporate our report cited above along with the analysis contained in this letter report into your process to arrive at a new Decision on the Upper Green issues remanded to the BTNF.
3. Finally, that you inform us as to the nature and timing of the process and public input opportunities you will be using to address the Upper Green remand.

Before presenting the results of our analysis of the data provided by Randall Griebel, we would like to outline a few of the results from our April 13 Report for ease of comparison with this current analysis.

Summary of WWP and Y2U April 12, 2023 Report Results:

- Plots clipped and weighed in the Elk Ridge Complex were producing less than 25% of potential after five years rest. Bluebunch wheatgrass was absent. According to the Ecological Site Descriptions, it should comprise a significant portion of forage production. Bluebunch wheatgrass is a strong decreaser species which is often eliminated from the system by livestock grazing.
- Our ungrazed plots in the Upper Green allotment found that most areas were producing less than 40% of potential. Bluebunch wheatgrass was absent even though it should have been a major component.
- Our measurement of paired plots in the Upper Green allotment found 73.1% upland utilization and 75.5% riparian utilization. This is much greater than the utilization standard provided in the Upper Green ROD or the 25% recommended by range science.
- The SCCD, Forest Service and Permittee (SCCD) joint monitoring in 2020 found an average of 9% utilization using stubble height of Idaho fescue, an increaser, as a key species. We calculated that forage production would need to be greater than 5,000 lb/acre to result in this low level of utilization based on the stocking rate.
- The SCCD green line results in 2020 averaged 11.7" for ungrazed sedges and 9.4" for grazed sedges which is approximately 8% utilization. Data was collected in dense willow stands where the sedges are protected from grazing.
- Greenline stubble heights are not representative of utilization in the adjacent riparian zone.
- The lowered production in these allotments is due to lack of rest, turning in a month earlier than actual range ready time of mid- to late July, underestimating the forage consumption of cattle, and continued unsustainable stocking rates.
- Incorporating range science, representative, and accurate monitoring into management would result in a major reduction in season and numbers. We estimated that would be 31% of the current stocking rate.
- We proposed a data validation study to compare methods, key areas, and determine forage production and are awaiting a response from the BTNF.

Bridger Teton National Forest Retention Plots from 2013 and 2014: A map of the BTNF study locations is provided in Figures 1 and 2. We consolidated the 2013 and 2014 BTNF data and performed some analysis. The Tables below provide a summary of our analysis with Table 1 (summary), Table 2 (site description and location), Table 3 (sample weights for each site), Table 4 (utilization and retention calculations from the raw data), Table 5 (utilization and retention values while removing sites with negative or zero values) and

Table 6 (production compared to ecological site potentials). Mesic sites are riparian meadow sites. Upland sites were in sagebrush and shrubby cinquefoil areas. Key species were sedges in the riparian areas and Idaho fescue in uplands. Non-key species included forbs, non-key grasses, and non-native plants.

Table 1 shows that utilization ranged from 45% to 59.4% with utilization on the non-key species being the highest. This indicates that the key species being used are less sensitive to grazing or less desirable to livestock. It also shows that retention levels do not meet the herbaceous retention objective of 70% specified in the Upper Green FEIS. At a key species utilization of 51.4% (which is near the 50% criteria used by the BTNF), retention is less than 50% for the key species and 55% for all species combined.

In 2013, the BTNF used a Robel Pole to measure average vegetation height. In the mesic (riparian areas), the ungrazed average height was 2.6 inches with a grazed average height of 1.4 inches. One upland site was measured at 2.1 inches ungrazed average height and 0.8 inches grazed average height. These are significantly less than the Sage grouse grass height objectives provided in the Upper Green FEIS which are > 7 inches in uplands and > 4 inches in herbaceous riparian and meadow habitat.

The 2013 – 2014 BTNF data illustrates what we also found, that use of the height-weight curves (utilization gauge) for Idaho fescue grossly underestimates utilization when compared to actual clipping and weighing using the Paired Plot Method. The SCCD has used a method/key species combination that appears unable to accurately reflect utilization and retention. Greenline monitoring conducted by SCCD in locations with protection by willows showed little utilization in 2020. Our study found 75% utilization and therefore 25% retention in riparian areas not protected by willows. The insensitivity of the method, key species selected, and locations negate the Adaptive Management process touted in the Upper Green ROD.

The data from the 2013 and 2014 BT retention study also found significant utilization in riparian areas that have less than 30% willow cover/protection (utilization ranged from 43.1 to 73%). (Table 1).

Table 1. Summary Averages of Utilization and Retention across Habitats

Site type	Key Species Retention	Key Species Utilization	Non-Key Species Retention	Non-Key Species Utilization	All Species Retention	All Species Utilization
Mesic Site Average	51.7%	48.3%	27.0%	73.0%	56.9%	43.1%
Upland Site Average	44.7%	55.3%	52.0%	48.0%	52.6%	47.4%
Overall Average	48.6%	51.4%	40.6%	59.4%	55.0%	45.0%

The Supplemental Wildlife Specialist Report (2016) by Kerry Murphy also analyzed this data and used it to evaluate herbaceous retention for amphibians.¹ The analysis compared key species utilization from the paired (clipped and weighed) plots to the 70 percent herbaceous retention needs of amphibians. Regression relationships were developed for both mesic areas (riparian with sparse willows) and uplands, comparing the key species utilization to herbaceous retention. The results included 2 of 11 mesic plots where key forage use was negative and one where it was zero, indicating that the randomly selected plots were subject to error. These were excluded from the regressions. The Paired Plot method requires that the grazed plots be selected to be similar to the caged plot and marked prior to grazing so this type of error can be minimized.²

Based on the regression relationships the analysis concluded that retention could be estimated as 100% minus the key forage use. This relationship was then used to determine retention in several allotments' riparian zones using the key species stubble heights data provided from the Upper Green monitoring program, resulting in herbaceous retention ranging from 92% to 35%, depending on the allotment. We have reviewed the [2013 Field Monitoring for the Upper Green River Cattle Allotment](#) to see if plots were clipped. These data were all based on stubble heights of sedges and in uplands, Idaho fescue.

As we determined in our 2022 Paired Plots, the greenline stubble heights are measured in areas with dense willow cover, not in mesic areas with sparse willow cover, and thereby

¹ Murphy, Kerry. 2016. Upper Green River Area Rangeland Project. Supplemental Wildlife Specialist Report: Federally listed species, Sensitive amphibians, Management indicator amphibians. Jackson Ranger District, Bridger-Teton National Forest.

² USDA and DOI. 1999. Utilization Studies and Residual Measurements. Interagency Technical Reference 1734-3.

https://www.blm.gov/sites/default/files/documents/files/Library_BLMTechnicalReference1734-03.pdf

understate utilization by measuring these stubble heights in areas little used by livestock. Similarly, the BTNF monitoring is using stubble height of Idaho fescue and a utilization gauge to determine utilization in uplands. Because Idaho fescue is a grazing-tolerant increaser grass, it was found to grossly understate upland utilization. Neither of these can be used to determine herbaceous retention.

The Specialist Report assumed “that adequate function and retention in riparian zones also indicated desired conditions in uplands and in shoreline aquatic communities were also met—requires verification in the project area through field studies.” [Emphasis added]. Our prior report provides evidence that the current key species monitoring in the Upper Green allotment grossly understates utilization and thereby any estimate of herbaceous retention is grossly overstated.

The Specialist Report then cited a Forest Service research study by Clary and Webster (1989) which related a 6” stubble height in the riparian zone to Utilization of 24 – 32% and a 4” stubble height to a utilization rate of 37 – 44%. Our 2022 study found that greenline stubble heights do not represent the stubble heights in the adjacent mesic, or riparian meadows. For example, the average greenline stubble height was 4.8” and 17.7% utilization while the adjacent riparian meadow transects averaged 3.3” and 31% utilization (without accounting for trampling). Meanwhile, our paired plots for riparian areas averaged 75.5% utilization. While Clary and Webster’s recommendations for 24 – 32% utilization comport with the best science, they are not being achieved and are retention levels are not meeting the recommendation of the Boreal Toad Recovery Team and Advisory Group to limit herbaceous utilization to no more than 30% of current season’s growth.

The Specialist Report made this assumption. “I assumed that achieving 70% total herbaceous retention in moist meadow-sparse willow riparian areas would provide for at a similar or greater level of retention in dry riparian (silver sage and shrubby cinquefoil), dense willow, and upland habitats dominated by herbaceous vegetation. Given the opportunity, cattle spend a disproportionate amount of time (up to 30 times higher) in riparian habitats as compared to adjacent, xeric uplands (Clary and Webster 1989). This assumption will require verification if any of the grazing alternatives are implemented.” [Emphasis added].

We summarized the 2013 Field Monitoring Data for the Upper Green River Cattle Allotment into a [spreadsheet](#) in order to determine average utilization for mesic and upland area. Key species were sedges in mesic areas and Idaho fescue in uplands. In the mesic areas, utilization on sedges averaged 10.8%. In uplands, utilization on Idaho fescue averaged 15.5%. As shown in Table 1, when the BTNF personnel clipped paired plots, directly measuring utilization, the utilization levels were much greater. These compare directly with our April 13 report results in which key species utilization levels measured by stubble

height were small in comparison to the paired plots. The key species are a proxy for an actual measurement of utilization by clipping and weighing standard grazed and ungrazed plots (paired plots).

In addition, we mapped the BTNF retention study sites and overlaid them on the Ecological Sites that are available in the Upper Green allotments. Three ecological sites were identified within which the retention study paired plots were collected. These included: (1) [Coarse Upland \(Foothills And Mountains West\)](#), (2) [Loamy \(Foothills And Mountains West\)](#), and (3) [Subirrigated \(High Mountains\)](#). Table 6 summarizes the production found in the BTNF Retention Study compared to the Ecological Site potential herbaceous production. These sites were taken as mapped but should be field verified. The resulting production for mesic sites averaged 597 lb/acre and 40.1% of potential. Production in the uplands averaged 270 lb/acre and 17.3% of potential. These values are much less than those claimed to exist in the analysis in the Upper Green FEIS.

In our April 13 report and transmittal letter, we requested these deficiencies be addressed. The current monitoring protocol is clearly unable to accurately measure actual use and retention for comparison to the BTNF required standards and objectives. We also determined that current production of herbaceous vegetation is a fraction of potential as did the BTNF retention study. Current forage capacity and stocking rates should be determined in conjunction with providing rest and later turn in. This can be accomplished in a true joint monitoring and management effort involving the Forest Service, Sublette County Conservation District, Permittees, WWP, and Y2U that will:

1. Select key areas in upland and riparian areas that meet the advice in the Forest Service guidance and research we have cited. It will include areas grazed first, that is, riparian areas lacking significant willow protection and upland areas that are in valleys, on slopes less than 7% and no more than 366 meters from the nearest water source. These would then be compared to the nearest SCCD monitoring sites.
2. Place cages in these areas, at current SCCD sites, and establish paired plots.
3. At each site, measure the key species, Idaho fescue, along upland transects; sedges along transects in riparian meadows; and green line stubble heights. Include trampling in the measures.
4. Compare the results from the different methods and locations.
5. Determine the stocking rate on capable areas using the Paired Plot production data and visiting pastures with turn-in after July and clip the vegetation. Inspection of the 2022 AOI indicates six pastures could be available if the schedule remains the same.
6. Initiate this in the summer of 2023.

We also included in our April 13 Report some of the Forest Service guidance on participation by the public in monitoring and grazing management. The Forest Service

Handbook FSH 2209.10 Chapter 10 describes public involvement:

- "Involve the permittee and interested publics in management of the range allotments." (Par. 11.3).
- "Obtain ID team, interested publics, and permittee assistance in securing the necessary inventory and monitoring information and establish criteria for determining allowable use levels." (Par. 12.2).
- "The interdisciplinary (ID) team, the permittee, and interested publics should assist in the rangeland inventory and analysis and in the preparation of environmental documents." (Par. 13).
- "Public participation should be a key element of the NFMA process as well as the NEPA process. Close consultation, cooperation, and coordination with grazing permittees is essential to help them understand the differences between existing and desired vegetation on their allotment and in identifying possible practices that will achieve desired future conditions for vegetation as well as the permittees livestock operation. Other interested parties should be involved as well to identify possible practices that will be responsive to potential concerns or issues they may express. Not only is public participation good business from the standpoint of identifying opportunities and possible practices to achieve desired conditions and reduce controversy later in the planning process, but it is a requirement of law.... Furthermore, in FLPMA's declaration of policy, Congress specifically requires the Secretary of Agriculture to consider the views of the general public, and to allow for adequate third-party participation exercising his discretionary authority. (43 USC (1701(a) (5)))." (Par. 15.7).
- "Benchmark areas should be selected and/or approved by the most experienced and qualified personnel available and agreed upon or coordinated with permittees and in some cases other interested agencies, individuals or groups." (1993 FSH 2209.21 Chapter 40 Par. 40.41).

At this time, we have not received a response from the BTNF regarding implementation of our proposal. We received a May 10, 2023 email invitation from Gary Hayward³ to a May 19, 2023 meeting for "presenters" or "interested parties" to attend a "short information sharing session". We provided our Report to the Forest Service on April 13, 2023 and met with Kevin Khung and Randall Griebel via Zoom on April 21 to discuss our Report and recommendations which included setting a meeting with Albert Sommers (Upper Green Grazing Association), Mike Henn (Sublette County Conservation District) and Gary Hayward (Range Specialist BTNF) in order to develop and carry out a data validation study at up to three locations this summer. Our report was provided a month before the meeting on May 19 and we did not get an invite as a presenter. Our prior experience with this annual meeting was it was very brief and our attempt to discuss issues was cut off and the meeting ended after about 15 minutes. This is hardly worth a drive to Pinedale.

³ Email from Gary Hayward dated May 10, 2023.

When we mentioned that there was no mention of our study being addressed in the meeting, we were told in an email received from Randall Griebel⁴ that, “The purpose of the meeting is to get through these topics and provide folks the results of the Forest’s monitoring effort – not go over other entities monitoring results that can range from “maybe usable information to not-useful-at-all” because the methods, site selections, and interpretation are not representative of the actual conditions in the allotment, as one example.”

This statement by Mr. Griebel is an exact description of what we find with the SCCD monitoring. We disagree with his interpretation of the meeting purpose as Jonathan Ratner⁵ pointed out in his email response to Randall. In that email, he cited the Upper Green ROD, which states:

“Monitoring and Adaptive Management – An Open Process: The overall intent of adaptive management for this project is to proactively manage livestock grazing consistent with meeting other resource objectives, using all available tools. This includes an intent to avoid the need for drastic consequences unless other tools and management options have not met desired outcomes. To address this intent, I will provide a forum for new information, current monitoring results sharing, and other information to be presented and considered so that solutions to issues can be considered in a collaborative, proactive way. The forum would consist of at least one annual meeting which would be open to collaborators and include, at a minimum, the following agenda items.”

This situation should be corrected to open the process to the public with sufficient time to prepare. Due to conflicts and short notice, we were not able to attend the May 19 meeting. However, we expect the BTNF to arrange a meeting with Albert Sommers, (Grazing Association President), Michael Henn (Sublette Conservation District), Gary Hayward (BTNF Range Specialist), Randall Griebel (Forest Ecologist), and ourselves to go over our data and reports and develop a plan to carry out a monitoring validation study in the summer of 2023 as we have outlined herein.

⁴ Email from Randall Griebel dated May 10, 2023.

⁵ Jonathan Ratner email dated May 10, 2023.

Sincerely,

A handwritten signature in blue ink that reads "John G. Carter". The signature is written in a cursive style with a large, stylized 'J'.

John Carter, Ecologist
Yellowstone to Uintas Connection
PO Box 464
Bondurant, WY 82922

A handwritten signature in blue ink that reads "Jonathan Ratner". The signature is written in a cursive style with a large, stylized 'J'.

Jonathan Ratner, Utah and Wyoming Director
Western Watersheds Project
PO Box 171
Bondurant, WY 82922

Figure 1. Bridger Teton NF Retention Study Site Locations

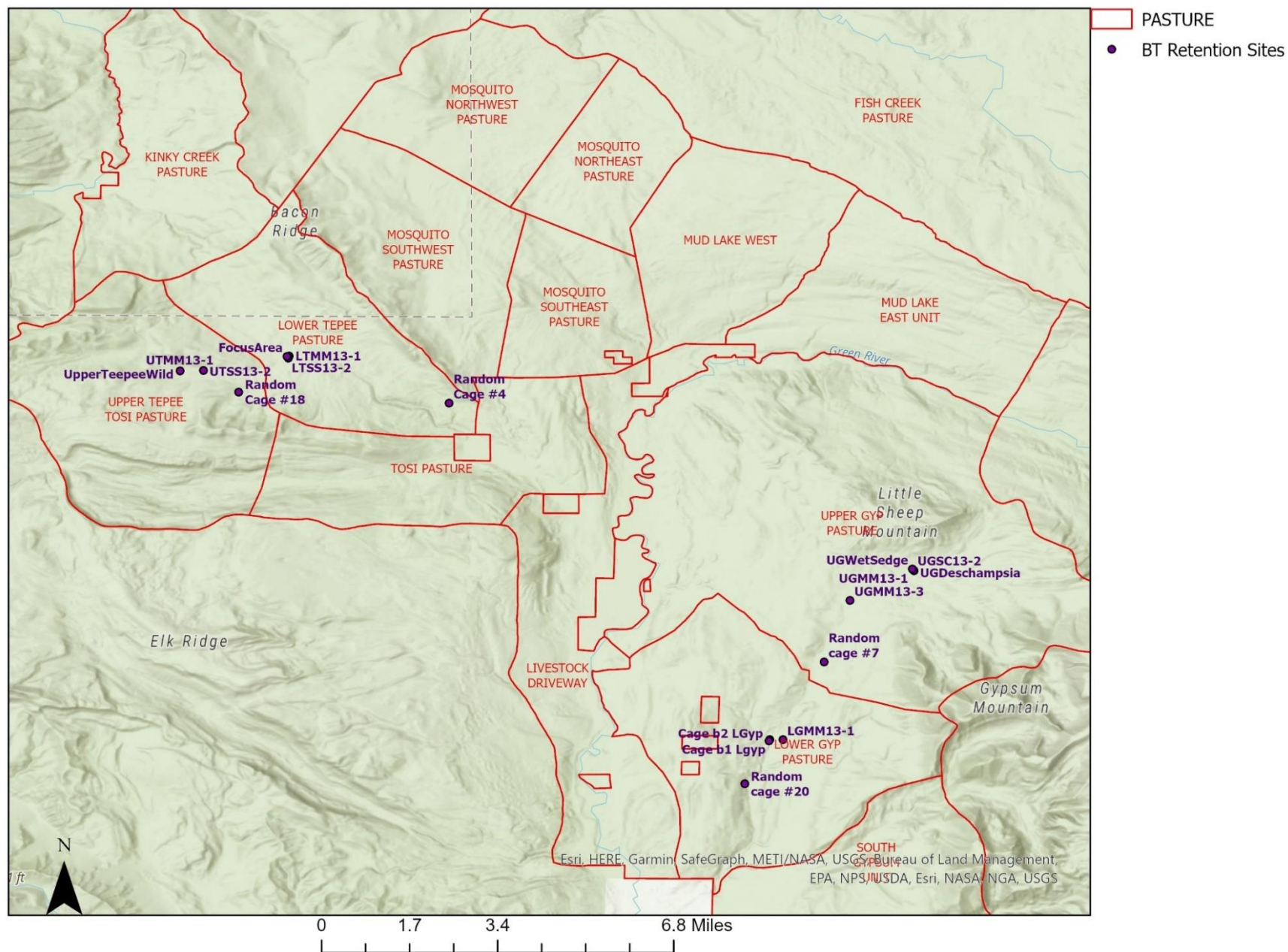


Figure 2. Bridger Teton NF Retention Study Sites Overlain on Ecological Sites

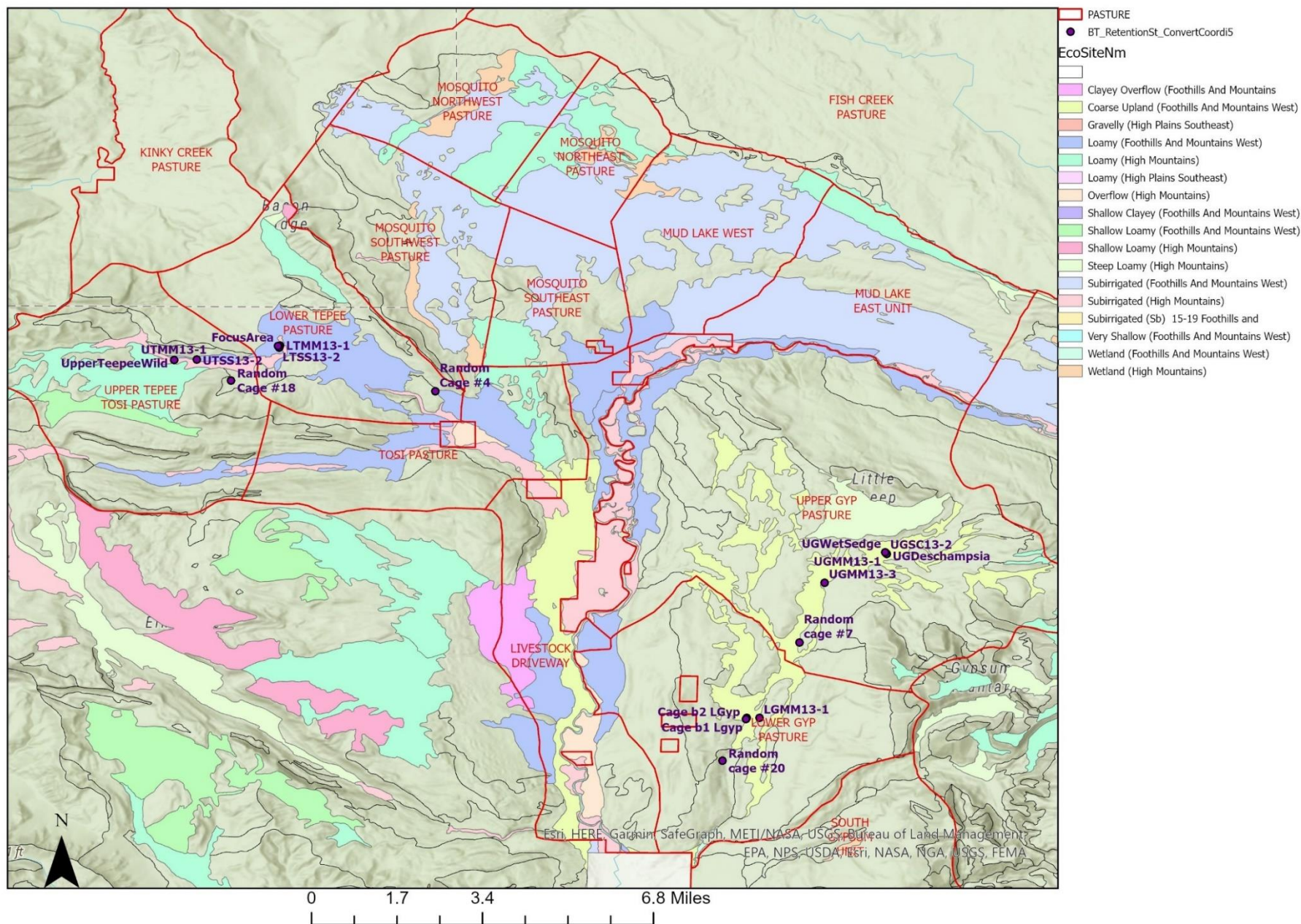


Table 2. Site Descriptions and Locations

Year	Pasture	Site ID	Site type	Easting	Northing	Elevation
2013	Lower Gypsum	LGMM13-1	Mesic Meadow	583564	4790190	8233
2013	Upper Gypsum	UGMM13-1	Mesic Meadow	586439	4795507	8950
2013	Upper Gypsum	UGMM13-3	Mesic Meadow	585033	4794531	8733
2013	Upper Teepee	UTMM13-1	Mesic Meadow	569784	4801473	8921
2013	Lower Teepee	LTMM13-1	Mesic Meadow	572253	4801959	8775
2014	Lower Gypsum	Cage b1 LGyp	Mesic Meadow	0583268	4790186	8212
2014	Lower Gypsum	Cage b2 LGyp	Mesic Meadow	0583245	4790149	8097
2014	Upper Gypsum*	UGDeschampsia	Mesic Meadow	0586470	4795470	8944
2014	Upper Gypsum*	UGWetSedge	Mesic Meadow	0586432	4795517	8925
2014	TosiTeepeeRed lower	FocusArea	Mesic Meadow	0572202	4801940	8775
2014	Upper Teepee	UpperTeepeeWild	Mesic Meadow	569784	4801473	SeeLastYr
2014	Upper Teepee	Random Cage #18	Mountain Big Sage	0571121	4800826	7172?
2013	Upper Gypsum	UGSC13-2	Shrubby Cinquefoil	586453	4795496	8961
2014	LGyp Random	Random cage #20	Shrubby cinquefoil	582716.45	4788812	
2013	Upper Teepee	UTSS13-2	Silver Sage	570316	4801491	8894
2013	Lower Teepee	LTSS13-2	Silver Sage	572228	4801893	8769
2014	Upper Teepee	UpperTeepeeNonWild	Silver Sage	570316	4081491	SeeLastYr
2014	UGyp Random	Random cage #7	SilverSage/Shrubby Cinquefoil	584470	4792615.8	
2014	TosiTeepeeRed lower	Random Cage #4	SilverSage/Shrubby Cinquefoil	0575885	4800540	8111?

Reproduced from the original spreadsheet unedited and sorted by mesic or upland type across years

Table 3. Summary of Sample Weights for Key, Non-Key, and All Species Grazed and Ungrazed

Year	Site ID	Site type	Key Species Cage, g	Key Species Grazed, g	Non-Key Sp Cage, g	Non-Key Sp Grazed, g	All Species Cage, g	All Species Grazed, g
2013	LGMM13-1	Mesic Meadow	18.7	11.5	0.8	2.8	19.1	12.9
2013	UGMM13-1	Mesic Meadow	7.6	4.8	5.5	1.7	10.4	5.7
2013	UGMM13-3	Mesic Meadow	7.2	7.7	10.1	2	12.3	8.9
2013	UTMM13-1	Mesic Meadow	9	4.8	7	2.6	12.5	6.1
2013	LTMM13-1	Mesic Meadow	7.6	4.4	3.8	6.7	9.5	7.8
2014	Cage b1 Lgyp	Mesic Meadow	13.75	10.8	1.65	0.45	15.4	11.25
2014	Cage b2 LGyp	Mesic Meadow	13.05	5	0.6	1.6	13.65	6.6
2014	UGDeschampsia	Mesic Meadow	12.25	2.8	0.8	1.5	13.05	4.3
2014	UGWetSedge	Mesic Meadow	31.3	19.1	0	0.05	31.3	19.15
2014	FocusArea	Mesic Meadow	35.85	10.15	0	0	35.85	10.15
2014	UpperTeepeeWild	Mesic Meadow	7.75	12.3	3.5	0.7	11.25	12.65
2014	Random Cage #18	Mountain Big Sage	8.5	2.4	1.85	2.95	10.35	5.35
2013	UGSC13-2	Shrubby Cinquefoil	3.2	5.1	6.9	2.8	6.7	6.5
2014	Random cage #20	Shrubby cinquefoil	0.75	0.25	2	1.25	2.75	1.5
2013	UTSS13-2	Silver Sage	2.7	2.3	18.2	6.1	11.8	5.3
2013	LTSS13-2	Silver Sage	3	1	2.7	2.9	4.5	2.4
2014	UpperTeepeeNonWild	Silver Sage	3.8	2.55	6.25	2.55	10.05	5.1
2014	Random cage #7	SilverSage/Shrubby Cinquefoil	4.55	0.4	4.45	2.85	9	3.25
2014	Random Cage #4	SilverSage/Shrubby Cinquefoil	3.15	1.8	1.35	0.95	8.4	2.75

Values summarized from BT Spreadsheets. Non-key values are forbs, non-natives, and invasives combined

Table 4. Utilization and Retention for Key, Non-Key and All Species Grazed and Ungrazed Unfiltered

Year	Site ID	Site type	Key Sp Retention	Key Sp Utilization	Non-Key Sp Retention	Non-Key Sp Utilization	All Sp Retention	All Sp Utilization
2013	LGMM13-1	Mesic Meadow	61.5%	38.5%	350.0%	-250.0%	67.5%	32.5%
2013	UGMM13-1	Mesic Meadow	63.2%	36.8%	30.9%	69.1%	54.8%	45.2%
2013	UGMM13-3	Mesic Meadow	106.9%	-6.9%	19.8%	80.2%	72.4%	27.6%
2013	UTMM13-1	Mesic Meadow	53.3%	46.7%	37.1%	62.9%	48.8%	51.2%
2013	LTMM13-1	Mesic Meadow	57.9%	42.1%	176.3%	-76.3%	82.1%	17.9%
2014	Cage b1 Lgyp	Mesic Meadow	78.5%	21.5%	27.3%	72.7%	73.1%	26.9%
2014	Cage b2 LGyp	Mesic Meadow	38.3%	61.7%	266.7%	-166.7%	48.4%	51.6%
2014	UGDeschampsia	Mesic Meadow	22.9%	77.1%	187.5%	-87.5%	33.0%	67.0%
2014	UGWetSedge	Mesic Meadow	61.0%	39.0%	#DIV/0!	#DIV/0!	61.2%	38.8%
2014	FocusArea	Mesic Meadow	28.3%	71.7%	#DIV/0!	#DIV/0!	28.3%	71.7%
2014	UpperTeepeeWild	Mesic Meadow	158.7%	-58.7%	20.0%	80.0%	112.4%	-12.4%
2014	Random Cage #18	Mountain Big Sage	28.2%	71.8%	159.5%	-59.5%	51.7%	48.3%
2013	UGSC13-2	Shrubby Cinquefoil	159.4%	-59.4%	40.6%	59.4%	97.0%	3.0%
2014	Random cage #20	Shrubby cinquefoil	33.3%	66.7%	62.5%	37.5%	54.5%	45.5%
2013	UTSS13-2	Silver Sage	85.2%	14.8%	33.5%	66.5%	44.9%	55.1%
2013	LTSS13-2	Silver Sage	33.3%	66.7%	107.4%	-7.4%	53.3%	46.7%
2014	UpperTeepeeNonWild	Silver Sage	67.1%	32.9%	40.8%	59.2%	50.7%	49.3%
2014	Random cage #7	SilverSage/Shrubby Cinquefoil	8.8%	91.2%	64.0%	36.0%	36.1%	63.9%
2014	Random Cage #4	SilverSage/Shrubby Cinquefoil	57.1%	42.9%	70.4%	29.6%	32.7%	67.3%

Table 5. Utilization and Retention for Key, Non-Key and All Species Grazed and Ungrazed

Year	Site ID	Site type	Key Sp Retention	Key Sp Utilization	Non-Key Sp Retention	Non-Key Sp Utilization	All Sp Retention	All Sp Utilization
2013	LGMM13-1	Mesic Meadow	61.5%	38.5%			67.5%	32.5%
2013	UGMM13-1	Mesic Meadow	63.2%	36.8%	30.9%	69.1%	54.8%	45.2%
2013	UGMM13-3	Mesic Meadow			19.8%	80.2%	72.4%	27.6%
2013	UTMM13-1	Mesic Meadow	53.3%	46.7%	37.1%	62.9%	48.8%	51.2%
2013	LTMM13-1	Mesic Meadow	57.9%	42.1%			82.1%	17.9%
2014	Cage b1 Lgyp	Mesic Meadow	78.5%	21.5%	27.3%	72.7%	73.1%	26.9%
2014	Cage b2 LGyp	Mesic Meadow	38.3%	61.7%			48.4%	51.6%
2014	UGDeschampsia	Mesic Meadow	22.9%	77.1%			33.0%	67.0%
2014	UGWetSedge	Mesic Meadow	61.0%	39.0%			61.2%	38.8%
2014	FocusArea	Mesic Meadow	28.3%	71.7%			28.3%	71.7%
2014	UpperTeepeeWild	Mesic Meadow			20.0%	80.0%		
2014	Random Cage #18	Mountain Big Sage	28.2%	71.8%			51.7%	48.3%
2013	UGSC13-2	Shrubby Cinquefoil			40.6%	59.4%	97.0%	3.0%
2014	Random cage #20	Shrubby cinquefoil	33.3%	66.7%	62.5%	37.5%	54.5%	45.5%
2013	UTSS13-2	Silver Sage	85.2%	14.8%	33.5%	66.5%	44.9%	55.1%
2013	LTSS13-2	Silver Sage	33.3%	66.7%			53.3%	46.7%
2014	UpperTeepeeNonWild	Silver Sage	67.1%	32.9%	40.8%	59.2%	50.7%	49.3%
2014	Random cage #7	SilverSage/Shrubby Cinquefoil	8.8%	91.2%	64.0%	36.0%	36.1%	63.9%
2014	Random Cage #4	SilverSage/Shrubby Cinquefoil	57.1%	42.9%	70.4%	29.6%	32.7%	67.3%
		Mesic Site Average	51.7%	48.3%	27.0%	73.0%	56.9%	43.1%
		Upland Site Average	44.7%	55.3%	52.0%	48.0%	52.6%	47.4%
		Overall Average	48.6%	51.4%	40.6%	59.4%	55.0%	45.0%

Utilization and Retention are calculated from Table 3 omitting zero and negative values.

Table 6. Bridger Teton Retention Study Production Compared to Ecological Site Potentials

Year	Site ID	Site type	Ecological Site Name	Normal Yr Ecosite Herbaceous Production lb/acre	Caged Plots Herbaceous Production lb/acre	Caged Plots Percent of Potential Production
2013	LGMM13-1	Mesic Meadow	Coarse Upland	1200	681	56.8
2013	UGMM13-1	Mesic Meadow	Coarse Upland	1200	371	30.9
2013	UGMM13-3	Mesic Meadow	Coarse Upland	1200	439	36.6
2013	UTMM13-1	Mesic Meadow	Subirrigated	4250	446	10.5
2013	LTMM13-1	Mesic Meadow	Subirrigated	4250	339	8.0
2014	Cage b1 Lgyp	Mesic Meadow	Coarse Upland	1200	549	45.8
2014	Cage b2 LGyp	Mesic Meadow	Coarse Upland	1200	487	40.6
2014	UGDeschampsia	Mesic Meadow	Coarse Upland	1200	465	38.8
2014	UGWetSedge	Mesic Meadow	Coarse Upland	1200	1116	93
2014	FocusArea	Mesic Meadow	Loamy	1800	1278	71
2014	UpperTeepeeWild	Mesic Meadow	Subirrigated	4250	401	9.4
2014	Random Cage #18	Mountain Big Sage	NA		369	NA
2013	UGSC13-2	Shrubby Cinquefoil	Coarse Upland	1200	239	19.9
2014	Random cage #20	Shrubby cinquefoil	NA		98	NA
2013	UTSS13-2	Silver Sage	Loamy	1800	421	23.3
2013	LTSS13-2	Silver Sage	Loamy	1800	160	8.8
2014	UpperTeepeeNonWild	Silver Sage	NA		358	NA
2014	Random cage #7	SilverSage/Shrubby Cinquefoil	NA		321	NA
2014	Random Cage #4	SilverSage/Shrubby Cinquefoil	NA		300	NA
		Mesic Site Average			597	40.1
		Upland Site Average			270	17.3