Appendix 1. Figures

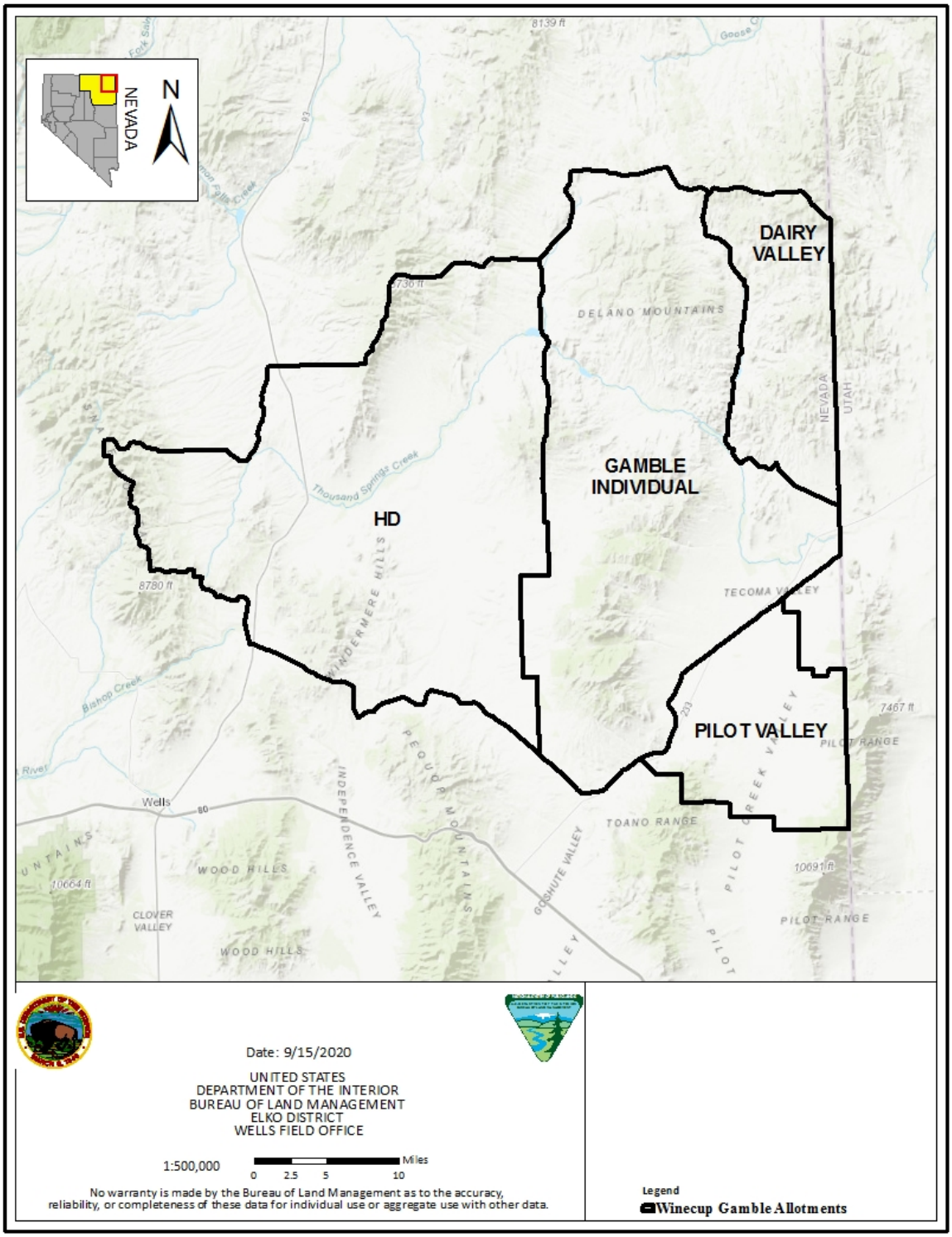

Figure 1. Winecup Gamble Ranch Complex Allotments Location

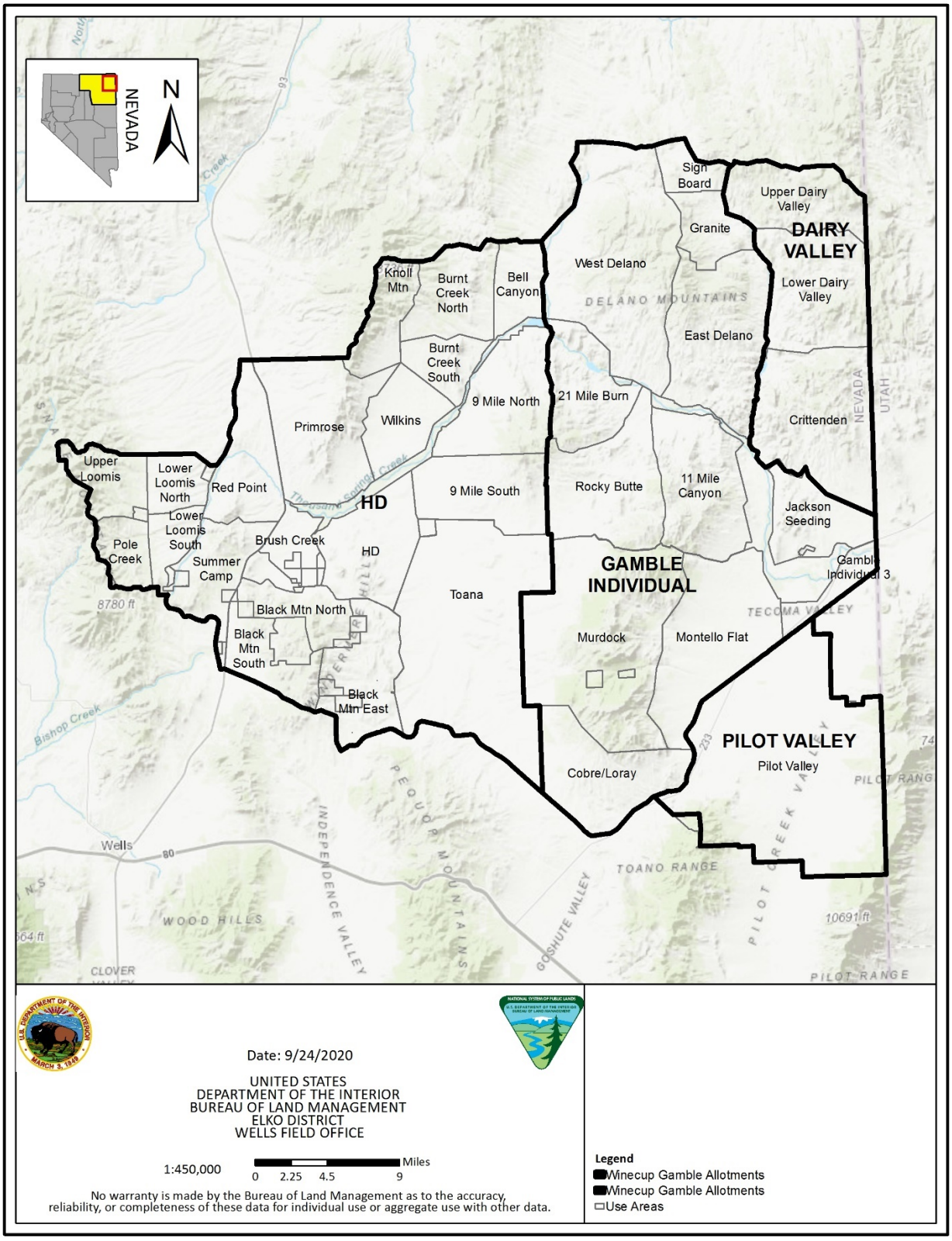

Figure 2. Winecup Gamble Ranch Complex Allotments Use Areas

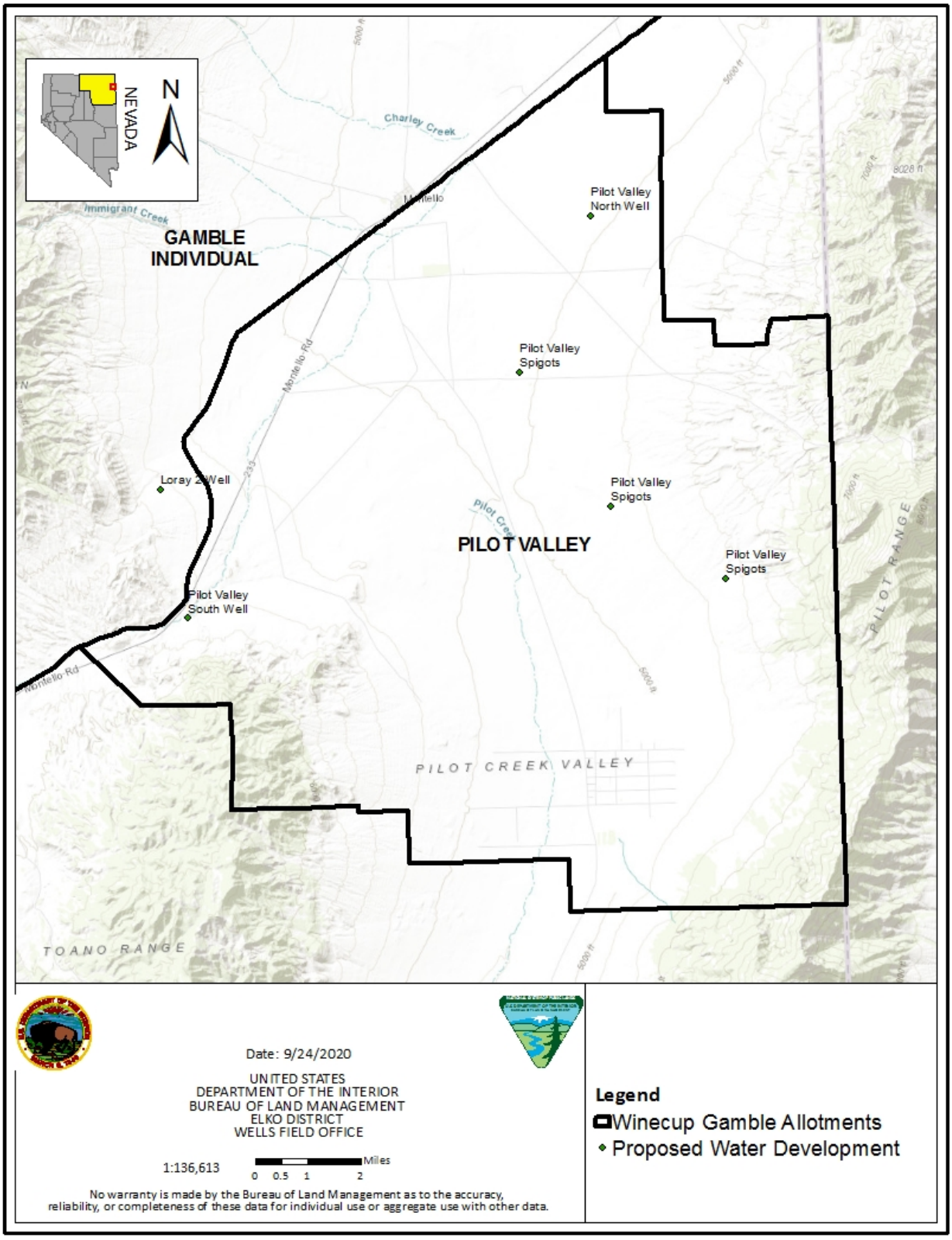

Figure 3. Proposed Range Improvement Projects- Pilot Valley Allotment

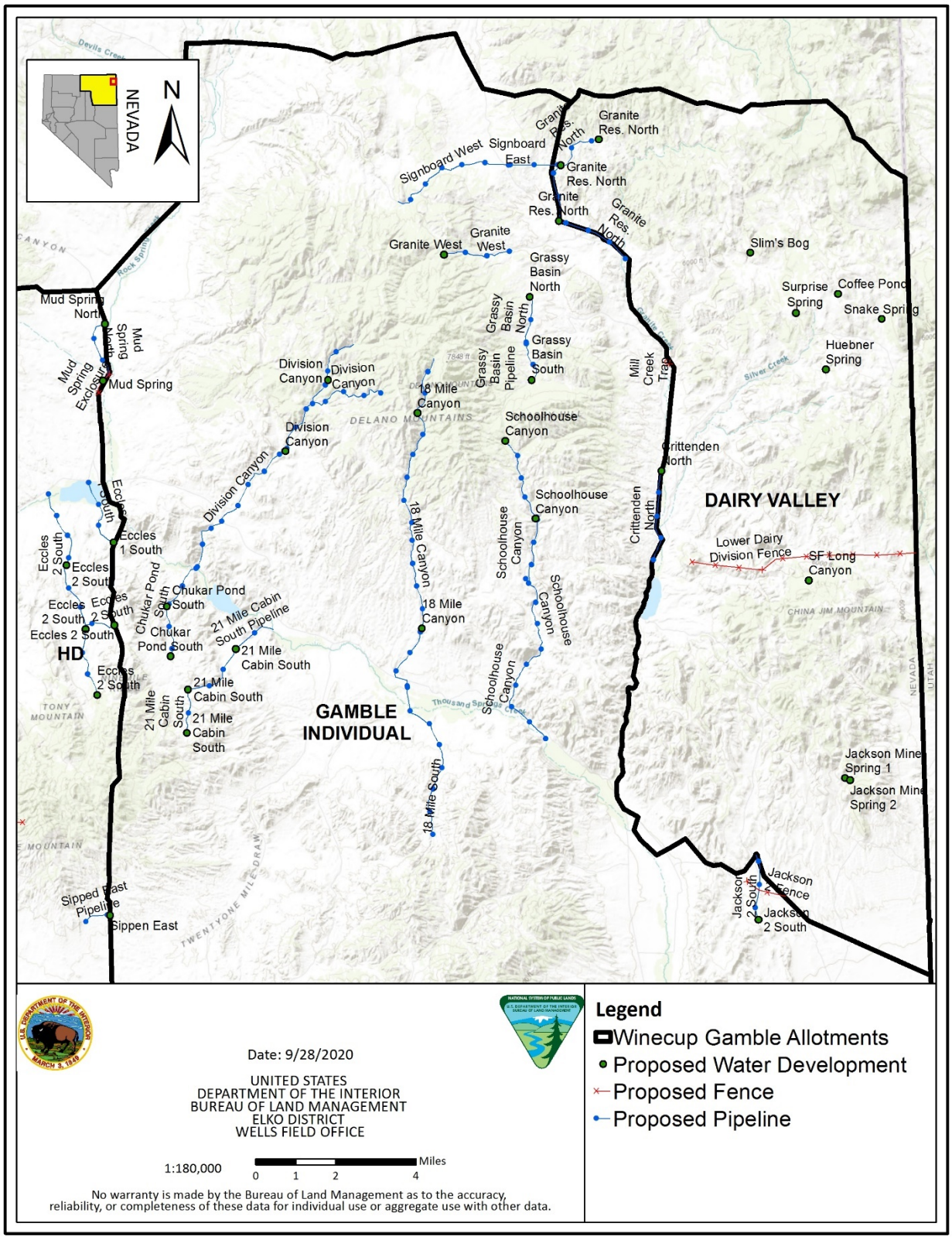

Figure 4. Proposed Range Improvement Projects- Gamble Individual North

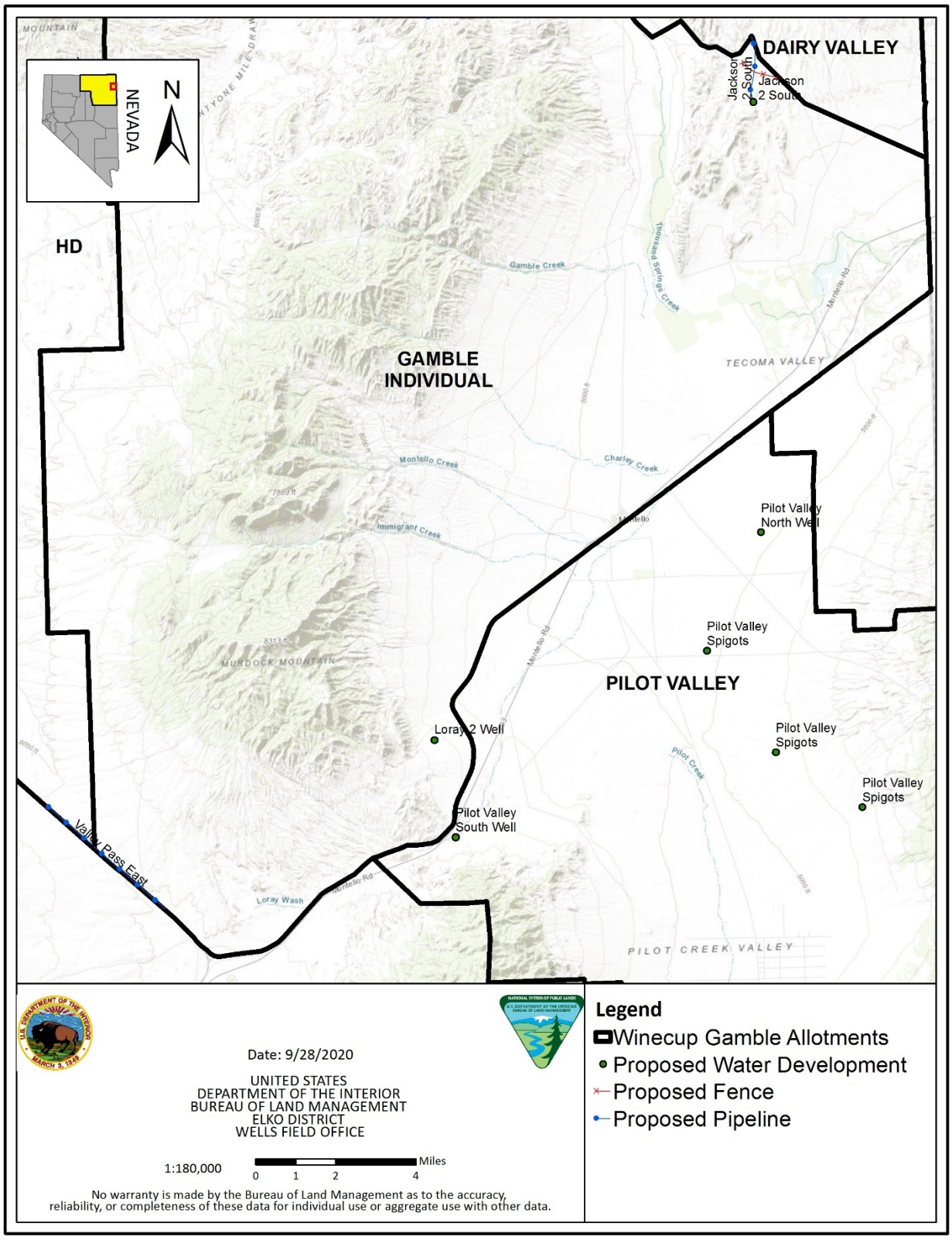

Figure 5. Proposed Range Improvement Projects- Gamble Individual South

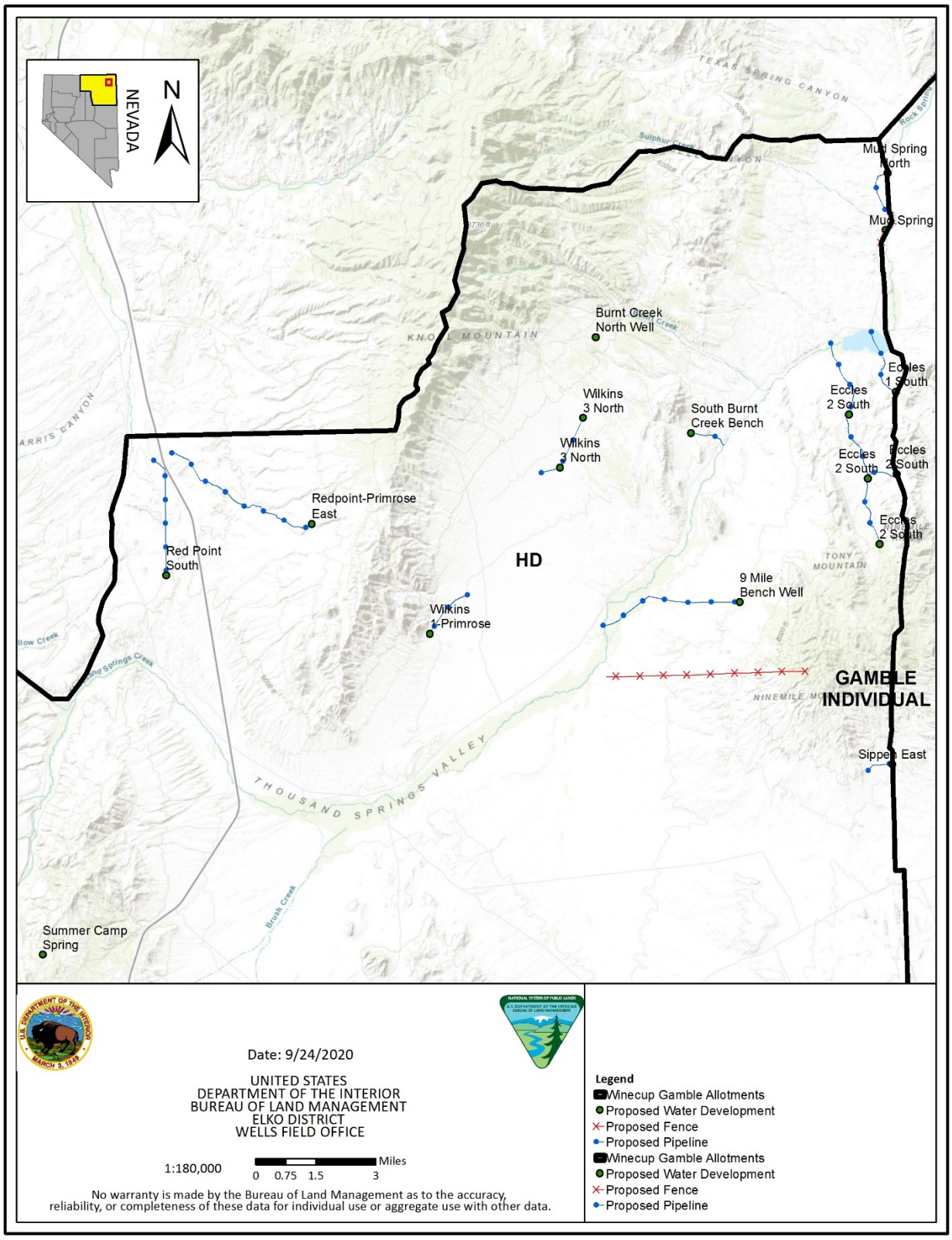

Figure 6. Proposed Range Improvement Projects- HD Allotment North

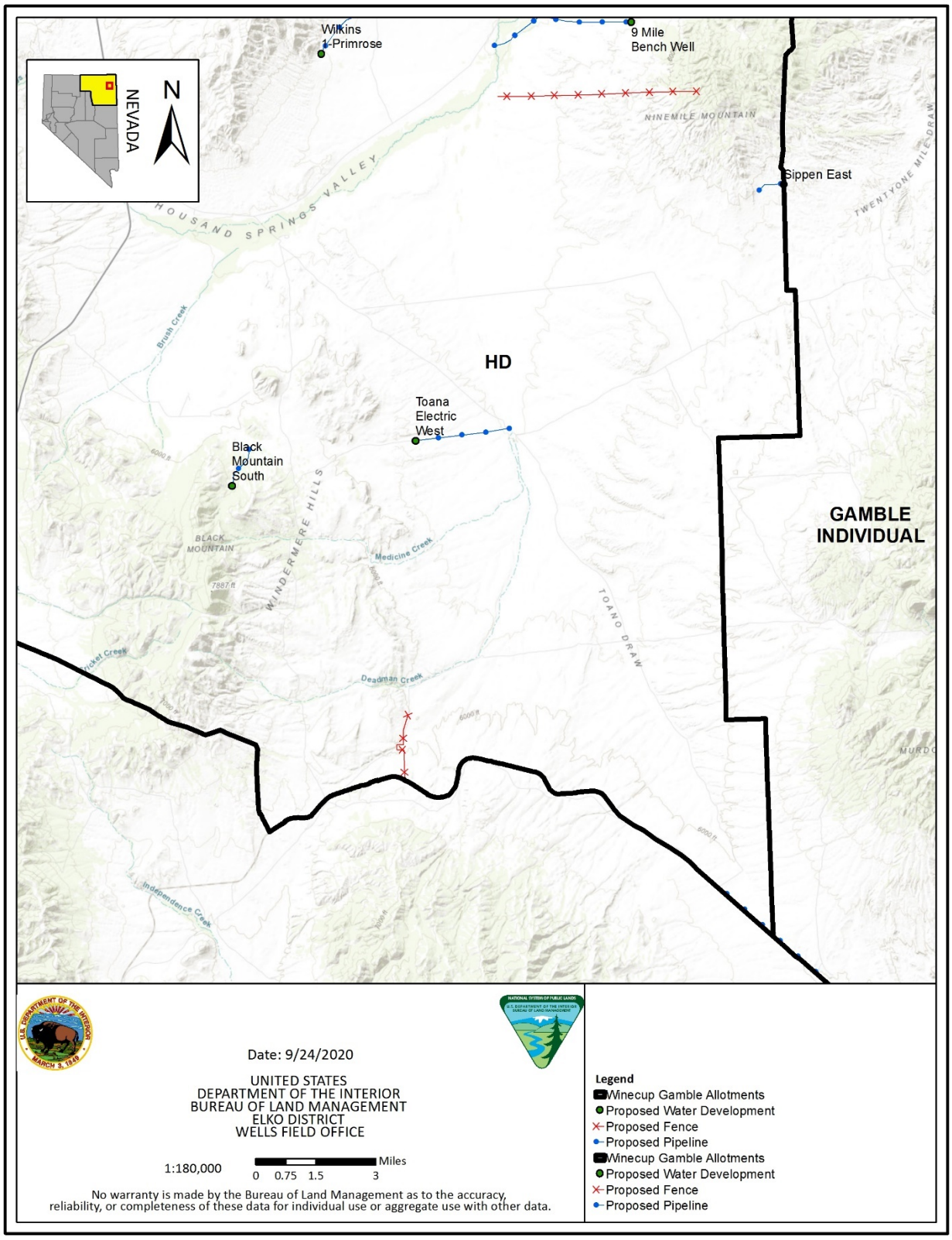

Figure 7. Proposed Range Improvement Projects- HD Allotment South

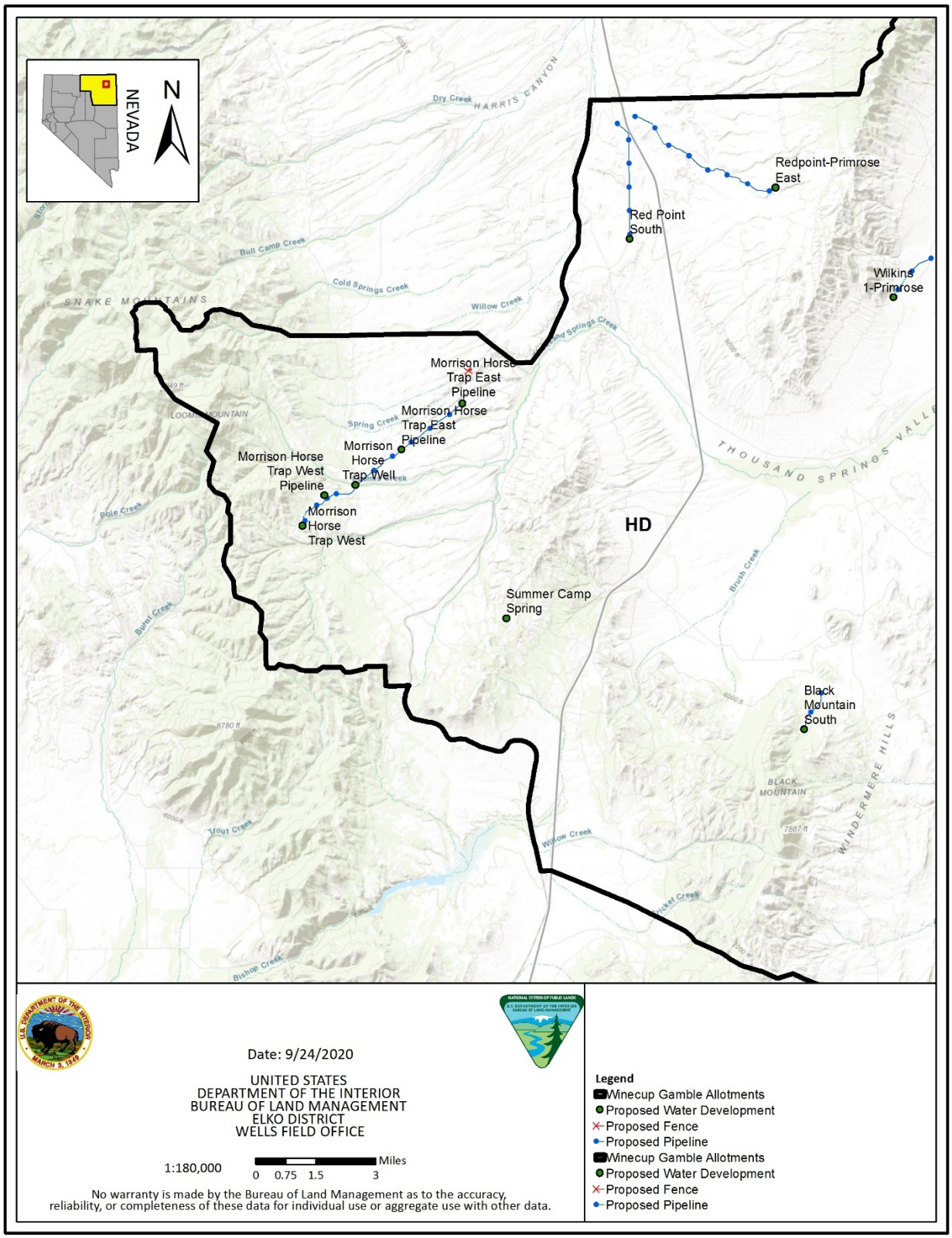

Figure 8. Proposed Range Improvement Projects- HD Allotment West

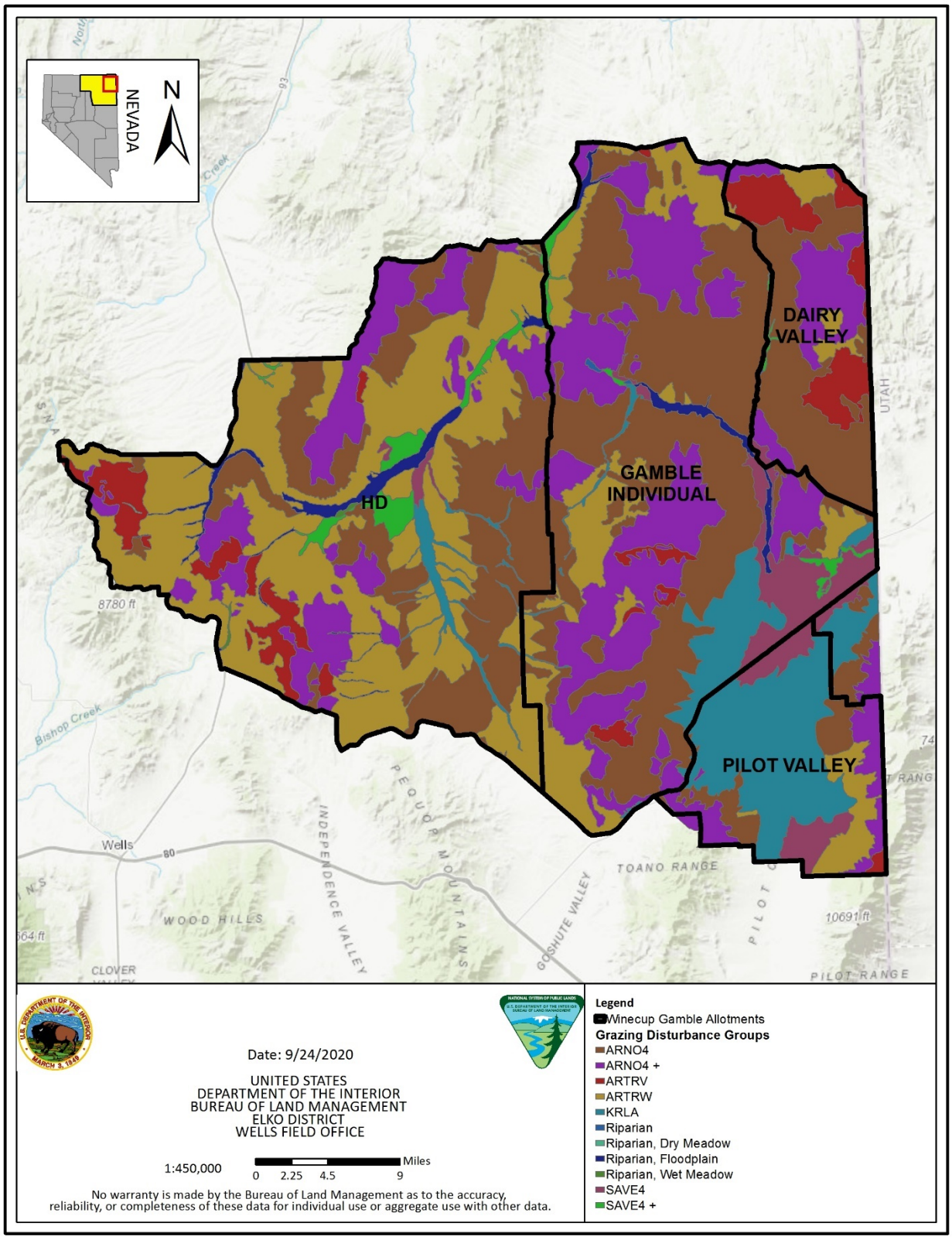

Figure 9. Grazing Disturbance Groups

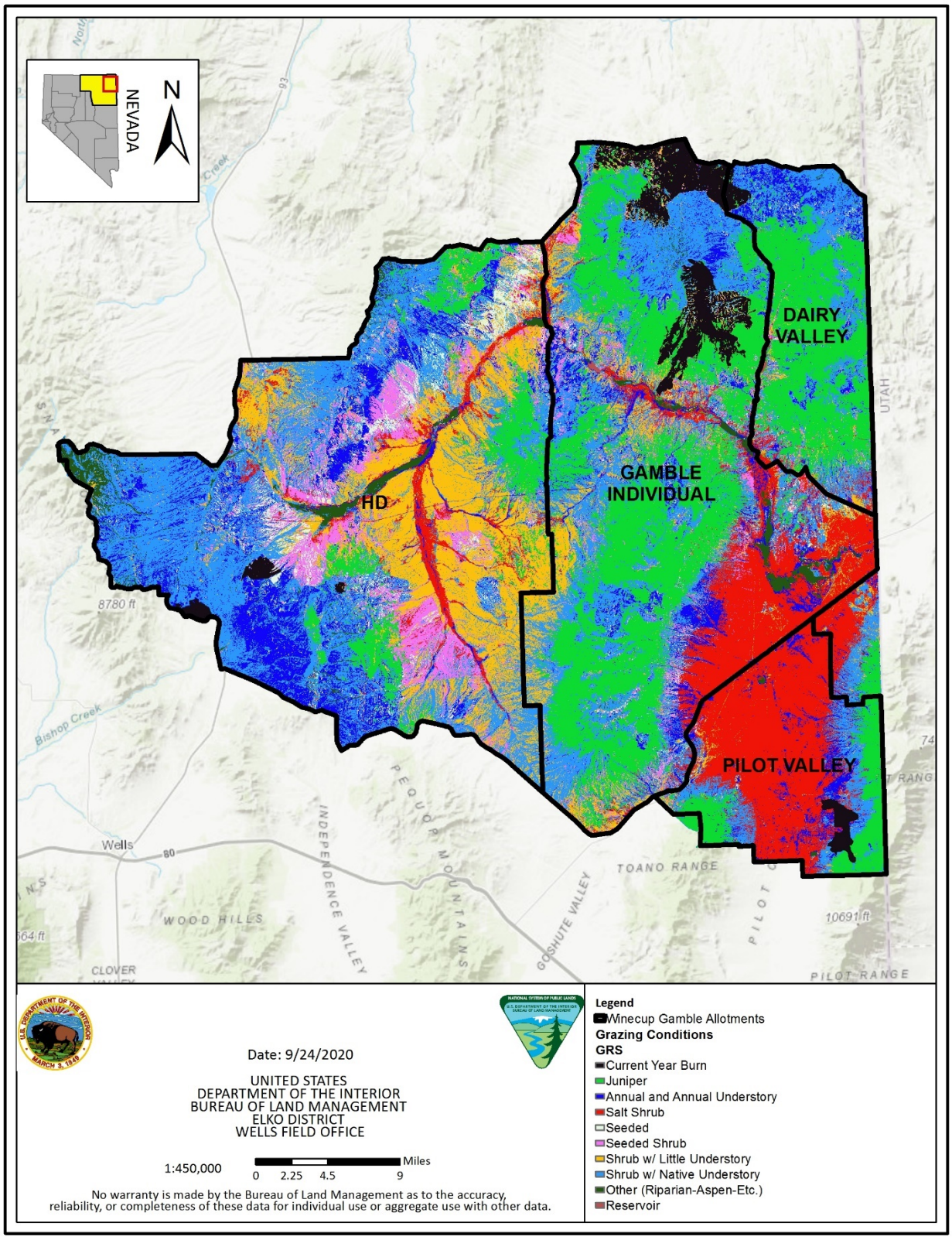

Figure 10. Grazing Conditions

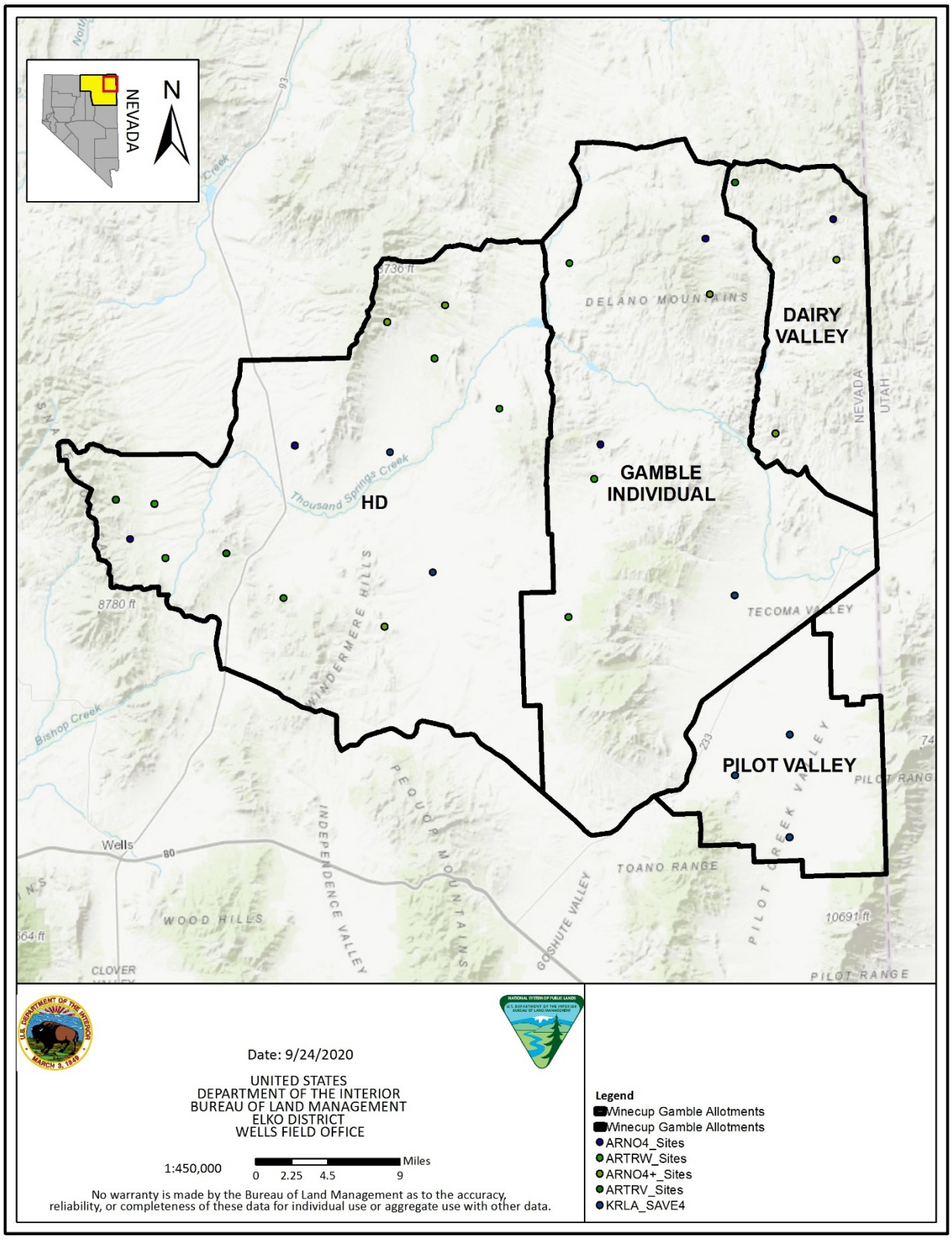

Figure 11. Upland Monitoring Sites

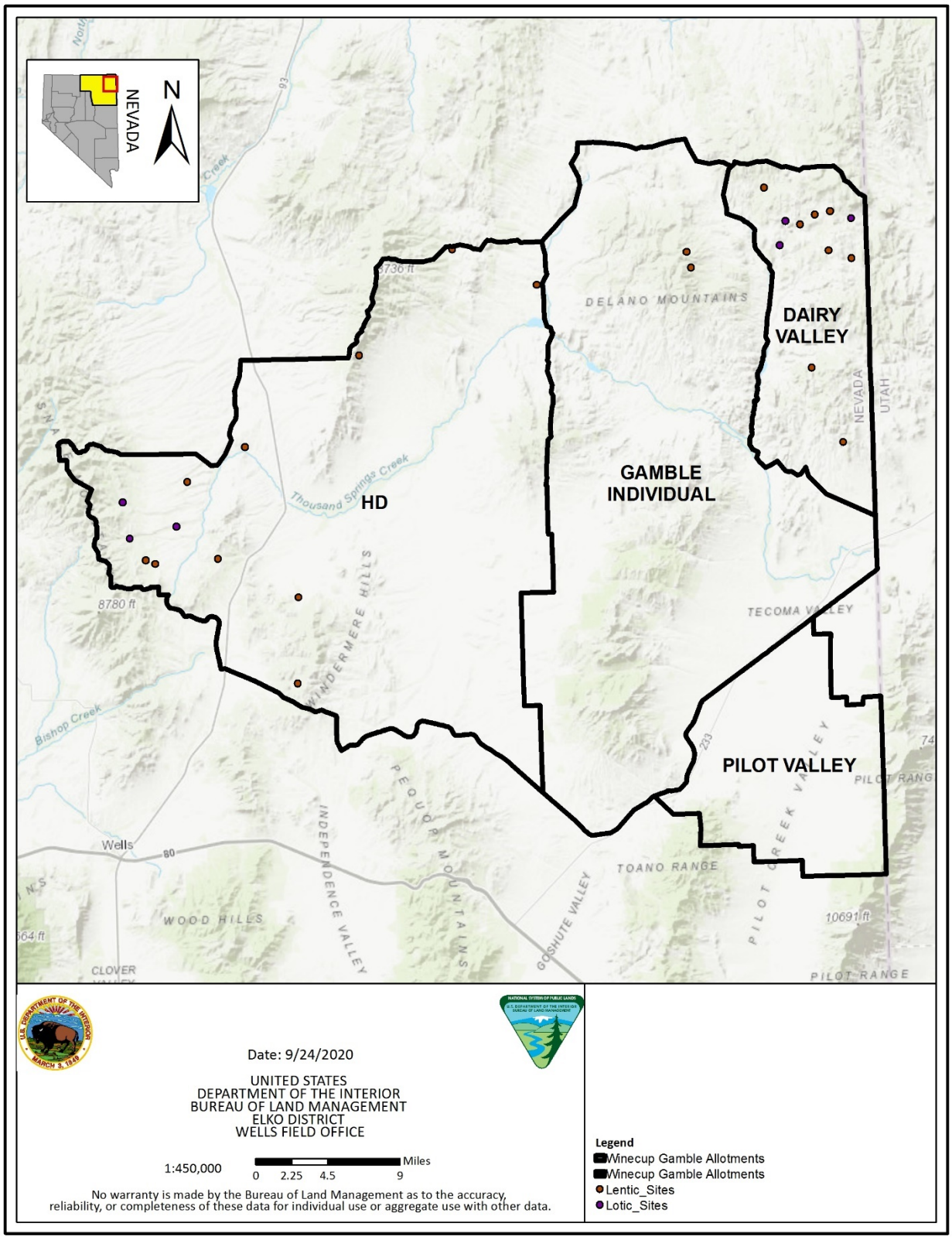

Figure 12. Riparian Monitoring Sites

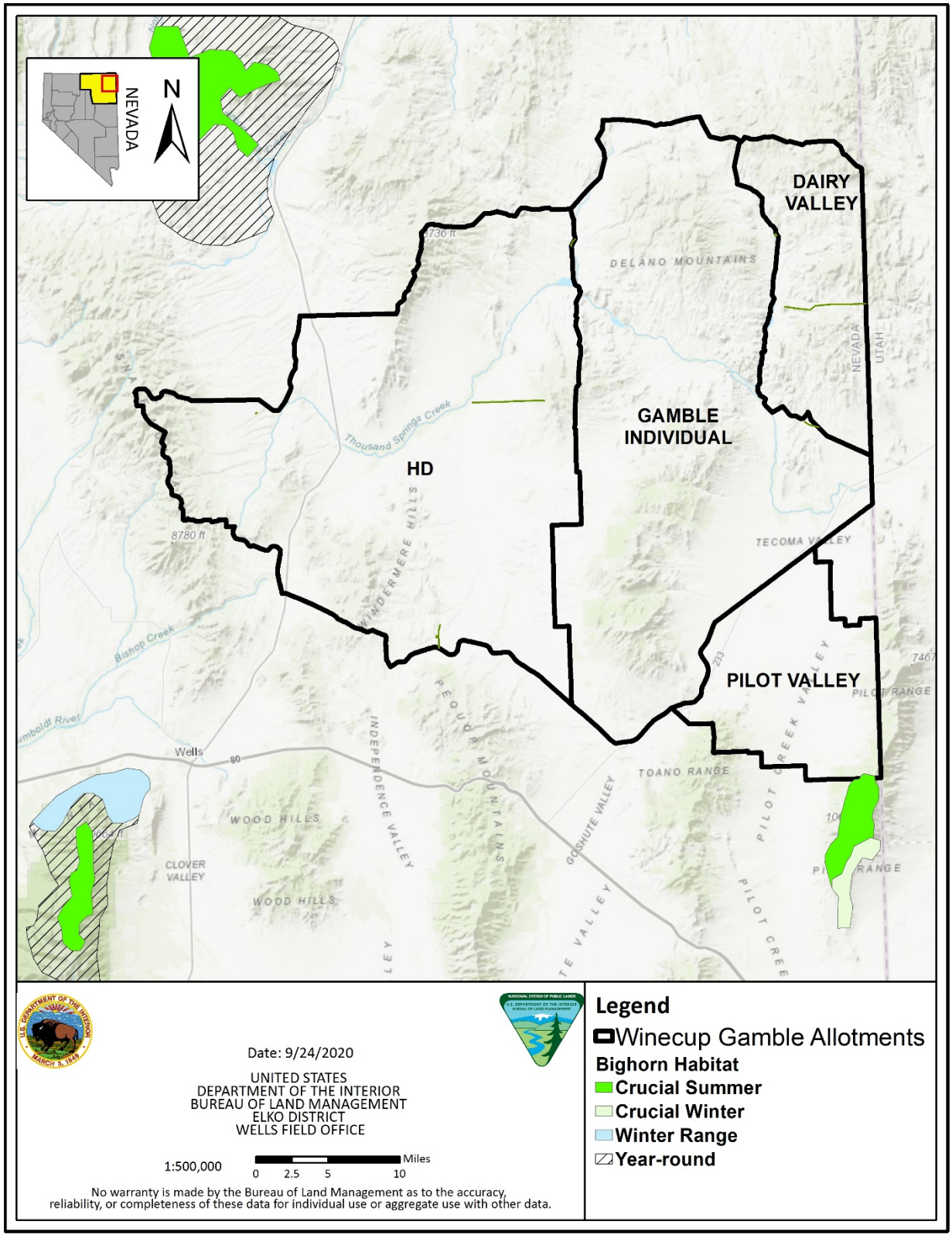

Figure 13. Seasonal bighorn sheep habitats within the Winecup-Gamble Allotments

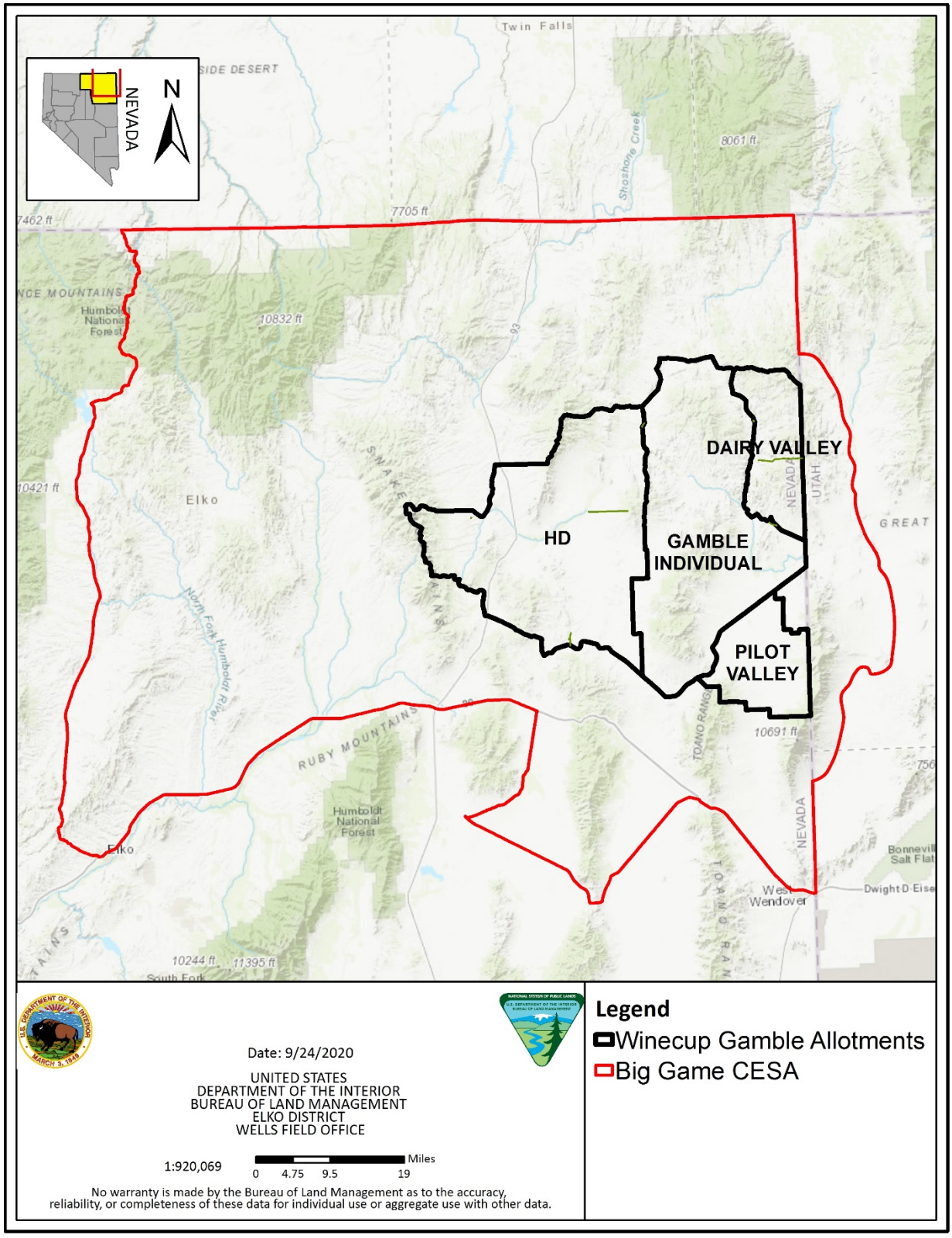

Figure 14. Cumulative Effects Study Area for Big Game (General Wildlife)

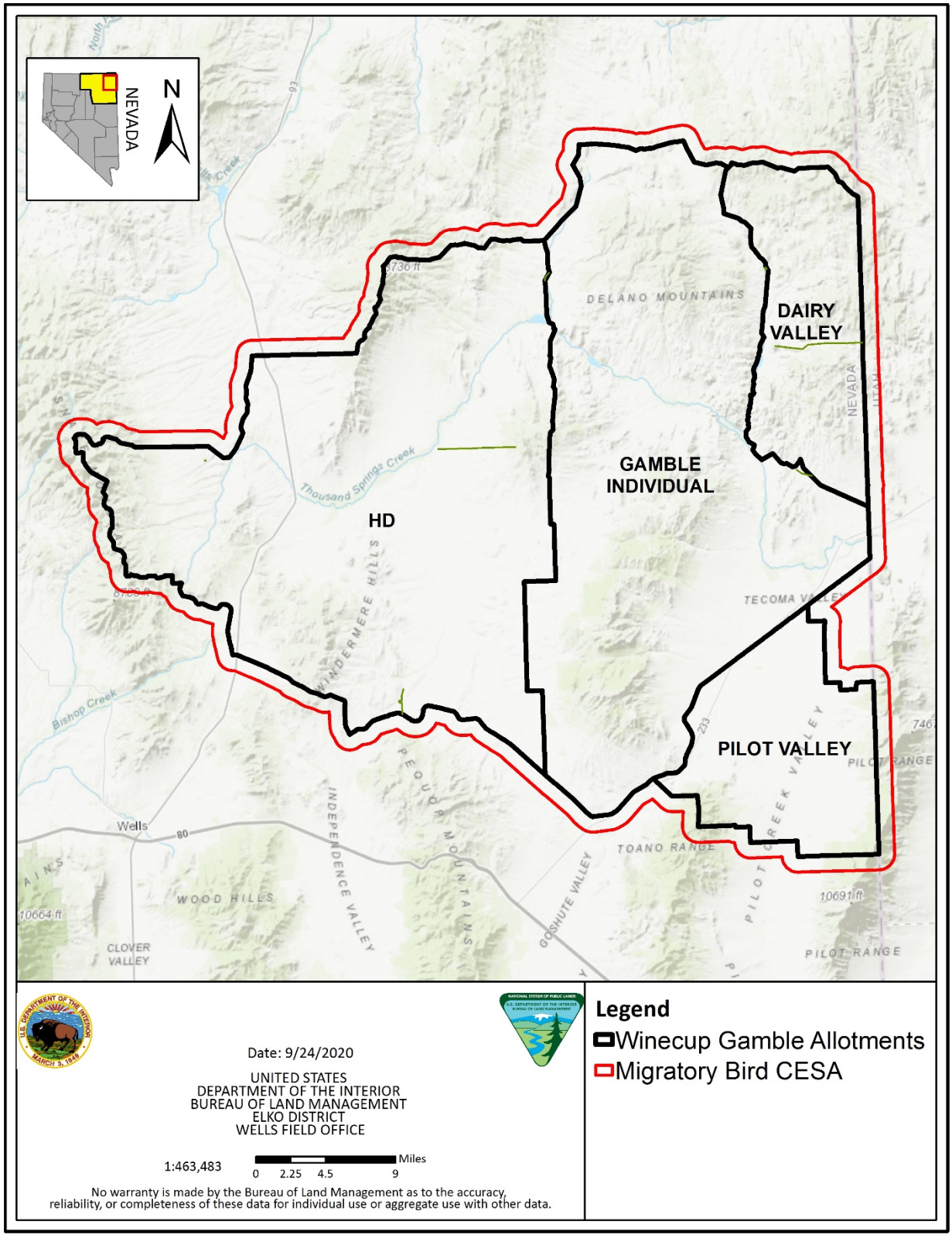

Figure 15. Cumulative Effects Study Area for Migratory Birds.

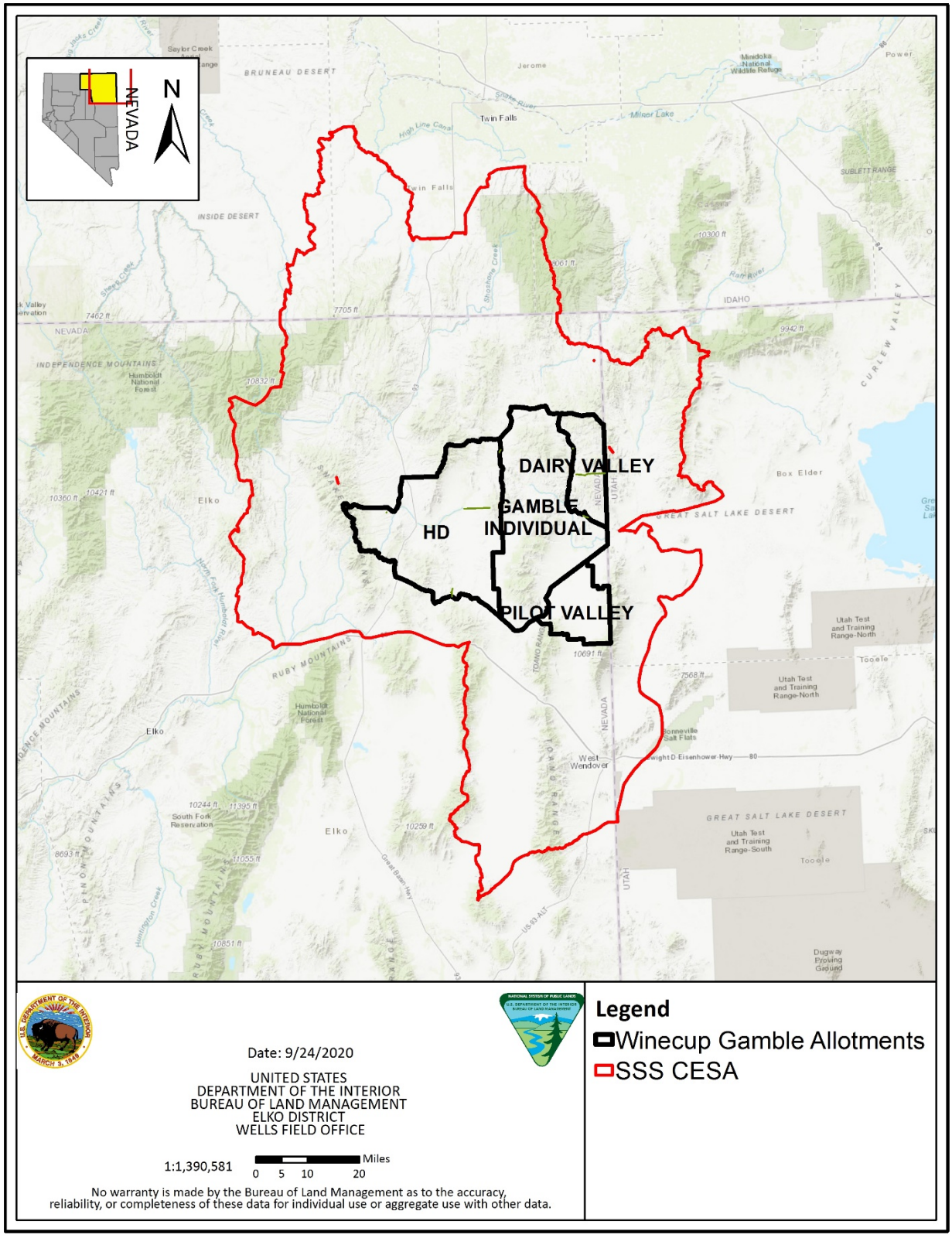

Figure 16. Cumulative Effects Study Area for Special Status Species (SSS).

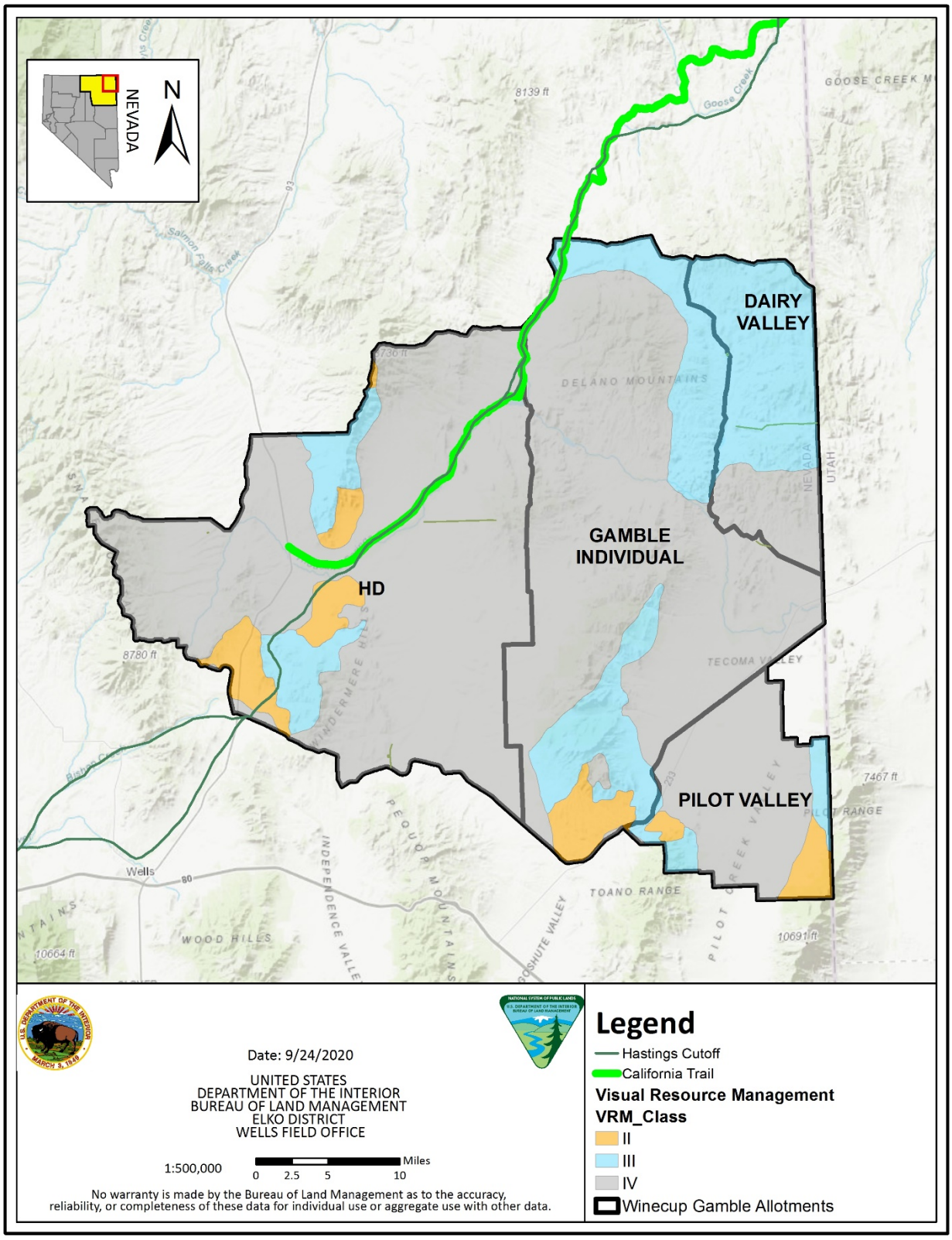

Figure 17. National Historic Trails and Visual Resource Management Classes

Appendix 2. Proposed Range Improvement Projects

Gamble Individual Allotment Proposed Range Improvement Projects
See Figures 4 and 5 above for project locations. Stipulations are in Appendix 8.

Table 1. Gamble Individual Allotment Proposed Range Improvement Projects

Project ID	Project Name	Type of Project	Distance	Use Area(s)	Legal Description	Landownership	Project Description
GP-1	Signboard West	Pipeline	Approx. 3.4 Miles	West Delano		Public	Pipeline from existing well at Signboard pass westerly following existing road to existing tank at top of Delano Canyon. This provides a supplemental source of water for West Delano use area.
GP-14	Signboard East	Pipeline	Approx. 1.3 Miles	Upper Dairy Valley		Public	Pipeline to follow existing fence line from existing well at Signboard pass easterly to new tank and pipeline being proposed (GP-2) in Upper Dairy Valley use area. This provides a supplemental back-up source of water for Dairy Valley use area.
GP-2	Granite Res. North	Pipeline and (3) Tanks	Approx. 5 Miles	Granite/Upper Dairy Valley	T44N R68E Sec 24, 25 T44N R69E Sec 18	Public	Pipeline to follow most probable route (existing road/fence line) from a newly drilled well on private property at old Granite Reservoir location north westerly 2 miles to fence corner and tank site on fence line between Granite and Upper Dairy Valley use areas. Pipe to continue northerly along existing two track road to 2 additional tank locations at ridge top locations along road.
GP-3	Granite West	Pipeline and Tank	Approx. 1.9 Miles	Granite/Upper Dairy Valley	T44N R68E Sec 33	Public	Pipeline to follow existing 2 track road westerly from Granite water well to tank location on ridge at fence line between Granite and West Delano use areas.
GP-4	Grassy Basin North	Pipeline and Tank	Approx. 1.2 Miles	Granite	T43N R68E Sec 2	Public	Pipeline from existing pipeline that connects Indian Spring to Grassy Well. Follow two track road northerly to new tank location.
GP-15	Grassy Basin South	Pipeline and Tank	Approx. 1.1 Miles	East Delano	T43N R68E Sec 14	Public	Pipeline from existing pipeline that connects Indian Spring to Grassy Well. Follow most probably route southerly to existing water tank.

Project ID	Project Name	Type of Project	Distance	Use Area(s)	Legal Description	Landownership	Project Description
GS-1	Slim's Bog	Dirt Tank		Upper Dairy Valley	T44N R69E Sec 35	Public	Existing range improvement that is not currently found on record. Dirt tank that needs repaired.
GS-2	Huebner Spring	Spring Development		Lower Dairy Valley	T43N R69E Sec 12	Public	Small wet meadow. Create a "tom pond" designed dirt tank. Mosquito abatement protocols will be followed to prevent West Nile virus.
GS-3	Surprise Spring	Dirt Tank		Lower Dairy Valley	T43N R69E Sec 12	Public	Existing range improvement that is not currently found on record. Create a "tom pond" designed dirt tank and protect spring head. Mosquito abatement protocols will be followed to prevent West Nile virus.
GF-2	Mill Creek Trap	Fence	Approx. .3 Mile	East Delano/Lower Dairy Valley		Public	Water Trap to be constructed of wildlife friendly Pipe Rail Fence for holding cattle overnight or having water from Mill Creek Pond available for cattle to access from Lower Dairy Valley.
GF-3	Long Canyon Drift Fence	Fence	Approx. 6 Miles	Lower Dairy Valley/Crittenden		Public Private	3 strand wildlife friendly fence that was originally part of the ESR plan in the Goose Creek Fire. Creates better control of livestock in the Lower Dairy Valley use area and creates a separate use area that will be referred to as Crittenden use area to the south.
GS-4	SF Long Canyon	Spring Development		Crittenden	T42N R69E Sec 12	Public	Small wet meadow. Create a "tom pond" designed dirt tank and protect head of spring. Mosquito abatement protocols will be followed to prevent West Nile virus.
GP 16	Crittenden North	Pipeline	Approx. 2.4 Miles	East Delano/Lower Dairy Valley		Public Private	Pipeline to follow northerly along existing road from existing spring source on private property north of Crittenden to private property tank location on fence line between East Delano and Lower Dairy Valley use area.
GS-5	Jackson Mine Spring 1	Spring Development		Crittenden	T41N R70E Sec 6	Public	Existing range improvement that is not currently found on record. Could alter to make a spring development with offsite water tank and float to maintain water in spring when water tank is full or create "tom pond" as secondary option.
GS-6	Jackson Mine Spring 2	Spring Development		Crittenden	T41N R70E Sec 6	Public	Existing range improvement that is not currently found on record. Could alter to make a spring development with offsite water tank and float to

Project ID	Project Name	Type of Project	Distance	Use Area(s)	Legal Description	Landownership	Project Description
							maintain water in spring when water tank is full or create "tom pond" as secondary option.
GP-5	Jackson 2 South	Pipeline and Tank	Approx. 1.2 Miles	Jackson Seeding	T41N R69E Sec 26	Public Private	Pipeline to follow most probable route southerly from Jackson #2 water well to tank location. 1 Mile of route is on private property with .2 of mile on public. Existing two track route can be used for the northly portion.
GF-4	Jackson 2 Fence	Fence	Approx. 1.7 Miles	Jackson Seeding		Public Private	Re-align fence along existing two track road with wildlife friendly 3 strand design and remove 2.25 miles of existing 4 wire fence with pinch point. This is conditional upon getting Jackson 2 South pipeline and tank installed.
GS-7	Coffee Pond	Dirt Tank		Lower Dairy Valley	T43N R70E Sec 6		Existing Range improvement that is not currently found on record. Small Dirt Tank that needs repaired.
GS-8	Snake Spring	Spring Development		Lower Dairy Valley	T43N R70E Sec 8	Public	Small wet meadow. Create a "tom pond" designed dirt tank and protect spring head. Mosquito abatement protocols will be followed to prevent West Nile virus.
GW-4	Loray 2 Well	Water Well and Tank		Cobre/Loray/Montello Flat	T38N R68E Sec 16	Public	New Water Well and Tank alongside existing 2 track road. Tank to split Montello Flat and Cobre/Loray use areas.
GP-7	21 Mile Cabin South	Surface Well Pipeline and (3) Tanks	Approx. 4 Miles	21 Mile Burn	T42N R67E Sec 22	Public Private	Pipeline to follow existing 2 track road most of southerly route and then follow most probable route from water source located on private property at Thousand Springs Creek. First tank on public lands and remaining 2 tanks located on private property.
GP-8	Chukar Pond South	Surface Well Pipeline and (2) Tanks	Approx. 2 Miles	21 Mile Burn	T42N R67E Sec 8, 20	Public	Pipeline to follow most probable southerly route to tank locations from water source located on private property at Thousand Springs Creek.
GP-10	Division Canyon	Surface Well Pipeline and (5) Tanks	Approx. 10 Miles	West Delano	T43N R67E Sec 34, 26, 13 T43N R68E Sec 7, 17	Public	Pipeline to follow existing 2 track road north easterly from surface well located on private property up division canyon to tank locations. First tank located on fence line between 21 Mile Burn and West Delano use areas. Following 2 tank locations are just off of an existing 2 track road with end tank location being an approved range improvement water

Project ID	Project Name	Type of Project	Distance	Use Area(s)	Legal Description	Landownership	Project Description
							haul. At 7.5 miles from beginning of pipeline a 2.5 mile spur will branch and go to tank location which is also an existing range improvement water haul.
GP-11	18 Mile Canyon	Pipeline and (4) Tanks	Approx. 9 Miles	West Delano	T43N R68E Sec 20, 16	Public Private	Pipeline to follow existing 2 track road northly up 18 mile canyon from existing water well on private property. Tank 1 location is on private property, Tank 2 location is at approved water haul location, Tank 3 is at junction of 2 track roads, Tank 4 is at approved water haul location.
GP-19	18 Mile South	Pipeline	Approx. 1 Mile	Rocky Butte	T42N 68E Sec 4	Public	Existing pipeline that crosses 1 mile of BLM that was originally a temporary line serving tanks on private property. Needs buried along existing 2 track road.
GP-12	Schoolhouse Canyon	Pipeline and (4) Tanks	Approx. 9 Miles	East Delano	T43N R68E Sec 26 T42N R68E Sec 2	Public Private	Pipeline currently exists along entire route. Pipe was originally used for temporary water system to connect multiple water wells but was never buried. Pipeline has been buried across private property but portions on public land need buried. Tank 1 and Tank 2 are on private property, Tank 3 was the old Schoolhouse well location that is on the boundary of private and public land, Tank 4 at the end of the pipeline is an old abandoned well with storage tank and water trough.
GP-18	Valley Pass East	Pipeline	Approx. 3.75 Miles	Toana/Cobre		Public Private	Pipeline to follow existing 2 track From Valley Pass Well easterly paralleling railroad right-of-way to an existing water tank located in T38N R67E Section 32. There is an old abandoned pipeline that historically serviced this tank from same water source but the pipeline is damaged and needs replaced. Old pipeline is inside the railroad right-of-way fence and does not appear on the range improvement list. New Pipeline will be outside the Railroad right-of- way.

Pilot Valley Allotment Proposed Range Improvement Projects
See Figure 3 above for project locations. Stipulations are in Appendix 8.

Table 2. Pilot Valley Allotment Proposed Range Improvement Projects

Project ID	Project Name	Type of Project	Distance	Use Area(s)	Legal Description	Landownership	Project Description
GW-2	Pilot Valley South Well	Water Well and Tank		Pilot Valley	T38N R68E Sec 28	Public	New water well and tank near NV St. Hwy 233 alongside existing 2 track road and next to power line for access to electricity.
GW-3	Pilot Valley North Well	Water Well and Tank		Pilot Valley	T39N R69E Sec 14	Public	New water well and tank located just north of existing 2 track road. No water in the vicinity for better cattle distribution.
GP-17	Pilot Valley Spigots	(3) Tanks		Pilot Valley	T38N R70E Sec 20 T38N R69E Sec 14 T39N R69E Sec 34	Public	Replace three existing tanks on an existing pipeline. Two tanks will be relocated from private to public lands.

HD Allotment Proposed Range Improvement Projects
See Figures 6, 7, and 8 above for project locations. Stipulations are in Appendix 8.

Table 3. HD Allotment Proposed Range Improvement Projects

Project ID	Project Name	Type of Project	Distance	Use Area(s)	Legal Description	Landownership	Project Description
WW-1	Morrison Horse Trap Well	Surface Well		Morrison Horse Trap	T41N R62E Sec 26	Public	Water Gathering Structure (culvert) buried alongside creek channel near existing road crossing with pump and valving to service 2 pipelines. Could be moved to private property to the east if necessary but would require new road to access location and creek crossing.
WP-1	Morrison Horse Trap West	Pipeline and (2) Tanks	Approx. 2 Miles	Pole Creek	T41N R62E Sec 34, 35	Public	Pipeline to follow existing road westerly. Tank 1 would be located with a short .10 mile spur of pipeline at the intersection of Morrison Horse Trap,

Project ID	Project Name	Type of Project	Distance	Use Area(s)	Legal Description	Landownership	Project Description
							Upper Loomis, Pole Creek. Tank 2 location on existing mining exploration route.
WP-2	Morrison Horse Trap East	Pipeline and (2) Tanks	Approx. 3.4 Miles	Lower Loomis North	T41N R63E Sec 19, 17	Public Private	Pipeline to follow existing road part way and then a ridge line with 2 water tanks located along route. The initial .2 mile and the last .85 of a mile are on public land and the remaining middle distance is on private property. Tank 1 will be located on private property and Tank 2 will be on Public.
WF-1	Lower Loomis North Spring	Exclosure	Approx. .25 Miles	Lower Loomis North	T 41N R63E Sec 8	Public	Small Lentic seep that is currently unprotected and overused. An exclosure with a water gap or a spring box with an offsite water tank to be installed. Water tank will have a float to keep water in the lentic area when water tank is full. Fencing will be NDOW rail fence that is wildlife friendly.
WS-1	Summer Camp Spring	Spring Development		Summer Camp	T40N R63E Sec 10	Public	Small wet meadow. Create a "tom pond" designed dirt tank. Mosquito abatement protocols will be followed to prevent West Nile virus.
WP-3	Red Point South	Pipeline and Tank	Approx. 3.25 Miles	Red Point	T42N R63E Sec 25	Public	Pipeline to connect at existing pipeline near Red Point Well and follow an existing two track road southerly to tank location. Tank would be a temporary.
WP-4	Red Point-Primrose East	Pipeline and Tank	Approx. 4.15 Miles	Primrose	T42N R64E Sec 22	Public	Pipeline to connect to existing pipeline at concrete trough in Primrose trap and run south easterly following most reasonable route approximately 1 mile to intercept with two track road and then following road remainder of distance to water tank location.
WP-5	Wilkins 1-Primrose	Pipeline and Tank	Approx. 1.4 Miles	Primrose/Wilkins	T41N R65E Sec 6	Public	Pipeline will run South westerly from Wilkins #1 water well following most reasonable route to tank location that will be straddling fence line to service both the Primrose and Wilkins use areas.
WP-6	Black Mountain South	Pipeline and Tank	Approx. 1 Mile	Blk Mtn North	T40N R64E Sec 26	Public	Pipeline will run South from Black Mountain water well following most probable route to tank location. Black Mountain water well rights are owned by the Winecup Gamble Ranch but land ownership is owned by others. Will need an easement from landowner.

Project ID	Project Name	Type of Project	Distance	Use Area(s)	Legal Description	Landownership	Project Description
WP-7	Toana Electric West	Pipeline and Tank	Approx. 2.5 Miles	HD/Toana	T40N R65E Sec 22	Public	Pipeline will follow existing 2 track road from Toano Electric water well. 1 Mile of pipeline crosses Winecup owned private property. Tank will be located just south of two track road and split fence between HD and Toano use areas.
WF-4	Cattail Spring Fence	Fence	Approx. 1.7 Miles	Blk Mtn East/Toana		Public Private	Re-align existing fence to nearly follow section line and build water gap at Cattail Spring. Spring is located on Winecup Gamble Ranch private property. Old 4 wire fence will be removed. New Fence will be 3 strand wildlife friendly design other than the water gap which will be NDOW metal rail fence.
WP-8	Sippen East	Pipeline and Tank	Approx. .70 Miles	9 Mile/Rocky Butte	T41N R66E Sec 24	Public	Pipeline to follow existing 2 track road just on the south edge of the Ruby Pipeline to tank location between Rocky Butte and 9 Mile use areas. Sippen #1 water well is existing water source.
WF-5	9 Mile Division Fence	Fence	Approx. 5 Miles	9 Mile		Public	3 strand wildlife friendly drift fence to follow approximate section lines. This creates a more definitive use area for 9 Mile north and south.
WW-2	9 Mile Bench Well	Water Well and Tank		9 Mile	T42N R66E Sec 33	Public	New Water and Tank. If water well cannot be drilled a pipeline would be routed from existing water well on private property with approximately 3.7 miles of pipeline to tank location.
WP-9	Eccles 2 South	Pipeline and (4) Tanks	Approx. 6.25 Miles	9 Mile/21 Mile Burn	T42N R66E Sec 1, 13, 25 T42N R67E Sec 18	Public	Pipeline to follow most probable route southerly to 3 tank locations. Eccles #2 water well is existing water source. One spur of pipeline goes easterly to tank location on fence line between 9 Mile North and 21 Mile Burn use areas. The majority of pipeline route can be an old hunter/salt road.
WP-10	Eccles 1 South	Pipeline and Tank	Approx. 1.8 Miles	9 Mile/21 Mile Burn	T42N R67E Sec 6	Public	Pipeline to follow most probable route southerly to tank location along fence line between 9 Mile North and 21 Mile Burn use areas. Eccles #1 water well is existing water source.
WP-11	Wilkins 3 North	Pipeline and (2) Tanks	Approx. 1.9 Miles	Wilkins/Burnt Creek South	T42N R65E Sec 2, 10	Public	Pipeline to follow existing road 5 miles north easterly to fence line to Tank 1 location between Wilkins and Burnt Creek South. Pipeline to continue northerly in most probable route 1.3 additional miles to Tank 2 location.

Project ID	Project Name	Type of Project	Distance	Use Area(s)	Legal Description	Landownership	Project Description
WP-12	South Burnt Creek Bench	Pipeline and Tank	Approx. 1 Mile	Burnt Creek South	T42N R66E Sec 8	Public Private	Pipeline to follow most probable route from water source at Thousand Springs Creek located on private property to tank location.
WW-3	Burnt Creek North Well	Water Well and Tank		Burnt Creek North	T43N R65E Sec 26	Public	New Water Well and Tank alongside existing 2 track road.
WW-4	Mud Spring	Surface Well		Bell Canyon	T43N R67E Sec 18	Public	Develop a ground well from the current spring encatchment and pump north through pipeline (WP-13) Cert 12996 is water right on spring owned by Winecup Gamble Ranch.
WP-13	Mud Spring North	Pipeline and Tank	Approx. 1.75 Miles	Bell Canyon	T43N R67E Sec 6	Public	Pipeline to follow existing road 1.5 miles northly then turn easterly for .25 miles to tank location on fence line between Bell Canyon and West Delano use areas. California historical trail is in area. Secondary option would be to locate tank location west of road into crested wheat seeding although it would only serve Bell Canyon Pasture.
WF-6	Mud Spring Exclosure	Fence	Approx. .70 Miles	Bell Canyon		Public	3 strand wildlife friendly fence to follow edge of county road right-of-way and tie into the pasture division fence between Bell Canyon and West Delano use areas. No sharp corners to trap cattle should support use of only 3 wires. If fence becomes unfunctional, put sturdier version in pressure points.

Appendix 3. Grazing Groups and Grazing Response Index

Ecological goals and grazing management strategies would be built around the concepts of Grazing Planning Groups, Grazing Management Conditions, Key Conditions, and the Grazing Response Index.

Grazing Management Groups are derived from Disturbance Response Groups, see the Land Health Assessment document for a detailed discussion of these. The proposal grouped mapped Ecological Sites and Disturbance Response Groups into eight Planning Groups, as displayed in Table 4. A full description of each Grazing Planning Group can be found in Appendix 4 and are mapped in Figure 9.

Table 4. Grazing Planning Groups and their approximate acreages within the boundaries of the Winecup Gamble Ranch, including both public and private land. A "+" sign denotes higher resistance to invasive grasses and higher productivity.

Combined Group Name	Approximate Acres	Included Ecogroups (DRGs and Ecosites)
Black Sagebrush	315,000	028AY231UT, 28 1B, 24 5B
Black Sagebrush+	194,000	028AY252UT, 25 3, 028AY324UT, 28 21AB, 25 11
Mountain Sagebrush	48,000	25 2, 25 6, 25 15, 025XY061NV, 25 8, 28 30AB
Wyoming Sagebrush	243,000	25 1, 25 4, 28 3B
Winterfat	85,000	28 16A, 28 16B, 28 17AB, 28 18AB, 28 19AB, 028AY140UT
Greasewood	28,000	028BY074NV, 28 12AB, 28 13AB,
Saline Bottom	21,000	28 15AB, 24 10, 24 3B
Riparian/Meadow Lentic/Lotic	15,000	025XY001NV, 25 Lotic Riparian, 025XY006NV, 025XY005NV, other

Grazing Planning Groups are derived from State and Transition Models, which are also discussed in detail in the Land Health Assessment. For the purposes of grazing management, broad patterns emerged in terms of how the landscape responds to grazing and therefore how grazing should be managed within these conditions. These "Grazing Management Conditions" are built on the foundation of state-and-transition models but are a slightly different grouping of phases for the specific purpose of livestock grazing management. For example, there are many locations across the landscape that exhibit shrubs with an understory dominated by Sandberg's bluegrass. These areas would normally be considered a phase within the "Shrub State" in the published state-and-transition models for the relevant MLRAs (Stringham et al. 2015A, Stringham et al. 2015B, Stringham et al. 2017). However, for the purposes of this permit alternative, these areas are characterized as "upland shrubs with dominant native grasses," which contains all phases of the published "current potential state" as well. The rationale for this grouping is twofold: 1) it corresponds with current abilities of readily available remotely-sensed products, and 2) grazing should be done with the intention to protect the integrity and sustainability of the native perennial plant community even though it may be somewhat altered by historic grazing. In reality, grazing management could be more relaxed in areas where the understory is dominated by *Poa secunda*, but this presents logistical challenges to the cattle

operation, so these areas are grouped with areas that support a greater abundance of the deep-rooted perennial grasses and are more sensitive to herbivory. Similarly, areas that have a shrub component with a cheatgrass understory are categorized as an "at risk" phase of the shrub state within published state-and-transition models for the relevant MLRAs (Stringham et al. 2015A, Stringham et al. 2015B, Stringham et al. 2017). In the "annuals with or without shrubs" grazing management condition, these areas are lumped with annual grasslands with an emphasis on managing the fine fuel component and avoiding conversion to an eroded state.

Eight general grazing management conditions that are found on the landscape and that should dictate annual grazing management decisions are proposed (Table 5). These grazing conditions are found within the Grazing Planning Groups, although not all conditions occur in each group. For example, seedings are not expected to exist in the Mountain Sagebrush group because even though they would have been more likely to succeed, they are not often needed after fire. However, they exist in many of the other sagebrush-dominated grazing groups. Using the modal state and transition models for the various DRGs in Table 4, Grazing Management Conditions were matrixed with Grazing Disturbance Groups. Table 5 shows how these management conditions occur within each of the Grazing Planning Groups. Figure 10 shows distribution of Grazing Management Conditions on the allotments.

Table 5. Grazing Management Conditions and Grazing Planning Groups

Grazing Management Condition	Black Sagebrush	Black Sagebrush+	Mountain Sagebrush	Wyoming Sagebrush	Winterfat	Grease-wood	Saline Bottom	Riparian, etc.
upland shrubs with dominant native grasses	X	X	X	X				
upland shrubs with minimal understory	X	X	X	X				
annual grasses dominate with/without shrubs	X	X	X	X	X	X	X	
seeded	X	X	X	X				
seeded shrub	X	X	X	X				
tree	X	X	X	X				
Salt Desert					X	X	X	
riparian/wet meadow obligates are/should be present1								X

Key Conditions reflect that grazing management groups and grazing planning groups exist in a patchwork fashion across the landscape and serve as a way of prioritizing management

1 Often this type is a small inclusion in landscapes that are predominantly in other groups.

considerations. Each use area would therefore be managed through identified key conditions, which may be defined by the following concepts:

- Condition that is most abundant (majority, plurality) of grazable Use Area
- Condition that is most sensitive to grazing within a Use Area
- Condition that is most likely to cross an undesirable threshold to a different state or Grazing Management Condition with a Use Area

Grazing Response Index (GRI) (Reed et al. 1999, Wyman et al. 2006) is being used in this permit as an important tool for adaptively managing the landscape and for monitoring implementation2. It allows the permittee the flexibility to make management adjustments between and within grazing years and is expected to lead to attainment of key management objectives within this permit, as well as objectives from other plans, such as those prescribed by the Nevada and Northeastern California Greater Sage-Grouse Approved Resource Management Plan Amendment (BLM 2015).

GRI scores are based on frequency (the number of times forage plants are defoliated during the grazing period), intensity (light, moderate, or heavy defoliation), and opportunity (the opportunity of a plant to grow before use or regrow after use in the current growing season). In addition, this alternative proposes to add a precipitation index, similar to the modifications done by Charlie Orchard in the LandEKG process and used extensively for grazing planning by The Nature Conservancy (TNC) in Oregon. This allows for the explicit accounting for the effect of precipitation on landscape conditions, which is implicitly included in the opportunity scores in Reed et al. (1999).

During the growing season, the GRI index emphasizes the need for plants to have enough leaf material available to grow or re-grow from photosynthesis rather than relying on stored carbohydrates in the roots (Wyman et al. 2006). In the dormant season, competing concerns drive management. On the one hand, dormant season grazing is often beneficial when managing use areas that have accumulated too much decadent vegetation that shades growth points of plants as well as being highly flammable and the ability to graze in the dormant season reduces reliance on expensive hay production. On the other hand, repeated heavy dormant season grazing can be detrimental; the removal of too much vegetation, too often, can expose the soil to wind, sun or rain (causing accelerated drying or compaction), reduce important winter vegetation for wildlife, and remove thermal cover and aerial protection for small mammals and birds. It is because of these competing demands this alternative proposes applying GRI to both growing season and dormant season grazing.

A few important considerations and assumptions have been adopted in order to use this tool consistently in this context:

- Annual GRI scores will incorporate an entire year of grazing beginning from the start of the growing season and continuing until the beginning of the next growing season.

2 Effectiveness monitoring will use remote sensing and on-the-ground monitoring techniques relevant to the stated objectives, such as recording cover and frequency of deep-rooted perennial bunch grasses, and is discussed more completely in the monitoring section below.

- Frequency scores in the growing season will be scored based on the following categories from Wyman et al. (2006) (Table 6). Because frequency is intended to measure how often a growing plant gets grazed (i.e. how many "bites" are taken *as a plant grows*) dormant season grazing will be given a frequency score of +1 since plants are not growing at this time.

Table 6. Frequency Scoring for GRI

Number of days in a use area during the growing season	Value
0-10	+1
11-20	0
>20	-1

- Intensity will be scored based on the amount of use during the *grazed period* and will be applied to dormant season and growing season use, where the growing season is generally considered to be from April 15 to June 15. In the dormant season, intensity scoring will provide sideboards against overuse as discussed above. In the growing season intensity will proved sideboards against overuse as suggested in Reed et al. (1999) (Table 7). While intensity is not considered a measure of utilization, utilization may be helpful in determining intensity.

Table 7. Intensity Scoring for GRI

Amount of Use	Approximate Utilization	Value
Light	<40%	+1
Moderate	40-55%	0
Heavy	>55%	-1

If a use area is grazed more than once during an annual cycle, this effect is accounted for by applying a *secondary intensity score*, where heavy intensity applies an additional -1 score and moderate or light grazing applies a neutral (zero) score. This assumes that the secondary intensity score is done during the dormant season.

- Opportunity scores will be based on the opportunity of forage plants to grow or regrow during the growing season, which is generally from April 15 to June 15, and will be based on the following categories from Wyman et al. (2006) (Table 8)

Table 8. Opportunity Scoring for GRI

Opportunity to grow or regrow	Value
Full Season	+2
Most of Season	+1
Some Chance	0

Opportunity to grow or regrow	Value
Little Chance	-1
No Chance	-2

- Precipitation scores for the growing season will be based on April-May-June (Q2) precipitation data collected from NOAA and compared to historic averages for the same months for every relevant grid of which the majority falls across the use area of the allotments. Precipitation thresholds were set to capture the middle 50% of observed Q2 precipitation within the study area observed since 1945 in the neutral category. Scores will be based as follows:

Table 9. Precipitation Scoring for GRI

Q2 Precipitation % of Average	Value
>120%	+1
70-120%	0
<70%	-1

In general, GRI will be used by establishing target *rolling* averages (rather than a set annual target) that are set relatively high (in this case, often +2). This is done to accomplish a few things: it encourages variability in grazing pressure *between* years, it allows the manager flexibility while accounting for annual variability, it creates clear consequences if/when target scores are not achieved, and it encourages lots of growing season rest. Practically speaking, on this large ranch, it is expected that growing season grazing will lead to annual scores less than +2. In order to offset this, the ranch will essentially be required to provide some significant growing season rest in other years. Thus, in a practical sense, using these average GRI scores will require changing the season of use from year to year in any given use area, while also moderating intensity and frequency, which will help meet goals and objectives that are based on the health of deep-rooted perennial bunch grasses.

Specific details as to how the GRI will be applied within each Grazing Management Condition and which conditions prevail in each pasture or use area are outlined in Appendix 5 (Ecological Goals, Objectives, Strategies, and Monitoring).

Appendix 4. Grazing Planning Group Descriptions

The sagebrush dominated groups (Black Sagebrush, Black Sagebrush+, Mountain Sagebrush, Wyoming Sagebrush) each have unique vegetation components from each other, although there is considerable overlap. Taken together, these four Grazing Planning Groups provide important habitat for a variety of species, including pygmy rabbit, Great Basin pocket mouse, sagebrush vole, sagebrush lizard, Greater Sage-Grouse, Sage Thrasher, Brewer's Sparrow, and Sage Sparrow (NDOW 2012). In addition, several species rely on sagebrush ecosystems for prey, such as Prairie Falcons, Ferruginous Hawks, and Bald and Golden Eagles (NDOW 2012). Loss of understory is considered a risk to many of these species as it reduces nesting and escape cover, reduces food availability to herbivores, and can increase predation (NDOW 2012).

The Black Sagebrush Group falls in 3B and 3C Resistance and Resilience (R&R) classifications indicating it has relatively low R&R indicating a high risk of annual invasives, very long recovery times for shrubs after fire, and that recovery from inappropriate livestock use is extremely challenging (Chambers et al. 2014). This Group has predominantly black sage (*Artemisia nova*) in the overstory, which is not considered palatable by cattle and is marginally palatable by sheep and goats and can be an important component of many domestic sheep diets in the winter. Ecologically desirable understory grasses include Indian ricegrass (*Achnatherum hymenoides*), bluebunch wheatgrass (*Pseudoroegneria spicata*), squirreltail (*Elymus elymoides*), Thurber's needlegrass (*Achnatherum thurberianum*), Idaho fescue (*Festuca idahoensis*), and needle and thread (*Hesperostipa comata*). All of these grasses are sensitive to repeated grazing by livestock during the growing season and require adequate recovery periods in order to persist and thrive. Sandberg's bluegrass (*Poa secunda*) is often present and can dominate sites that have been historically overgrazed. Areas where any of the above mentioned "upland shrubs with dominant native grasses" should be grazed with intention to protect the integrity and sustainability of the perennial plant community. Other common land conditions found within the ARNO4 group are "upland shrubs with minimal understory" where the understory has largely been lost, and "annual grasses dominant with/without shrubs" where cheatgrass and other annual invasive species dominate the understory or exist in a monoculture with little to no remnant perennial grasses. This latter condition groups areas where invasive annual species have changed ecosystem functioning through changing the fire risk and behavior thus need to be managed for invasive annual fine fuels. This Grazing Planning Group can also include a "seeded" condition dominated by introduced forage species and a "seeded with shrubs" condition where upland shrub species are intermixed with introduced forage species. In addition, a "tree" condition may exist, where singleleaf pinyon pine (*Pinus monophylla*) and juniper (*Juniperus* spp.) dominate and may create a situation where an unpalatable overstory exists with a palatable understory.

The Black Sagebrush+ group falls mostly in the 3B R&R classifications indicating it has relatively low R&R indicating a high risk of annual invasives, very long recovery times for shrubs after fire, and that recovery from inappropriate livestock use is extremely challenging (Chambers et al. 2014). However, expert opinion suggests that this Group is expected to have slightly higher production and slightly higher resistance to cheatgrass than the previous group. Black and Wyoming sagebrush (*A. tridentata wyomingensis*) are found in the overstory, which are not considered palatable by cattle and are marginally palatable to sheep and goats.

Ecologically desirable understory grasses include Indian ricegrass, bluebunch wheatgrass, Thurber's needlegrass, and Idaho fescue. All of these are sensitive to repeated grazing by livestock during the growing season and require adequate recovery periods in order to persist and thrive. Sandberg's bluegrass is often present and can dominate sites that were improperly grazed over the last century and a half. In addition, these areas often have antelope bitterbrush (*Purshia tridentata*) and bud sagebrush (*Picrothamnus desertorum*) which are both highly palatable to cattle, sheep, goats, and are critically important for wildlife. Areas where any of the above mentioned "upland shrubs with dominant native grasses" should be grazed with intention to protect the integrity and sustainability of the perennial plant community. Other common land conditions found within the ARNO4+ group are "upland shrubs with minimal understory" where shrubs occur but the native understory has largely been lost and "annual grasses dominant with/without shrubs" where cheatgrass and other annual invasive species dominate the understory or exist in a monoculture with little to no remnant perennial grasses. This latter condition groups areas where invasive annual species have changed ecosystem functioning through changing the fire risk and behavior thus need to be managed for invasive annual fine fuels. This Grazing Planning Group can also include a "seeded" condition dominated by introduced forage species and a "seeded with shrubs" condition where upland shrub species are intermixed with introduced forage species. In addition, a "tree" condition may exist, where pinyon pine and juniper dominate and may create a situation where an unpalatable overstory exists with a palatable understory.

The Mountain Sagebrush group falls into a higher R&R classifications 2A, 2B, 2C, 1A, and 1B indicating it has relatively high R&R suggesting a lower risk of annual invasives, very long recovery times for shrubs after fire, and that recovery from inappropriate livestock use is somewhat easier than the previous communities (Chambers et al. 2014). This Group includes low sagebrush (*A. arbuscula*) and mountain sagebrush (*A.tridentata t vaseyana*), which are not considered palatable by cattle and are marginally palatable to sheep and goats. Ecologically desirable understory grasses include bluebunch wheatgrass, Thurber's needlegrass, and Idaho fescue. These grasses are all sensitive to repeated grazing by livestock during the growing season and require adequate recovery periods to persist and thrive. Sandberg's bluegrass is often present and can dominate sites that have been historically overgrazed. In addition, these areas often have antelope bitterbrush and basin wildrye (*Leymus cinereus*) which are highly palatable to domestic livestock and critically important for wildlife. Areas where any of the above mentioned "upland shrubs with dominant native grasses" should be grazed with intention to protect the integrity and sustainability of the perennial plant community. Other common land conditions found within the ARTRV group are "upland shrubs with minimal understory" where shrubs occur but the native understory has largely been lost, and "annual grasses dominant with/without shrubs" where cheatgrass and other annual invasive species dominate the understory or exist in a monoculture with little to no remnant perennial grasses. This latter condition groups areas where invasive annual species have changed ecosystem functioning through changing the fire risk and behavior thus need to be managed for invasive annual fine fuels.

The Wyoming Sagebrush group falls into 3B and 3C Resistance and Resilience (R&R) classifications indicating it has relatively low R&R suggesting a high risk of annual invasives, very long recovery times for shrubs after fire, and that recovery from inappropriate livestock use is extremely challenging (Chambers et al. 2014). This Group includes Wyoming, black, and low

sagebrush dominated areas, which are not considered palatable by cattle and are marginally palatable to sheep and goats. Ecologically desirable understory grasses include Indian ricegrass, bluebunch wheatgrass, Thurber's needlegrass, and needle and thread. All of these are sensitive to repeated grazing by livestock during the growing season and require adequate recovery periods to persist and thrive. In addition, these areas often have antelope bitterbrush and basin wildrye which are highly palatable to domestic livestock and critically important for wildlife. Areas where any of the above mentioned "upland shrubs with dominant native grasses" should be grazed with intention to protect the integrity and sustainability of the perennial plant community. Other common land conditions found within the ARTRW group are "upland shrubs with minimal understory" where shrubs occur but the native understory has largely been lost, and "annual grasses dominant with/without shrubs" where cheatgrass and other annual invasive species dominate the understory or exist in a monoculture with little to no remnant perennial grasses. This latter condition groups areas where invasive annual species have changed ecosystem functioning through changing the fire risk and behavior thus need to be managed for invasive annual fine fuels. This Grazing Planning Group can also include a "seeded" condition dominated by introduced forage species and a "seeded with shrubs" condition where upland shrub species are intermixed with introduced forage species. In addition, a "tree" condition may exist, where Pinyon and Juniper dominate and may create a situation where an unpalatable overstory exists with a palatable understory.

Winterfat, Greasewood and Saline Bottom areas are also present across the Ranch. All three of these groups fall mostly in the 3C R&R classification suggesting they have relatively low R&R indicating a high risk of annual invasives, very long recovery times for shrubs after fire, and that recovery from inappropriate livestock use is extremely challenging (Chambers et al. 2014). These areas provide important habitat for pale kangaroo mouse, Loggerhead Shrike, long-nosed leopard lizard, and contain important feeding habitats for pallid bats (NDOW 2012). Bald Eagles and Prairie Falcons are also found here in winter months, in search of jackrabbits and smaller rodents (NDOW 2012). These areas are also important to Sage Thrasher, Sage Sparrow, and Brewer's Sparrow (NDOW 2012). Washes exist within these landscapes, and have been identified as important attributes for certain terrestrial species, including endemic amphibians because of their function as a conduit for surface runoff and subsoil moisture (NDOW 2012). The importance of retaining more soil moisture than surrounding upland areas, can therefore help retain key population dynamics for these species. The broad components of these three Grazing Planning Groups are described below.

The Winterfat Group is dominated by winterfat (*Krascheninnikovia lanata*) which is palatable to all livestock and considered nutritious winter feed. Winterfat is particularly sensitive to grazing in March and April (late winter/early spring) and grazing needs to be carefully managed during this time. Other species in this community have similar characteristics, such as fourwing saltbush (*Atriplex canescens*) and sickle saltbush (*Atriplex falcata*). Because of its vulnerability to grazing, where the "winterfat plant community" is present, regardless of the understory, grazing will need to be tightly controlled and generally focused on winter dormant season use with adequate rest/recovery periods. Within the Winterfat Group, there are areas of "annual grasses dominant with/without shrubs" where cheatgrass and other invasive species such as halogeton (*Halogeton glomeratus*) dominate with or without a woody component. Areas where invasive

annual species have changed ecosystem functioning through changing the fire risk and behavior thus need to be managed for invasive annual fine fuels.

The Greasewood group is dominated by black greasewood (*Sarcobatus vermiculatus*) and Wyoming big sagebrush which are not considered palatable by cattle (except during winter for black greasewood) but moderately palatable by sheep and goats. Grass components include basin wildrye, Indian ricegrass, alkali sacaton (*Sporobolus airoides*), and thickspike wheatgrass (*Elymus lanceolatus*). Other important species in the community include bud sagebrush (*Picrothamnus desertorum*), bottlebrush squirreltail (*Elymus elymoides*), green molly (*Bassia americana*), and spiny hopsage (*Grayia spinosa*). All of these (with the possible exception of thickspike wheatgrass) are sensitive to repeated grazing by livestock during the growing season and require adequate recovery periods to persist and thrive. Shadscale (*Atriplex confertolia*), rabbitbrush (*Chrysothamnus spp*.), and inland saltgrass (*Distichlis spicata*) are also often present and can dominate sites that have been historically overgrazed, however, these sites should still be grazed with intention to protect the integrity and sustainability of the perennial plant community. Collectively, areas where the above-mentioned "greasewood plant community is present" are sensitive to repeated grazing by livestock during the growing season and require adequate recovery periods to persist and thrive. Within the Greasewood Group, there are areas of "annual grasses dominant with/without shrubs" where cheatgrass and other annual invasive species dominate the understory or exist in a monoculture with little to no remnant perennial grasses. This latter condition groups areas where invasive annual species have changed ecosystem functioning through changing the fire risk and behavior thus need to be managed for invasive annual fine fuels. This Grazing Planning Group can also include a "seeded" condition that may occur where introduced forage species dominate.

The Saline Bottom group is dominated by black greasewood and Wyoming big sagebrush in the overstory which are not considered palatable by cattle but marginally palatable by sheep and goats. Grass components include basin wildrye, and alkali sacaton and are considered good forage. Other common species in the community include alkali muhly (*Muhlenbergia asperifolia*), alkali grass (*Puccinellia* sp.), iodine bush (*Allenrolfea occidentalis*), silver buffaloberry (*Shepherdia argentea*), and Torrey's saltbush (*Atriplex torreyi*). Rabbitbrush, inland saltgrass, Western wheatgrass (*Pascopyrum smithii*), Sandberg's bluegrass and seep weed (*Suaeda calceoliformis*) are also often present and can dominate sites that have been historically overgrazed. Collectively, areas where the above-mentioned "greasewood plant community is present" are sensitive to repeated grazing by livestock during the growing season and require adequate recovery periods to persist and thrive. Within the Saline Bottom Group, there are areas of "annual grasses dominant with/without shrubs" where halogeton and other invasive annuals dominate.

Another key component of the landscape is riparian habitat and other wet systems (e.g., springs and seeps) which are critical from a livestock management perspective as well as a habitat and wildlife perspective. These areas are generally considered high R&R sites, with a strong resistance to invasive annuals, faster recovery times after fire, and are relatively responsive to changes in grazing management (Chambers et al. 2014). According to the Nevada Department of Wildlife's Action Plan:

> Although extremely small in extent, riparian communities are critical centers of wildlife diversity (Mac, 1988). More than 75% of the species in Nevada are strongly associated with riparian vegetation (U.S. General Accounting Office, 1993), including 80% of the birds (Dobkin, 1998). Almost all of these systems provide surface water for wildlife at some point in the year, and some provide critical year-round water. Because of the presence of water either at or near the surface, riparian systems are the most productive habitats in the state. This includes production of seeds, fruits, insects, arthropods, reptiles, amphibians, and vegetation for wildlife food, and often abundant plant growth that provides nest and den sites, cavity sites, hiding cover, and thermal cover. Another critical function of riparian areas is to provide corridors for either long-distance migration (e.g., birds, bats) or short-distance wildlife movements (e.g., deer, bobcat). By facilitating such movements, riparian corridors connect populations and improve the genetic health of wildlife populations. Wetted backwaters along streams provide excellent habitat for amphibian species, provided that these areas receive adequate water during high flows in the spring. (NDOW 2012)

Riparian and Wet Meadow systems across the landscape are varied and complex. They consist of perennial, and intermittent lotic systems and lentic systems consisting of individual springs and spring complexes. According to the Proper Functioning Condition (PFC) assessments in the Draft Land Health Evaluation completed in 2020, many of the riparian systems across the ranch are not in PFC or trending in that direction. Four common reasons for not meeting standards are 1) historic livestock grazing, 2) human alteration of the site, 3) drought, and 4) current livestock grazing. Many are recoverable with improved management and restoration although some areas have altered potential or are not recoverable due to multiple factors. For the sake of grazing management groups, all of these conditions of riparian/wet systems are lumped together into one condition called “riparian/wet meadow obligates are/should be present.” However, at a smaller scale and for objective setting, these systems have been further broken out into sub-groups based on information from the most recent Properly Functioning Condition (PFC) assessments. Three lentic groups have been identified: 1) lentic sites in PFC, 2) lentic sites that can be improved with changes in grazing management, and 3) lentic sites that can be improved with restoration and grazing management. In addition, lotic systems are relatively rare on the ranch and are identified by their specific names: Mill Creek, Death Creek, Loomis Creek, and Pole Creek. Objectives for all of these systems are necessarily designed to meet the specific challenges outlined in PFC assessments.

Aspen is a minor component in this landscape and covers less than 1% of the Winecup Gamble Ranch. Aspen stands are commonly associated with meadow edges, rocky outcrops, riparian areas, and areas with relatively high water tables. Aspen occur at 6500 to over 8000 Ft in elevation, on 0–45% slopes across all aspects. In eastern Nevada, aspen do not exist in the large, extensive stands (several hundred acres) common to the Rocky Mountains, Great Basin, or Canadian provinces. Aspen are typically found in isolated upland stands where soil and moisture conditions are favorable (perched water tables) or as stringers along stream corridors (Cobb and Vavra 2003). Managing herbivory on scattered small stands dispersed across the landscape is challenging. In addition, these stands are small in comparison to the surrounding area available for grazing/browsing. However, aspen communities are known for their forage productivity.

Herbivory, the consumption of plants, is done by many species of animals and insects. Herbivores that utilize aspen include cattle, sheep, elk, deer, moose, beavers, gophers, wood borers, leafminers, etc. Utilization of aspen and terminal buds tends to be greater when sites are used by multiple species: cattle and sheep, cattle and deer, cattle and elk, or deer and elk. Young aspen sprouts are nutritious and, when available, can make up a substantial portion of livestock and big game diets (Mueggler 1985). Thus, these sites are especially attractive to livestock and wildlife. Repeated overbrowsing will eliminate aspen regeneration and eventually the grove. Aspen is especially susceptible to gnawing or stripping of its bark by several species of mammals, such as elk, deer, rabbits, hares, mice, voles, and porcupines. Aspen buds are an important winter food source for wildlife. Aspen seedlings and saplings may also be trampled by livestock and large ungulates. Aspens may be effected by digging and feeding upon their roots by pocket gophers and other burrowing creatures (www.fs.fed.us).

Aspen reproduce primarily by sprouting from root systems, rather than spreading seeds. Each "clone" can live hundreds or even thousands of years. A stem may die, but beneath the soil, the root sends out fresh shoots, and the cycle begins again. The aspen stands with dying trees do not seem to produce shoots to replace old trees as they normally would, which may be related to years of drought that inflicted deep damage (www.fs.fed.us).

If no sprouts or saplings are present and there are only a few mature trees in an aspen grove. The grove is not healthy if it is no longer producing sprouts. Unfortunately, it may be just a matter of time before this aspen grove dies off and disappears from the landscape (www.fs.fed.us).
The key to maintaining a healthy aspen grove are a continuing source of sprouts. New sprouts are the best indicator that the grove is healthy (www.fs.fed.us).

Curlleaf mountain-mahogany is a multi-branched evergreen tree or shrub. Mature plants range from 3 to 35 feet tall (Booth and Wright 1962, Conrad 1987). One to several trunks is common. Main trunks may be more than 3 feet in diameter but average 12 inches (Harrington 1964, Johnson 1970, Lanner 1983). Young plants typically have branches growing near the ground, producing a shrubby appearance. Plants may not reach full height until 100 or more years of age (Johnson 1970, Plummer 1972). Curlleaf mountain-mahogany is drought tolerant and grows slowly (Lacey and Mosley 2002, Lanner 1983). Plants are long lived. The oldest trees located in the Shoshone Range of Nevada were an estimated 1,350 years old (Dealy 1977, Schultz 1987). It prefers shallow, well-drained soils with a sandy or grainy consistency, and is generally found in areas which receive low annual precipitation 6-1n in (Arno 2000). This makes it common on low mountains and slopes, (Arno and Gruell 1983, Arno 2000) where it grows in scattered groves among other drought-resistant species such as Pinyon Pines, Junipers and Sagebrush ecosystems. Curlleaf mountain-mahogany functions as a late-seral or a mid-seral species in most communities. Site conditions likely dictate curlleaf mountain-mahogany's place in succession. Curlleaf mountain-mahogany's shade tolerance is low (Borland 1989, Lackschewitz 1991), so if sites can support coniferous species, curlleaf mountain-mahogany may be replaced as conifers dominate the canopy. However, succession proceeds at an "extremely slow" rate in many curlleaf mountain-mahogany communities (Davis 1976, Davis and Brotherson 1991), and long-term studies of successional change in curlleaf mountain-mahogany communities are lacking. Increases in curlleaf mountain-mahogany abundance are often attributed to decreased fire frequency (Gruell 1982, Gruell and Eddleman 1994). Curlleaf mountain-mahogany

recolonization can be quick if seed in the soil is unharmed, but postfire establishment can take several decades following severe fires that destroy the seed bank and kill parent plants (Gruell, Bunting and Neuenschwander 1985).

Curlleaf mountain-mahogany has thick bark and may survive "light" fires (Gruell, Bunting and Neuenschwander 1985). Sprouts following fire are rare and short lived (Bacon 1985, Neuenschwander 1978). Most often curlleaf mountain-mahogany is killed by fire, and regeneration is by seedling establishment fires (Gruell, Bunting and Neuenschwander 1985). Seed may come from curlleaf mountain-mahogany trees avoiding fire in low fuel areas (Dealy 1975) or by seed surviving in soil (Johnson 1998).

In the Petersen Mountains of western Nevada, the area occupied by curlleaf mountain-mahogany has "decreased dramatically" from 1954 to 1997 as a result of increased fire incidence. Increased fire frequency has been linked to increased cheatgrass dominance. The area occupied by curlleaf mountain-mahogany in 1954 was nearly 14% more than that occupied in 1996. The researcher predicts that the current fire frequency in the areas will make successful recruitment impossible (Ross 1999).

Utah juniper (*Juniperus osteosperma*) occurs in every county of the state, and it covers more acreage in Nevada than any other tree. It is extremely adaptable, occurring in low valleys as well as in high-elevation mountain shrub communities, ranging in elevation from 2000 to 8000 feet. Utah juniper is distributed over at least 200 mountain ranges and is absent only in the northernmost mountain ranges of the state.

Utah juniper woodlands have expanded substantially throughout the Intermountain West. Over the past 150 years, various changes in land management, particularly fire suppression have aided in this expansion. In juniper dominate areas, they out-compete understory species for light, moisture, and nutrients eventually resulting in a near complete removal of sagebrush and other understory vegetation. Increases in Utah juniper woodland cover often lead to a reduction in soil water availability. This shortens the growing season and limits the amount and quality of forbs and grasses available for cover and food utilization by wildlife, including greater sage-grouse (sage-grouse) (Miller et al. 2017). There are three transitional Phases of Utah juniper woodland development (Miller et al. 2005):

• Phase I: Trees are present, but shrubs and forbs are the dominant vegetation that influence ecological processes (e.g., hydrologic, nutrient and energy cycles) on the site.
• Phase II: Trees are co-dominant with shrubs and forbs, and all three vegetation layers influence ecological processes on the site.
• Phase III: Trees are the dominant vegetation and the primary plant layer influencing ecological processes on the site.

Utah juniper has expanded in the Winecup Gamble Ranch Complex to the extent that current stands exceed what historically occurred. The effect of this expansion is a reduction in quantity and quality habitat for sage-grouse and other sagebrush obligate species. In 2015, the US Fish & Wildlife Service (USFWS) determined that sage-grouse is not warranted from listing under the Endangered Species Act (ESA), and will conduct a status review in 2020. The 2015 Finding

identified conifer expansion as a primary threat to sage-grouse in the Great Basin (Connelly and Braun 1997; Braun 1998; USFWS 2015) and treatments are necessary to maintain suitable sagebrush ecosystems.

Several studies document strong avoidance of Utah juniper by sage-grouse at multiple spatial scales and across different grouse life history stages (Doherty et al. 2008). This is seen even at relatively low density (e.g., <4% canopy cover; Baruch-Mordo et al. 2013) and Utah juniper is expected to become closed canopy habitats if no action is taken to curtail encroachment (Doherty et al. 2008). Different levels of Utah juniper cover have varying effects on sage-grouse behavior and population dynamics. For example, important resources to sage-grouse, such as food and concealment cover decrease disproportionately as the percent of Utah juniper overstory increases (Miller et al. 2005; Miller et al. 2014). Additional tall vertical structures (i.e. trees) provide perching and nesting habitat in an otherwise flat landscape can increase risk of avian predation (Coates et al. 2014; Howe et al. 2014) which sage-grouse may perceive as a threat. The perception of a threat is related to the density of trees on the landscape.

Appendix 5: Ecological Goals, Objectives, Strategies, and Monitoring

Landscape-Scale Goals, Strategies, Objectives and Monitoring

Certain goals, objectives and strategies, such as those related to fire and general habitat goals, are most appropriately described at the landscape scale. They are as follows:

Landscape-Scale Goals

- Keep bare ground at the appropriate level to the ecological sites
- Manage the threat of uncharacteristic fire, while allowing for characteristic fire to occur
- Maintain or increase biological soil crusts where possible
- Sustain diverse populations of healthy plants and animals
- Maintain and improve healthy habitats

Landscape-Scale Management Strategies

Grazing

The overarching strategies that will be used in the management of grazing for the objectives within this alternative are:

- Vary the time of year that a use area is grazed (i.e. avoid grazing the same place at the same time of year in subsequent years)
- Allow perennial grasses to periodically go through an entire growing season and produce a mature seed crop without grazing pressure.
- Avoid intensity levels that exceed moderate use during the growing season
- Use dormant season grazing, Temporary Non-Renewable AUMs, and/or employing the provisions of the Nevada Targeted and Prescribed Grazing Environmental Assessment to manage residual dry matter and decrease reliance on hay production.

These grazing strategies are implemented by setting sideboards using GRI which include high target average GRI scores, and by tracking grazing management carefully. The mechanics of the GRI and how it scores livestock use is described in Appendix 3, and attaining the scores as outlined below will promote maintenance and improvement of the plant communities.

Because of the variation of conditions and the size of these allotments, it is also important to note a few specific strategies that will be used to achieve desired objectives.

- Use the seeded areas that are more resilient to growing season grazing to reduce growing season use in upland shrub and native grass areas or areas that are recovering from fire or other heavy disturbance
- In winterfat communities, severely limit the occurrence of late-winter/early-spring (March-April) grazing by livestock

Precipitation is highly variable in this region and directly affects annual production of forage. This can drastically affect the annual carrying capacity of the allotments within a given year.

Accounting for this variation while minimizing the fluctuations in AUMs will be accomplished with four primary strategies:

- Plan grazing to create reserves of forage (forage banks) that can be used to mitigate for drought or fire conditions while avoiding excessive fuel loads when feasible.
- Match species of livestock to accompany long-term trends in market and climate conditions
- Strategically position new range improvements (e.g., water, fencing, temporary fencing) to support expanded flexibility and increased resiliency to unfavorable conditions
- Utilize Temporary Non-Renewable (TNR) AUMs and/or employ the provisions of the Nevada Targeted and Prescribed Grazing Environmental Assessment to reduce the risk of fire when significant residual dry matter exists on the ranch and the permitted AUMs have been met *(see section on Adaptive Management below for more information)*.

Wildfires

Wildfires are extremely common across the Ranch and are an important part of the ecosystem. However, as with the rest of the Great Basin, patterns of fire are changing and landscape-scale, stand-replacing fires are becoming more common as compared to the historic patterns of smaller fires that create a mosaic of conditions across the landscape. Historically, fire-return intervals for this landscape could exceed 50 years. Today, catastrophic fires can burn hundreds of thousands of acres, particularly in areas where the understory is dominated by annual grasses, or where perennial vegetation mixed with annual grasses develop a large buildup of residual dry matter. The interaction of fire and vegetation conditions ultimately result in shorter periods between fires for a given location on the landscape. Because of the risk or consequences of fires having negative effects on landscape health, the following strategies will be used to manage for fire:

- Manage excessive residual dry matter when needed using dormant season grazing, Temporary Non-Renewable AUMs, and/or employing the provisions of the Nevada Targeted and Prescribed Grazing Environmental Assessment while considering the impact to drought forage reserves.
- When wildfires do occur, the permittee and the BLM will work to reach a grazing agreement (rather than a grazing closure) for the Use Area(s) affected.

Additional

Grazing alone will not and cannot move this landscape entirely to the achievement of all Rangeland Health Standards given its current condition and historic disturbances. This alternative encourages other management strategies to help maintain or restore ecosystem function. This may include permanent riparian protection, creation or restoration of riparian/wetland conditions, seeding, prescribed burning, mechanical, chemical or biological treatment of shrubs and trees, chemical or biological treatment of weeds, chemical or biological treatment of annual forbs or grasses, and mechanical maintenance of fuel breaks, to name a few. Programmatic, landscape--scale environmental analyses (EA) are being completed during the writing of this alternative that could serve to further the implementation of some of these strategies. The O'Neil Project Planning Area EA is one such project.

Landscape-Scale Objectives

- Maintain or reduce the 10-year average of annual acres burned.

Landscape-Scale Monitoring

- BLM to maintain fire records including size and location and a 10-year running average of annual acres burned.

Ecological Goals, Objectives, and Monitoring by Grazing Management Condition

As discussed in the proposed action, Use Areas will be managed according to Key Conditions, which may change over time. Thus, the following goals, objectives, and monitoring considerations for each grazing management condition are described here independent of place but are tied to the landscape using the periodically updated Grazing Management Condition map and Key Condition per Use Areas table.

Upland shrubs with dominant native grasses/Curl-leaf mountain mahogany

The upland shrub and native grass conditions are comprised of multiple species of shrubs, grasses, and forbs but are primarily intact or absent of recent disturbance from fire.

Goals:

- Maintain or encourage appropriate diversity and composition of vegetation growth forms according to the ecological site to support future forage for livestock and habitat for wildlife.
- Maintain or increase deep-rooted perennial grasses to support forage for livestock/wildlife and cover for wildlife, recognizing that woody succession is a naturally occurring phenomenon that cannot be overcome by grazing.
- Limit the opportunity for invasion and/or abundance of annual grasses and conifers to limit the risk of wildfire.
- Limiting the risk of catastrophic wildfire caused by excessive buildup of residual dry matter.

Objective:

- Maintain or increase the foliar cover and/or density of deep-rooted perennial grasses over 10 years.

Strategies:

- Maintain a 3-year average GRI score of +2
- When herbaceous residual dry matter (RDM) exceeds 760 lbs/acre[3], consider managing fuel loads using dormant season grazing, Temporary Non-Renewable AUMs, and/or employing the provisions of the Nevada Targeted and Prescribed Grazing Environmental Assessment.

[3] Brown (1982) suggested that in areas with 20% sagebrush cover, herbaceous fuel loads need to be at least 381 lbs/acre to limit the spread of wildfire under low-wind conditions. As there is a gap in knowledge on what constitutes an upper limit of fuel loading that presents an extreme risk of fire (Strand et al. 2014), this alternative proposes an upper limit of *double* the Brown (1982) figure.

Monitoring:

Effectiveness

- Permittee and/or BLM maintain monitoring sites assessing cover and density of deep-rooted perennial grasses using photo plot monitoring and other methods at least once every 5 years. *(See monitoring section for more detail.)*

Implementation

- Permittee and/or BLM to assess and assign a GRI score for each use area each year at the end of the grazing season and maintain records of running 3-year average of the GRI score in each use area.

Curlleaf mountain-mahogany provides food and cover for a variety of wildlife species. It is most often praised as big game forage (Lanner 1983). Some livestock (domestic goats, sheep, and cattle) use it in spring, fall, and/or winter but rarely in the summer (Sampson 1969, USDA Forest service). Big game browsing can be extensive; consumption of all the leaves and stems within reach is common (Sampson 1969). Garrison (Garrison 1953) suggests that utilization of 50% to 60% for curlleaf mountain-mahogany plants under 60 inches tall is tolerated. As plants mature, stems are often beyond the reach of big game animals (Plummer, Christensen and Monsen 1968). Browsing can result in heavy seedling mortality or suppressed growth. Dealy (Dealy 1971) suggests that successful seedling establishment in curlleaf mountain-mahogany/Idaho fescue habitats with heavy deer use may be a result of seedlings being undetected among bunchgrasses and in snow until they reach 6 to 12 inches, when a well-developed root system and numerous branches increase curlleaf mountain-mahogany's resiliency.

Researchers consider curlleaf mountain-mahogany a valuable component in revegetation or reclamation efforts. Seed and/or plants are commercially available for restoration or revegetation (Atthowe 1993, USDA NRCS 2001). Curlleaf mountain-mahogany provides soil stabilization (McArther, Giunta and Plummer 1977), fixes nitrogen (Monsen and Stevens 2004), and provides important wildlife browse and cover (Stevens 2004). Establishment can be very slow, however, and sites may require protection from livestock, humans, and/or native browsers for 4 to 6 years for successful establishment (Stevens 2004).

Goals:

- Maintain habitat conditions that facilitate terrestrial species use.
- Maintain or encourage appropriate diversity and composition of vegetation growth forms according to the ecological site to support future forage for wildlife and livestock.
- Minimize the loss of existing curlleaf mountain-mahogany stands.
- Enable livestock management and other restoration activities to maintain or restore ecosystem function.

Objective:

- Actively manage the season, intensity, and frequency of browse on curlleaf mountain-mahogany leaves and stems.

- Carefully managing understory components when grazing with livestock, recognizing that large amounts of curlleaf mountain-mahogany stems can be damaged from trampling.

Strategies:

- Limit defoliation intensity on curlleaf mountain-mahogany during mid and late growing season.
- Mid-season browse should be avoided over consecutive years.
- Repeat browsing of leaves and stems within a growing season should be avoided.
- Utilize temporary electric fencing to protect areas when forage is still available in uplands and sensitive areas need further recovery.
- Install exclosure/riparian pasture fences where appropriate.
- Increase water availability for livestock and wildlife away from sensitive sites.
- Allow for long recovery periods after grazing.
- Allow for periodic complete rest from June 15 to September 1.
- Limit grazing from June 15 to September 1.
- Any grazing from June 15 to September 1 will be light-moderate use.
- From June 15 to September 1, use protein supplements to draw livestock away from sensitive areas.
- In Aspen Grazing Planning Groups, maintain a 3-year average GRI score of +3

Monitoring:

Effectiveness

- When curl-leaf mountain mahogany stands are located within a grazing planning area, key areas will be established to incorporate these species in them. Use of these species will be recorded in monitoring of the key area and will be included in monitoring data assessment affecting use of the area.

Implementation

- Permittee and/or BLM to assess and assign a GRI score including ocular assessment of utilization for each use area each year at the end of the grazing season and maintain records of running 3-year average of the GRI score in each use area.

Upland shrubs with minimal understory

The upland shrubs with minimal understory conditions are comprised of multiple shrub components with very little understory. They are primarily shrubs and bare ground in the interspaces although some native plants can exist within the protection of the shrub canopy.

Goals:

- Limit the opportunity for invasion of annual grasses and conifers
- Maintain any currently present native understory
- Enable livestock management and other restoration activities to maintain or restore ecosystem function

Objective:

- Prevent transition to a more degraded condition (annual with/without shrubs) within 10 years.

Strategy:

- Maintain a 3-year average GRI score of +2

Monitoring:

Effectiveness

- Permittee, in association with the BLM, to use remote sensing change detection to analyze the changes occurring in the "shrub with minimal understory" condition and to determine if areas are stable or converting to other conditions at least every 5 years.

Implementation

- Permittee and/or BLM to assess and assign a GRI score for each use area each year at the end of the grazing season and maintain records of running 3-year average of the GRI score in each use area.

Annual grasses dominant with/without shrubs

The annual grass condition may or may not have a shrub component to them however the herbaceous vegetation of annual grasses or forbs are dominating the understory. This condition is most susceptible to fire and erosion.

Goals:

- Avoid conversion to an eroded condition
- Enable livestock management and other restoration activities to maintain or restore ecosystem function
- Manage fuel loads to limit the opportunity for uncharacteristic fire
- Utilize allowable actions to manage fuel breaks and convert areas to more desirable conditions.

Objective:

- Maintain or reduce the total acreage of "annual grasses dominant with or without shrubs" within 10 years.

Strategy:

- Maintain a 3-year average GRI score of +2 and/or utilize the Targeted and Prescribed Grazing of Annual Grasses EA to reduce the competitiveness of annuals.
- When herbaceous residual dry matter (RDM) exceeds 760 lbs/acre in areas with shrubs, and 1250 lbs/acre in areas without shrubs[4], consider managing fuel loads using dormant

[4] Strand et al. (2014) suggests that in areas without sagebrush cover, herbaceous fuel loads need to be at least 627 lbs/acre to limit the spread of wildfire under low-wind conditions. As there is a gap in knowledge on what constitutes an upper limit of fuel loading that presents an extreme risk of fire (Strand et al. 2014), this alternative proposes an upper limit of *double* the Strand et. al. (2014) figure.

season grazing, Temporary Non-Renewable AUMs, and/or employing the provisions of the Nevada Targeted and Prescribed Grazing Environmental Assessment.

Monitoring:
Effectiveness

- Permittee, in association with the BLM, to use remote sensing change detection to analyze the changes occurring with respect to "annual grasses with/without shrubs," and determine if areas are stable or converting to other conditions at least every 5 years.
- Permittee and/or BLM to assess and assign a GRI score including ocular assessment of utilization of any perennial grasses for each use area each year at the end of the grazing season and maintain records of running 3-year average of the GRI score in each use area.

Seeded grassland

The seeded condition is primarily a monoculture of crested wheatgrass (*Agropyron cristatum*) or similar non-native bunchgrass. These areas lack a functional upland shrub component, and the grasses tend to be very resilient to livestock grazing and exhibit resistance to annual grass invasion. Robust stands of introduced species can also be slow to go through woody succession and may outcompete other, more desirable native vegetation. By using a holistic view of the landscape and the attributes of the seeded condition, these areas can be used to help achieve desired condition in other areas that are more sensitive to grazing.

Goals:

- Maintain the health and vigor of the seeded grasses, allowing them to remain competitive against invasive annuals
- Utilize seeded areas to reduce grazing pressure on other areas within the watershed
- Restore native plant species and/or ecosystem function where possible, including through increased grazing pressure to encourage woody succession and/or more careful grazing to increase local herbaceous diversity

Objective:

- Convert 10% of the total acreage in allotments that were classified as "seeded" in 2020 to "seeded with shrub" in 10 years.
- When herbaceous residual dry matter (RDM) exceeds and 1250 lbs/acre, consider managing fuel loads using dormant season grazing, Temporary Non-Renewable AUMs, and/or employing the provisions of the Nevada Targeted and Prescribed Grazing Environmental Assessment.

Strategy:

- Maintain a 3-year average GRI score of 0

Monitoring:
Effectiveness

- Permittee, in association with the BLM, to use remote sensing change detection to analyze changes occurring in the "seeded" condition and to determine if conversation to "seeded with shrubs" is occurring at least every 5 years.

Implementation

- Permittee and/or BLM to assess and assign a GRI score at the end of the grazing season and maintain records of running 3-year average of the GRI score in each use area.

Seeded with shrubs

The seeded with shrub condition is primarily a monoculture of crested wheatgrass or similar non-native grass but with a functional shrub component. The grasses tend to be very resilient to livestock grazing. By using a holistic view of the landscape and the attributes of the seeded with shrub condition, we can complement the achievement of another desired condition that is more sensitive to grazing.

Goals:

- Maintain the health and vigor of the seeded grasses, allowing them to remain competitive against annual invasion and avoiding acceleration of woody succession beyond what would be naturally occurring.
- Reduce grazing pressure on other areas within the watershed.
- Restore native plant species and/or ecosystem function where possible.

Objectives:

- Convert 10% of the total acreage in allotments that were classified as "seeded" in 2020 to "seeded with shrub" in 10 years[5].
- Avoid transition to a less desirable condition (aka annual grasses with/without shrubs).

Strategies:

- Maintain a 3-year average GRI score of +1.

Monitoring:

Effectiveness

- Permittee, in association with the BLM, to use remote sensing change detection to analyze changes occurring in the "seeded" condition and to determine if conversation to "seeded with shrubs" is occurring at least every 5 years.
- Permittee, in association with the BLM, to use remote sensing change detection to analyze changes occurring in the "seeded with shrubs" condition determine if conversion to "annual with/without shrubs" is occurring at least every 5 years.

Implementation

- Permittee and/or BLM to assess and assign a GRI score at the end of the grazing season and maintain records of running 3-year average of the GRI score in each use area

[5] Note that this is the exact same objective as seeded because they are directly related.

Juniper

Utah juniper is most commonly found as an associate of singleleaf pinyon, (*Pinus monophyla)* and is a key component of Nevada's pinyon-juniper woodlands. The more drought-tolerant juniper dominates at lower elevations and becomes scarce at moderate elevations, where pinyon dominates; it then reappears on dry, rocky ridgetops. Utah juniper is usually the first of the two species to establish following fire or other disturbances and creates the environmental conditions in which pinyon can subsequently establish.

Miller et al. (2008) reported in three Great Basin study areas occupied by Utah juniper, Utah juniper has increased by 125% to 625% since 1860. The expansion of Utah juniper is a natural process that under normal circumstances would be controlled by wildfire. However, wildfire suppression may have allowed expansion into areas not historically available to Utah juniper. Furthermore, cultivation of valley floors has led to the loss of lower elevation sagebrush habitats throughout large areas within the Winecup Gamble Ranch Complex and provides little opportunity for sage-grouse populations to disperse into adjacent habitats. FIAT identified the area as high priority for restoration treatment which is necessary for the recovery of sage-grouse in the Northern Great Basin population (BLM WO IM No. 2014-134).

Loss of sagebrush habitat due to Utah juniper expansion is identified as a major threat to sage-grouse in the Conservation Plan for the Greater Sage-Grouse (Sage-Grouse Advisory Committee 2006). Thus, proactively managing Utah juniper to prevent the loss of sagebrush is considered a priority conservation measure to meet sage-grouse habitat objectives.

The Utah juniper condition has varying degrees of tree dominance. In Phase I, trees are present, but shrubs and herbs are the dominant vegetation that influences ecological processes on the site; Phase I trees can be treated with vegetation management tools including, but not limited to targeted grazing (browsing) by goats. In Phase II, trees are co-dominant with shrubs and herbs and all three vegetation layers influence ecological processes on the site. In this phase, many trees are well established and tall enough to have escaped browsing height. These trees will dominate ecological processes and suppress understory growth within 40-50 years after reaching Phase II, becoming Phase III. In Phase III, trees are the dominant vegetation and the primary plant layer influencing ecological processes on the site. Areas in Phase I and II are often the highest priority areas for vegetation treatments to maintain shrubs with native understory while Phase III has most likely lost their valuable understory plants.

Goals:

- Protect and promote healthy sagebrush-steppe ecosystems by reducing the density of encroaching junipers that out compete understory vegetation and increase the landscape's susceptibility to large-scale erosion and uncharacteristically large wildfires.
- Improve the health, vigor, and acreage of the native sagebrush-steppe vegetation and promote natural resiliency of this vegetation.
- Maintain or improve wildlife habitat by providing multiple successional stages of more diverse vegetative communities. Additionally, opportunities exist to treat the landscape in

a manner beneficial to other BLM sensitive species such as bighorn sheep, sage sparrow, Brewer's sparrow, and pygmy rabbit.
- Benefit mule deer and implement the Secretarial Order 3362 by promoting browse vegetation to meet the nutritional requirements for wintering mule deer.
- Enable livestock management and other restoration activities to maintain or restore ecosystem function

Objective:

- Carefully managing understory components when grazing with cattle, recognizing that woody succession is naturally occurring.

Strategies:
- Treatment areas may be subjected to maintenance in subsequent years to ensure all the targeted vegetation is removed, including juniper seedlings sprouting after the first year.
- Treatments will avoid known special status plant populations of Goose Creek Milkvetch and Idaho Penstemon. Surveys may be required if a new special status plant species or its potential habitat is discovered during the project timeframe.
- Maintain a 3-year average GRI score of +2.

Monitoring:
Effectiveness
- Monitoring would be performed in accordance with individual program requirements and would typically be performed both pre- and post-treatment.
- Permittee, in association with the BLM, to use remote sensing change detection to analyze the changes occurring with respect to the "tree" condition and determine if new areas are appearing or if treatments are effective at least every 5 years.

Implementation
- Permittee and/or BLM to assess and assign a GRI score including ocular assessment of utilization for each use area each year at the end of the grazing season and maintain records of running 3-year average of the GRI score in each use area.

Salt Desert

For the purposes of remote sensing, intact Winterfat, Greasewood, and Saline Bottom communities are lumped into a single Condition called "Salt Desert." Here, shrubs exist along with deep-rooted perennial grass plants such as Indian rice grass and basin wildrye in this condition. Winterfat is very sensitive to grazing by livestock in the late winter/early spring growing season.

Goals:
- Maintain and protect diversity of native plant species composition appropriate to the Ecological Sites.
- Limit the opportunity for invasion and/or abundance of annual grasses.

Objective:

- Maintain or increase cover of winterfat in the Winterfat Grazing Planning Group.
- Winterfat, Greasewood, and Saline Bottom Grazing Planning Groups, maintain or increase the cover of deep-rooted perennial grasses recognizing that woody succession is naturally occurring and that perennial grasses may not be abundant in this type.

Strategies:

- In Winterfat areas, graze in the dormant season with very limited grazing in March and April.
- In Winterfat, Greasewood, and Saline Bottom Grazing Planning Groups, maintain a 3-year average GRI score of +3

Monitoring:

Effectiveness

- In Winterfat Grazing Planning Group, permittee and/or BLM to maintain monitoring sites to determine cover of winterfat plants and cover and density of deep-rooted perennial grasses using photo plot and other methods at least every 5 years.
- In Greasewood and Saline Bottom Grazing Planning Groups, permittee and/or BLM to maintain monitoring sites to determine cover and density of deep-rooted perennial grasses using photo plot and other methods at least every 5 years.

Implementation

- Permittee and/or BLM to assess and assign a GRI score for each use area each year and the end of the grazing season while maintaining a running 3-year average of the GRI score in each use area.

Riparian/Wet meadows/Aspen stands

Riparian areas and wet meadows are found throughout the allotment and are valuable to livestock and wildlife alike. The traditional timing of use in these areas has often restricted livestock use to the most sensitive season with very water access. This alternative focuses on the ability to change the season of use, provide alternate water sources, and in some cases, protect these sensitive areas with exclosures that are wildlife friendly. With the added flexibility of timing and with the additional tools and strategies that are described below, this alternative provides multiple avenues to improve riparian and wet meadow conditions.

Within the riparian conditions there are common goals (i.e., achieving Proper Functioning Condition) but specific objectives have been created for different systems. For lentic systems, which are scattered across the landscape, objectives and strategies based on the following sub-conditions: **Properly Functioning, Recoverable with Improved Grazing, and Recoverable with Treatment.** Specific site names and their current sub-conditions according to the data supporting the 2020 Land Health Evaluation are identified below. For lotic systems, objectives and strategies have been identified for the specific lotic resources by name.

Overall Riparian/Wet Meadow Goals:

- Manage for Proper Functioning Condition.
- Maintain habitat conditions that facilitate terrestrial species use.
- Maintain or improve functional conditions that reduce velocity of flowing water and increase bank and soil stability.
- Maintain conditions that allow for the retention and infiltration of naturally occurring moisture to include bank and/or floodplain soil storage.
- Maintain or improve conditions to facilitate appropriate water temperatures for site.

<u>For lentic areas currently in Proper Functioning Condition</u>

Objectives:

- Maintain wetland extent.
- Maintain appropriate riparian plant composition.
- Maintain consistent cover of wetland stabilizers.
- Maintain greenline-to-greenline width.

Strategies:

- Increase water availability for livestock and wildlife away from sensitive sites.
- Allow for long recovery periods after grazing.
- Allow for periodic complete rest from June 15 to September 1.
- Limit grazing from June 15 to September 1.
- Any grazing from June 15 to September 1 will be light-moderate use.
- From June 15 to September 1, use protein supplements to draw livestock away from sensitive areas.

Monitoring:

- Permittee, in association with the BLM, to use remote sensing to analyze wetland extent at least every 5 years.
- BLM, in association with permittee, to measure greenline-to-greenline width and greenline composition on-the-ground at least every 5 years.

<u>For lentic areas identified as Recoverable with Improved Grazing</u>

Objectives:

- By 2030, increase wetland extent by 20% (or to full potential) on 80% of areas as compared to 2013-2014 data.
- By 2030, riparian plant composition is appropriate to site at 80% of areas.
- By 2030, increase cover of wetland stabilizers by 20% (or to full potential) on 80% of areas.

Strategies:

- Increase water availability away from sensitive sites.
- Allow for long recovery periods after grazing.

- Allow for periodic complete rest from June 15 to September 1.
- Limit grazing from June 15 to September 1.
- Utilize temporary electric fencing to protect areas when forage is still available in uplands and sensitive areas need further recovery.
- Any grazing from June 15 to September 1 will be light-moderate use.
- From June 15 to September 1, use protein supplements to draw livestock away from sensitive areas.

Monitoring:

- Permittee, in association with the BLM, to use remote sensing to analyze wetland extent at least every 5 years.
- BLM, in association with permittee, to measure greenline-to-greenline width and greenline composition on-the-ground at least every 5 years.

For lentic areas that are recoverable with treatment:

Objectives:

- By 2030, increase cover of wetland stabilizers by 20% (or to full potential) on 80% of areas.
- By 2030, increase wetland extent by 20% (or to full potential) on 80% of areas as compared to 2013-2014 data.
- By 2030, riparian plant composition is appropriate to site at 80% of areas.
- By 2025, stop the advancement of head cuts.

Strategies:

- Install exclosure/riparian pasture fences where appropriate.
- Install rock check dams to stabilize head cuts where needed.
- Increase water availability away from sensitive sites.
- Allow for long recovery periods after grazing.
- Allow for periodic complete rest from June 15 to September 1.
- Limit grazing from June 15 to September 1.
- Utilize temporary electric fencing to protect areas when forage is still available in uplands and sensitive areas need further recovery.
- Any grazing from June 15 to September 1 will be light-moderate use.
- From June 15 to September 1, use protein supplements to draw livestock away from sensitive areas.

Monitoring:

- Riparian fences checked and maintained prior to use in all years.
- Head cuts monitored at least every 5 years
- Permittee, in association with the BLM, to use remote sensing to analyze wetland extent at least every 5 years.

- BLM, in association with permittee, to measure greenline-to-greenline width and greenline composition on-the-ground at least every 5 years.

For Lotic areas:

Tables 10 and 11 contain the objectives, strategies and monitoring activities for specific lotic systems.

Table 10. Riparian Objectives for Lotic Systems.

	Riparian System Loomis Creek	Pole Creek	Mill Creek	Death Creek
Objectives	• increase cover of stabilizing vegetation • decrease greenline-to-greenline width in incised reach • increase wetland extent where possible	• stabilize headcut • increase cover of stabilizing vegetation • decrease greenline-to-greenline width in incised reach • increase wetland extent where possible	• maintain cover of stabilizing vegetation • maintain wetland extent	• increase cover of stabilizing vegetation • decrease greenline-to-greenline width in incised reach • increase wetland extent where possible

Table 11. Riparian Strategies, and Monitoring for Lotic Systems

Riparian	**Action**
Strategies	• Install exclosure/riparian pasture fences where appropriate. • Install rock check dams to stabilize head cuts where needed. • Increase water availability away from sensitive sites. • Allow for long recovery periods after grazing. • Allow for periodic complete rest from June 15 to September 1. • Limit grazing from June 15 to September 1. • Utilize temporary electric fencing to protect areas when forage is still available in uplands and sensitive areas need further recovery. • Any grazing from June 15 to September 1 will be light-moderate use. • From June 15 to September 1, use protein supplements to draw livestock away from sensitive areas. • Encourage presence of beavers.

Riparian	Action
Monitoring	• Permittee, in association with the BLM, to use remote sensing to analyze wetland extent at least every 5 years at key reaches. • BLM, in association with permittee, to measure greenline-to-greenline width and greenline composition on-the-ground at least every 5 years at key areas.

Aspen (*Populus tremuloides*) is a disturbance-dependent, fire-resilient, shade-intolerant, clonal species that relies on vegetative reproduction to maintain stands between episodic seeding events (Eriksson 1993; Romme et al. 1997; Shepperd et al. 2006). As Shepperd (2001) summarizes, successful aspen regeneration is dependent upon 1) release of apical dominance and subsequent hormonal stimulation of root buds to initiate suckering (Schier et al. 1985; Frey et al. 2003); 2) a growth environment that provides sunlight and warm soil temperatures (Doucet 1989; Fraser et al. 2002); and 3) protection of aspen suckers from excessive browsing (Bartos and Campbell 1998; Kay 2001; Rolf 2001). Animals select areas to graze based on forage quality and quantity, comfort, and security. As a result, aspen stands cannot be viewed as discrete types when dealing with impacts of grazing and browsing (DeByle 1985).

Factors known to incite aspen decline include altered fire regime, excessive browsing by livestock and native ungulates, severe drought, disease, and insect damage (DeByle 1985; Mueggler 1985; Chong et al. 2001; Frey et al. 2004; Kaye et al. 2005; Kashian et al. 2007; Worrall et al. 2008). Lengthened fire return interval allows conifer succession in some aspen stands, creating a growth environment that cannot support aspen (Schier 1976; Bartos 2001; Kaye et al. 2005; Kashian et al. 2007). Early reports document loss of heavily grazed aspen stands and persistence of moderately grazed stands in the western United States (Baker 1918; Sampson 1919). Excessive browsing suppresses establishment of new aspen tree cohorts by maintaining suckers in a hedged growth form below the herbivore browse line, or total elimination of suckers (Bartos et al. 1994; White et al. 1998; Kay and Bartos 2000; Kay 2001; Turner et al. 2003; Dockrill et al. 2004). Studies have found heavy cattle grazing, particularly mid- to late growing season, to be an effective means to suppress aspen regeneration following conversion of aspen parkland to grassland (Fitzgerald et al. 1984; Bailey et al. 1990). Aspen restoration in grazed landscapes is a priority for many resource managers (Jones et al. 2005; Shepperd et al. 2006; Bartos 2007). Excessive browsing by livestock, and some wildlife species, can be controlled with exclusionary fencing (Shepperd and Fairweather 1994; Kay and Bartos 2000; Kay 2001). However, widespread exclusionary fencing of aspen stands may not be ecologically or economically practical (Rolf 2001). Aspen sucker recruitment, establishment of new stand cohorts, and stand restoration requires suckers to grow above the livestock and native ungulate browse line (about 1.5 m). Understanding aspen sucker height growth response to intensity and season of browse is central to developing livestock grazing strategies to restore stands that are in decline due to excessive livestock browsing.

Cattle utilize aspen primarily early in the season. As the growing season progresses, cattle diets consist primarily of herbaceous species (grasses). However, following fire, use of aspen suckers by cattle has been shown to be significant in August. Sheep will browse aspen regardless of season. The season of use by elk and deer is primarily fall and winter. Deer diets can be made up

of as much as 74 percent trees and shrubs. Snow depths generally force deer out of aspen stands during the winter, but elk, being larger, are able to remain throughout most of the winter months. Any of these herbivores, when out of balance, can have a pronounced negative impact on restoration success.

Goals:

- Maintain habitat conditions that facilitate terrestrial species use.
- Maintain or encourage appropriate diversity and composition of vegetation growth forms according to the ecological site to support future forage for wildlife and livestock.
- Minimize the loss of existing Aspen stands.
- Enable livestock management and other restoration activities to maintain or restore ecosystem function.

Objective:

- Actively manage the season, intensity, and frequency of browse on aspen suckers.
- Carefully managing understory components when grazing with livestock, recognizing that large amounts of aspen suckers can be damaged from trampling.

Strategies:

- Limit defoliation intensity on aspen regeneration during mid and late growing season.
- Mid-season browse should be avoided over consecutive years.
- Repeat browsing of suckers within a growing season should be avoided.
- Utilize temporary electric fencing to protect areas when forage is still available in uplands and sensitive areas need further recovery.
- Install exclosure/riparian pasture fences where appropriate.
- Increase water availability for livestock and wildlife away from sensitive sites.
- Allow for long recovery periods after grazing.
- Allow for periodic complete rest from June 15 to September 1.
- Limit grazing from June 15 to September 1.
- Any grazing from June 15 to September 1 will be light-moderate use.
- From June 15 to September 1, use protein supplements to draw livestock away from sensitive areas.
- In Aspen Grazing Planning Groups, maintain a 3-year average GRI score of +3.

Monitoring:

Effectiveness

- Visual assessment would be used to determine status and trend of aspen stands; if, at a distance one can see through a stand, that is an indication that it has not successfully regenerated a young age class and is in poor ecological condition. If one cannot see through a stand this indicates the stand has produced sufficient saplings and is not in immediate danger of extinction (Kay 2003). Permanent photo plots would be utilized at representative aspen stands to assess degree of regeneration and relative stand health as recommended by Kay (2003).

Implementation

- Permittee and/or BLM to assess and assign a GRI score including ocular assessment of utilization for each use area each year at the end of the grazing season and maintain records of running 3-year average of the GRI score in each use area.

Tables of Key Conditions Per Use Area

Table 12. HD Allotment Key Conditions Per Use Area

Use Area	Key Condition	Short Term Objective	Riparian
Pole Creek	Native	Average GRI +2	Yes
Upper Loomis	Native	Average GRI +2	Yes
Lower Loomis North	Native	Average GRI +2	Yes
Lower Loomis South	Native	Average GRI +2	Yes
Summer Camp	Native	Average GRI +2	Yes
Red Point	Native	Average GRI +2	Yes
Primrose	Native	Average GRI +2	No
Wilkins	Seeded Shrub	Average GRI +1	No
Knoll Mountain	Native	Average GRI +2	Yes
Burnt Creek South	Native	Average GRI +2	No
Burnt Creek North	Native	Average GRI +2	No
Bell Canyon	Seeded	Average GRI 0	Yes
9 Mile North	Native	Average GRI +2	No
9 Mile South	Native	Average GRI +2	No
HD	Seeded Shrub	Average GRI +1	No
Toano	Winterfat	Average GRI +3.5	No
Black Mtn East	Native	Average GRI +2	Yes
Black Mtn South	Native	Average GRI +2	Yes
Black Mtn North	Native	Average GRI +2	Yes
Brush Creek	Seeded	Average GRI +0	No

Table 13. Gamble Individual Allotment Key Conditions Per Use Area

Use Area	Key Condition	Short Term Objective	Riparian
Cobre/Loray	Native	Average GRI +2	No
Murdock	Native	Average GRI +2	Yes
Montello Flat	Winterfat	Average GRI +3.5	No
11 Mile Canyon	Native	Average GRI +2	No
Rocky Butte	Native	Average GRI +2	No
21 Mile Burn	Native	Average GRI +2	No
West Delano	Native	Average GRI +2	No
East Delano	Native	Average GRI +2	No
Granite	Native	Average GRI +2	No
Signboard	Native	Average GRI +2	No
Upper Dairy Valley	Native	Average GRI +2	Yes
Lower Dairy Valley	Native	Average GRI +2	Yes
Crittenden	Native	Average GRI +2	Yes

Use Area	Key Condition	Short Term Objective	Riparian
Jackson Seeding	Winterfat	Average GRI +3.5	No

Table 14. Pilot Valley Allotment Key Conditions Per Use Area

Use Area	Key Condition	Short Term Objective	Riparian
Pilot Valley	Winterfat	Average GRI +3.5	Yes

Table 15. Riparian Sites and Sub-conditions

Lentic Spring Name	Acres	Current PFC Assessment	Objective	Treatment
Proper Functioning				
DV 7	0.66	PFC		Maintain
DV-10	3.06	PFC		Maintain
Recoverable w/Grazing				
HD-2	4.14	FARD		After Grazing
HD-5	1.05	FARN		After Grazing/ Treat Invasives
DV-17	0.25	FARN		After Grazing
HD 21	0.06	FARD		After Grazing
DV-6	1.16	UNK		After Grazing
Jackson	0.2	UNK		After Grazing
DV26	0.38	UNK		After Grazing
DV-28	0.51	UNK		After Grazing
DV 30	1.29	UNK		After Grazing
Recoverable w/Treatment				
HD 9	1.8	UNK		Protect
DV 3b	0.3	NF		Protect
HD 20	0.94	NF		Protect
HD 11	0.46	NF		Protect
GI-3	0.77	FARD		Protect w/Tank
GI-4	0.35	FARD		Protect w/Tank
HD 18	0.64	UNK		Fix Head Cut/Protect
HD 13	2.89	NF		Fix Head Cut/Protect
Lotic Creek Name	**Reach**			
Loomis Creek	LC-01	PFC		Maintain
Mill Creek	MC-2	PFC		Maintain
Recoverable w/Grazing				
Loomis Creek	LC-03	FARD		After Grazing
Pole Creek	S-06	FARD		After Grazing
Mill Creek	MC-1	FARD		Fix Head Cut/ After Grazing

Lentic Spring Name	Acres	Current PFC Assessment	Objective	Treatment
Death Creek	DC-1	FARN		After Grazing

Social Goals, Objectives, Strategies, and Monitoring Considerations

The overarching goal of this alternative for the community is to build, support, and sustain healthy relationships that are inclusive of all people.

Goals:

- Foster an inclusive, fun, inspiring, educational process for all stakeholders (public, agency staff, landowners, etc.).
- Build ownership from all stakeholders in management plans and outcomes.
- Attract and retain a diversity of people.
- Create more time for Permittee and BLM Specialists to interact on the land together.

Objectives:

- Effectively use the monitoring to update and shape the short and long-term management (i.e. an updated riparian condition will change the short-term objective of a lentic site).
- Permittee and Range Specialist meet annually to discuss and review grazing strategy, monitoring data, and adaptive management plans.
- Through a Cooperative Monitoring Agreement, the permittee and BLM will share all monitoring data to include upland, riparian, and remotely sensed data.

Strategies:

- Include time within the process to build trust, accountability, and forgiveness.
- Develop a bi-annual process for planning and review that is sustainable for the life of the permit.
- Embrace and build a culture of people working together to solve problems.
- Utilize monitoring methods that inspire and are understandable by working crew.
- Spend more time on the ground together.

Monitoring:

Implementation

- Permittee to capture a photo of the Group taken on ranch tour each year and retain in records during term of this permit to assess involvement.
- Permittee to maintain notes from meetings including date, location, participants, and key issues discussed.
- The BLM and Permittee maintain records of the annual proposed grazing plan and the actual grazing that occurred.

Effectiveness

- Permittee to contract a Situation Assessment review to be completed every 5 years.

Economic Goals, Objectives, Strategies, and Monitoring Considerations

The overarching economic goal of this alternative is to provide an optimum level of diverse production on the landscape that creates sustainable economic returns for all stakeholders. This includes livestock, wildlife, and recreation. In addition, precipitation is highly variable in this region and directly affects annual production of forage which can drastically affect the annual carrying capacity of the allotments. It is the intention of this alternative to provide more flexibility within a given year so that more consistency of AUMs can be realized over the long term, thereby creating more business predictability. This will be accomplished with three primary strategies:

Goals:

- Permittee is consistently profitable with a diversity of enterprises.
- Permittee and BLM minimize unnecessary expenses.
- Monitoring is robust, relevant, and financially feasible.

Objectives:

- Permittee will maintain a diversity of livestock and other enterprises within the grazing allotments (i.e. Cow Herd, Yearlings, Goats/Sheep[6], etc.).
- Annual variation of livestock AUMs available for use over a 10-year period is less than 15%.
- Through dormant season grazing, 5-year average total days of feeding hay to mature cowherd is less than 30 days.
- Through a Cooperative Monitoring Agreement, the permittee and BLM will share the cost of monitoring of 25 upland locations, 25 riparian locations, and remote sensing model updates.

Strategies:

- Annual grazing plan will include forage banks and flexible use of time and use areas between and within the allotments.
- Annual grazing plan to include dormant season stockpiled feed for use as an alternative to feeding hay.
- Permittee maintains a diversity of livestock enterprises that are grazed on the allotments.
- Permittee refines and adjusts the production model and classes of livestock enterprises to optimally exist within changing ecological conditions and markets.
- Permittee and BLM explore the use of stewardship contracting for fuel breaks, shrub/tree suppression, and biological weed control using livestock.
- Permittee and BLM maintain a Cooperative Monitoring Agreement that allows permittee and BLM to mutually engage in monitoring and data analysis
- Permittee and BLM maintain monitoring methods that are easily understood, engaging, and replicable by permittee and ranch staff as well as monitoring methods that are efficient and cost effective with relevant information (i.e. photo plots, remote sensing).

[6] The permittee recognizes that a risk-of-contact analysis would need to be completed prior to any sheep grazing.

- Strategically position new range improvements that support expanded flexibility and resiliency to unfavorable conditions (water, fencing, temporary fencing).

Monitoring:

Implementation

- BLM will maintain annual actual billing records and compare the AUM classes of livestock and actual use variation over 10 years.
- Permittee will maintain actual log/journal of days feeding hay to mature cowherd and compare over 5 years.
- Permittee and BLM will update the Cooperative Monitoring Agreement annually to reflect adjustments to monitoring and maintain shared responsibilities.
- Permittee will maintain records of various business enterprises and report general activities.
- Permittee and BLM will maintain records of the cost of monitoring including "in kind" man hours on an annual basis.

Effectiveness

- Permittee and BLM will sponsor an economic Performance Assessment including 1) analysis of economic indicators and 2) recommendations to the permittee for issues to be addressed at least every 5 years.

Appendix 6: Monitoring and Adaptive Management

Monitoring and Adaptive Management is essential to the success of this outcome-based grazing proposal. This section outlines the monitoring plan, including monitoring techniques and protocols to assess implementation and effectiveness, key thresholds and responses, and the adaptive management process for integrating the above-mentioned components. This monitoring plan does not include BLM-required monitoring for other initiatives, such as AIM, which is expected to occur in parallel to this effort, but is designed to answer the question: Is the grazing management achieving the desired objectives?

Implementation Monitoring

Implementation monitoring is done to ensure that the grazing plan is being implemented as planned or the needed adjustments made are accounted for. It informs short-term decision-making within the adaptive management framework. Key questions that implementation monitoring seeks to address include:

- Did you implement the grazing plan and strategies by Grazing Planning Group and Grazing Management Condition as designed – if not, what were the changes and why?
- Did the amount of forage exceed or run short of expectations, resulting in defoliation levels different than expected?
- Did precipitation vary from expectations at the planning phase?

To answer these questions, the following data will be compiled and discussed on an annual basis:
Table of agreed-to annual target GRI scores and RDM targets (when applicable) by use area

- Grazing plan with on/off dates and non-grazing periods by use area to determine if recovery periods were met and whether the timing of grazing differed from year to year.
- Actual precipitation report along with brief description of weather, fire, and other disturbance patterns that affected the landscape and operations.
- Table of actual GRI scores and RDM (when applicable) achieved and explanation of any variance from original planning including individual scores for frequency, intensity, opportunity, and precipitation.
- Annual actual BLM billing records.
- Permittee log of days feeding hay to mature cow herd.
- Record of fuel break maintenance activities and any other stewardship activities.
- Implementation records for each vegetation management treatment such as biological, chemical, mechanical, or fire treatments.

Discussion

Grazing Response Index (GRI)

The Grazing Response Index is used both to set annual targets for grazing, as well as evaluating the implementation of the grazing at the end of the year. Each year as part of the grazing plan development, a target GRI score will be assigned by the permittee and/or the BLM for every use area. During the year, the permittee tracks actual index scores based on their observations of

conditions as livestock arrive to a Use Area and as livestock are leaving the Use Area and followed up by observing any recovery of that year's growth if cattle are moved prior to the end of the growing season. This is all based on the criteria discussed in the GRI section above. Actual precipitation report from Q2 by use area will be used to inform precipitation index. Use Area conditions should be reviewed with the BLM Range Specialist as often as feasible. Both the target GRI scores and the actual GRI scores achieved will be shared and recorded as part of annual implementation monitoring.

Residual Dry Matter (RDM)

RDM is the remaining herbaceous vegetation that remains on the landscape post growing season and/or post grazing and is measured in pounds per acre. For areas being managed for RDM under the Targeted and Prescribed Grazing EA, the Permittee and/or the BLM will measure residual dry matter before and after grazing treatment using photo series or other methods (including remote sensing). RDM will also be measured in rested use areas as needed. RDM, when collected, will be shared and recorded as part of annual implementation monitoring.

Weather, Fire, and other Disturbances

The BLM and/or Permittee will provide an actual precipitation report for the ranch as well as a brief report of the previous year's weather conditions, fire activity, and other notable disturbances (such as aroga moth outbreaks) to provide context for grazing management decisions and to inform the GRI. The precipitation estimates will be derived from "CPC US Unified Precipitation Data"[7]. The quarterly precipitation estimates will be generated by summing the precipitation within each quarter since 1948 and establishing an average quarterly amount of precipitation for each grid and quarter. A given year's precipitation will then compared to that average in inches and as a percent of the average. In addition, the precipitation for the entire ranch will be calculated by quarter and by year in order to compare the ranch wide experience against previous years.

AUM Actual Billing Records

BLM will maintain annual actual billing records and compare the AUE classes of livestock and actual use variation over 10 years. This will monitor if the permit is being implemented at planned in accordance with the stated objective of minimizing the fluctuations in AUMs.

Hay Feeding

The Permittee will maintain actual log/journal of days feeding hay to mature cowherd and compare over 5 years. One of the largest expenses on any ranch is the cost of feeding hay during the dormant season. It will be important for the permittee to maintain an abundance of hay available for extreme conditions when grass is unavailable to graze, but this alternative provides for flexibility during the dormant season to graze forage rather than feed forage. By tracking the number of days feeding hay, the Permittee and the BLM can evaluate whether the annual grazing

[7] Detailed documentation can be found at https://psl.noaa.gov/data/gridded/data.unified.daily.conus.html and the data are presented in a user-friendly interface at https://www.cpc.ncep.noaa.gov/products/Global_Monsoons/American_Monsoons/NAMS_precip_monitoring.shtml.

plan is being implemented to achieve stated economic and natural resource objectives, simultaneously.

Effectiveness Monitoring

Effectiveness monitoring is important to answer what effects management actions are having to achieve the long-term outcomes for ecological, social, and economic objectives. Effectiveness monitoring allows enough time to transpire for management strategies to be adjusted from short term monitoring feedback.

In order to evaluate the effectiveness of the management approach, the following data will be collected at specified intervals:

- Revised remotely-sensed map with the following changes quantified and briefly discussed:
    - conversion of "shrub with minimal understory" to "upland shrub with native grasses"
    - conversion of "annuals grasses with/without shrubs" to a more desirable condition
    - extent of "annuals grasses with/without shrubs" evaluating expansion or contraction
    - conversion of "seeded" to "seeded with shrubs"
    - extent of "tree" condition evaluating expansion or contraction
    - wetland extent of select riparian locations
- Photo-Plot data from all agreed-to locations, properly labeled and organized:
    - photos from each location (landscape and oblique plots)
    - estimates of foliar cover by lifeform based on grid-intercept analysis or continuous cover from photo plots.
    - other pertinent analyses of photo plot information
- Riparian monitoring information:
    - photos from each location
    - data sheets of greenline composition, greenline-to-greenline width, and other monitoring protocols as appropriate
- Residual Dry Matter (when applicable).
- Situation Assessment including 1) identification of areas of conflict should they exist, and 2) recommendations to the permittee of processes for addressing issues.
- Economic Performance Assessment including 1) analysis of economic indicators and 2) recommendations to the permittee for issues to be addressed.

Discussion

Remotely-sensed Monitoring

Remotely sensed data will be collected by the Permittee, in association with the BLM, at least every 5 years and will be used to evaluate specific upland and riparian objectives. Remotely sensed data will also be used to update key conditions for use areas, which is discussed in further detail in the adaptive management section.

At the allotment level, each grazing management group will have a baseline acreage established in 2020. When new remotely-sensed data are collected, change detection will be used to assess the overall long-term effectiveness of the grazing management for specific grazing management conditions, along with wildfire effects and additional landscape alterations or treatments that have occurred within the allotments as follows:

- Quantify the conversion of "shrub with minimal understory" to "upland shrub with native grasses".
- Quantify the conversion of "annual grasses with/without shrubs" to a more desirable condition.
- Quantify the conversion of "seeded" to "seeded with shrubs".
- Quantify the conversion of "seeded with shrubs" to "annual grasses with or without shrubs".
- Quantify the extent of "tree" condition evaluating expansion or contraction.
- Quantify the extent of new fires and detect recovery within older fires.

Remote sensing will also be used as an inexpensive monitoring tool in riparian areas for detecting expansion or contraction of "wetland extent". This monitoring can be done as often as needed, at a minimum of every five years, and will be used to help inform the permittee and/or BLM of a potential problem for earlier intervention than other processes might permit.

For selected lentic areas, remote sensing will be used to define the Potential Riparian Area (PRA). This is the fullest extent that is likely to support wetland-obligate species based on the current potential of a system. Establishing the PRA is done by delineating the PRA on ~1m Color Infrared (CIR) imagery by visually digitizing training sets, applying the training set to the entire landscape using object oriented classification techniques, and aggregating the classification to remove spurious objects. The training sets consist of polygons that span the current flood plain or maximum wetted area of the riparian area. These training samples are applied to the remaining image pixels using the "Land Cover Feature" and "Manhattan Input Representation 3*3" algorithms within the Feature Analyst software (Maxwell 2010; Booth 2012). The resulting classification result in errors of omission inside of the PRA and errors of commission outside of the PRA. We eliminate these errors by aggregating the classified polygons by 10,000 pixels. This system has been used extensively in Nevada, including on Maggie Creek Ranch and Humboldt River Ranch.

In addition, remote sensing will be used to establish the current percent of the PRA that is comprised of various functional groups, such as water, bare ground/mud/gravel, upland species, and riparian vegetation. These groups will be determined and adjusted based on the needs of the monitoring and the ability of remote sensing technology. The percent of the PRA that is riparian vegetation should be considered the "wetland extent" as it was described in collaboratively developed alternative.

For lotic systems, remote sensing will be used to establish the PRA and current vegetation percentages as described above and then further stratify these creeks into reaches with similar departure from potential. Based on this analysis, specific management objectives and actions can be defined per reach, including interventions beyond changes in grazing if needed.

The above preliminary remote sensed analysis will be completed after, and in alignment with, the BLM final grazing decision and site visits will be completed in 2021 to verify analysis and confirm objectives. Site visits and results of the remote sensed data will inform discussion of on-the-ground monitoring.

Photo-Plot and Density Monitoring

Photo plot monitoring will be conducted on at least 25 upland sites, which were stratified by combining Grazing Planning Groups and Grazing Management Conditions. These sites were determined based on two factors: 1) located in "upland shrubs with dominant native grasses" or "salt desert" Grazing Management Conditions 2) proportionately represent the Grazing Planning Groups within the allotments. This proportional verification is shown in Table 16 and includes the number of sites that will be monitored in each Grazing Disturbance Group. Field visits will be used to ensure all sites meet the criteria for Key Area selection from TR 1734-03.

Table 16. Monitoring Site per Grazing Management Group

Grazing Planning Group (Grazing Management Condition)	Acres	Percent of Total	Approximate # of Monitoring Sites	Monitoring site percent of Total
Winterfat, Greasewood, and Saline Bottom (Salt Desert)	95,491	26%	6	24%
Mountain Sagebrush (upland shrubs with dominant native grasses)	17,954	5%	2	8%
Black Sagebrush (upland shrubs with dominant native grasses)	88,481	24%	6	24%
Black Sagebrush+ (upland shrubs with dominant native grasses)	69,304	19%	5	20%
Wyoming Sagebrush (upland shrubs with dominant native grasses)	92,957	26%	6	24%
Total	**364,187**	**100%**	**25**	**100%**

The key locations that will be monitored are indicated in Appendix 1. These sites will be verified and monumented by the permittee and BLM in 2021 and monitored at least every 5 years. Baseline data for each site will be collected in 2021 with a desired time period of collection to be mid-May/end-June.

At each location, a 100-ft tape will be laid due north from the monument. Oblique pictures using a minimum of 12-megapixel digital camera of five 1-meter square frames captured at set intervals along the line using the methods described in Booth et al (2004). In addition, two landscape photos will be taken: looking north from the south end point and looking south from

the north end point. Photo frames will be further analyzed by using Grid Point Intercept (GPI) or other computer-based method of continuous cover as it becomes available. For GPI, a grid of at least 25 evenly spaced points is laid over the photo plot. For At each point, the functional vegetation group is recorded. A total of at least 125 points can thus be captured either in the field or later through desktop analysis of the photos to achieve foliar cover-by-lifeform estimates. Because this method is based on oblique imagery, it is expected that foliar cover estimates may be different than other methods which can consider multiple canopy stories. Alternatively, analysis of the captured photo frames using advanced software tools or other methods may be used at the discretion of the Permittee and the BLM. For example, these photos may be used for added training or evaluation of remotely sensed products, or plot-based continuous cover estimates.

Density of deep-rooted perennial bunch grasses will also be captured within each frame in the field. At each plot, the number of deep-rooted perennial bunch grasses will be counted and recorded. Additional qualitative observations, including evidence of recruitment, will also be recorded.

Thus, at each site, the following data will be collected at a minimum:

- 5 Oblique photos of plots.
- 2 Landscape photos.
- Estimated foliar cover x lifeform from grid points.
- Density of deep-rooted perennial bunch grasses.

These data will then inform analysis and adaptive management as discussed below.

<u>On-the-ground Riparian/Wet Meadow Monitoring</u>

To fully monitor the effectiveness of management actions on riparian and wet meadow systems, on-the-ground effectiveness monitoring will be completed at least every 5 years by the BLM and the Permittee. This includes measurements of greenline-to-greenline width, and greenline composition. In addition, restoration and infrastructure, such as fences and small rock check-dams, will be monitored and maintained.

Based on historical monitoring data, the grazing strategy in this proposed alternative, and the professional judgment of the appropriate BLM Resource Specialist(s), approximately 20% of the lentic systems and the four lotic systems will be considered Designated Monitoring Areas (DMAs) as defined by TR 1737-37 and will be subject to assessment and monitoring as a representation of the condition of the remaining systems. This does not mean the permittee and/or BLM may disregard personal observation or remote sensing indications of additional riparian areas that need additional monitoring or management. It is understood that the BLM will adapt the monitoring plan to add or exchange monitoring sites as necessary. The map of initial key sites for this alternative is shown in Appendix 1.

Greenline composition and greenline-to-greenline width measurements will be completed using the techniques described in the Multiple Indicator Monitoring (MIM) technical reference TR1737-37; Riparian AIM protocols; Stream Survey; or other methodologies approved by BLM. In addition, permanent photo plots will be established at all DMAs to create a visual record of the site. Photo monitoring may be conducted more frequently than MIM-based monitoring.

The Permittee and/or BLM will complete the baseline monitoring of selected riparian sites during the 2020 and 2021 field seasons. This baseline data will be used to update Appendix 5 and to create additional site-specific objectives and assign specific management strategies for these riparian sites if needed, as outlined above.

Residual Dry Matter

Occasionally, conditions may warrant the use of Residual Dry Matter (RDM) monitoring in order to allow for grazing under the Targeted and Prescribed Grazing of Annual Grasses EA or because use areas appear to have excessive fuel loads from long periods of rest or excessive production from abnormal precipitation. In these circumstances, RDM data will be collected by the Permittee or the BLM using one of the methods described in Great Basin Fact Sheet "Assessing Fuel Loads in Sagebrush Steppe and PJ Woodlands" during the planning phase prior to implementation of any grazing action and post grazing action to determine effectiveness.

Adaptive Management

Adaptive management for this permit exists in 3 timescales: 1) within the grazing year, 2) between grazing years, and 3) as a response to effectiveness monitoring.

Adaptive Management within the Grazing Year

The adaptive management plan is structured around two primary meetings between the BLM and Permittee each year.

Annual Planning Meeting (1 Full Day) – Target Month: February

- Review short term monitoring data for ecological, social, and economic components, including annual and 3-year average GRI scores and residual dry matter data (if applicable). If a threshold has been met, plan the appropriate response.
- Review any projects completed in the previous year.
- Review wildlife report including State and USGS analysis of the population health of sage grouse, mule deer, pronghorn, etc.
- Propose and discuss adjustments to Use Areas or Key Conditions based on new information and update appendices as appropriate.
- Propose and discuss grazing plan for upcoming year including target GRI scores for every Use Area, incorporating responses to thresholds reached, logistical concerns, limitations and possible "what if" scenarios.
- Propose and discuss any projects for upcoming year.

During the growing season:

- The permittee has the authority to meet annual target GRI scores (or higher) at his or her discretion as the grazing season unfolds. In addition, the permittee has the authority to meet GRI scores lower than the annual target at their discretion, so long as they do not jeopardize the target 3-year average. Any change in grazing that meets one of these criteria can be done without consultation of the BLM, although the Permittee will make a good-faith effort to inform the BLM of these changes in a timely manner.

Mid-year Meeting (1/2 Day) Target Month: September

- Review grazing implementation to-date and existing grazing plans
- Review residual dry matter monitoring data, if applicable.
- Propose and discuss adjustments to dormant season grazing plan based on precipitation, forage, habitat conditions, fires season, and RDM objectives (when applicable).

During the dormant season:

- The permittee has the authority to meet target GRI scores (or higher) or RDM objectives that were approved at the Mid-Year meeting (when applicable) at his or her discretion during the dormant season. Any change in grazing that maintains the agreed-upon GRI score or RDM, (when applicable) during the dormant season can be done without consultation of the BLM, although the Permittee will make a good-faith effort to inform the BLM of these changes in a timely manner. When applicable, changes in grazing that result in not meeting the desired RDM objectives, and are done for animal welfare reasons (i.e. to protect from cold, provide adequate feed, etc.) can also be made without consultation with the BLM.

Adaptive Management Between Years

The key components of adaptive management between years are responding to key variables by using thresholds and responses, and updating the guiding appendices to this permit so management strategies have a framework.

Updating Key Conditions for Use Areas

At the Use Area level, the Grazing Management Conditions can be quantified and used to further refine where specific changes might be occurring. This will be helpful in monitoring the effectiveness of targeted grazing projects or other treatments that could be implemented throughout the term of this permit. But more importantly, at the Use Area level, the Grazing Management Conditions and Key Conditions will need to be periodically updated so that objectives and strategies are relevant to changing conditions on the landscape. At a minimum, this update will occur every 5 years. However, if it any point it is estimated that any Grazing Management Condition in a Use Area has been altered by more than 30% by fire or other major disturbance, an update of the Grazing Management Condition and Key Condition appendices will be triggered.

Thresholds and Responses

Despite the best efforts of the permittee and the BLM to plan and adjust within a season, there may be situations when target GRI scores are not achieved due to extreme/unplanned conditions such as large-scale fire events which inhibit livestock movement, failures in fencing caused by external stressors, drought conditions leading to less-than-expected forage production, or above-average and well-timed precipitation leading to abundant fuel-loads, among others. Table 17 describes specific within-year thresholds and responses and Table 18 outlines specific GRI-based thresholds and responses. These should be followed according to the adaptive management process as required.

Table 17. Within-year grazing management thresholds and responses

Grazing Management Conditions	Threshold	Response
all	3-year GRI average achieved	move to new Use Area
all	inadequate feed/water (snow/drought)	movement to area with available feed/water (including private ground, when necessary)

Table 18. Grazing Management Condition Implementation Thresholds and Responses

	"1-year threshold"		"3-year threshold"		"3-year critical threshold"	
Grazing Management Condition	**Threshold**	**Response**	**Threshold**	**Response**	**Threshold**	**Response**
upland shrubs and native grasses are dominant	grazing year end GRI is below -1	mandatory full growing season rest in following year	rolling 3-year average drops below +2	mandatory full growing season rest in following year	rolling 3-year average drops below +1	mandatory full growing season rest in two subsequent years with at least one year being complete rest
upland shrubs with little understory	grazing year end GRI is below -1	mandatory full growing season rest in following year	rolling 3-year average drops below +2	mandatory full growing season rest in following year	rolling 3-year average drops below +1	mandatory full growing season rest in two subsequent years with at least one year being complete rest
seeded	grazing year end GRI is below -3	mandatory full growing season rest in	rolling 3-year average drops below 0	mandatory full growing season rest in	rolling 3-year average drops below -1	mandatory full growing season rest in two

	"1-year threshold"		"3-year threshold"		"3-year critical threshold"	
Grazing Management Condition	**Threshold**	**Response**	**Threshold**	**Response**	**Threshold**	**Response**
		following year		following year		subsequent years with at least one year being complete rest
Seeded with shrubs	grazing year end GRI is below -2	mandatory full growing season rest in following year	rolling 3-year average drops below +1	mandatory full growing season rest in following year	rolling 3-year average drops below 0	mandatory full growing season rest in two subsequent years with at least one year being complete rest
tree	grazing year end GRI is below -1	mandatory full growing season rest in following year	rolling 3-year average drops below +2	mandatory full growing season rest in following year	rolling 3-year average drops below +1	mandatory full growing season rest in two subsequent years with at least one year being complete rest
winterfat plant community is present	Grazing year end GRI is below +3	mandatory full growing season rest in two subsequent years with at least one year being	n/a	n/a	Rolling 3-year average drops to +3 or below	mandatory full growing season rest in two subsequent years with at least one year

	"1-year threshold"		"3-year threshold"		"3-year critical threshold"	
Grazing Management Condition	**Threshold**	**Response**	**Threshold**	**Response**	**Threshold**	**Response**
		complete rest				being complete rest
all conditions	heavy defoliation in dormant season grazing	mandatory complete growing season rest	n/a	n/a	n/a	n/a

As effectiveness monitoring data become available, thresholds and responses that can be utilized to adjust the management of the landscape as needed. These are described in Table 19. All responses below are contingent on a review of other factors that occurred over the period of consideration in addition to the livestock grazing management that may have affected the plant communities such as drought, aroga moth, fire, etc.

Table 19. Grazing Management Condition Effectiveness Monitoring Thresholds and Responses

Grazing Management Condition	5-year effectiveness monitoring threshold	Response
upland shrubs with dominant native grasses	On-the-ground monitoring reveals a negative trend in DRPB cover in a Grazing Planning Group.	adjust target GRI average +0.5 at the use area/all use areas under the same condition/Grazing Planning Group.
"	RDM exceeds 780 lbs/acre 3 years running	adjust target GRI average -0.5 at the use area/all use areas under the same condition
upland shrubs with little understory	5% of area from 2020 converts to less desirable state (not explained by fire or aroga moth)	adjust target GRI average +0.5 at the use area/ all use areas under the same condition
seeded	5% of area from 2020 converts to less desirable state (not explained by fire or drought)	adjust target GRI average +0.5 at the use area/all use areas under the same condition
"	0% of area from 2020 converts to seeded with shrubs	adjust target GRI average -0.5 at the use area/all use areas under the same condition

Grazing Management Condition	5-year effectiveness monitoring threshold	Response
seeded with shrubs	5% of area from 2020 converts to less desirable state (not explained by fire, drought, or aroga moth)	adjust target GRI average +0.5 at the use area/all use areas under the same condition
annuals with or without shrubs	5% of area from 2020 converts to less desirable state (not explained by fire, drought, or aroga moth)	adjust target GRI average +0.5 at the use area/all use areas under the same condition
tree	increase in total acreage of treed condition by 5%	Prioritize additional tree control actions in conjunction with O'Neil PPA
winterfat plant community is present	5% of area from 2020 converts to less desirable state (not explained by fire)	adjust target GRI average +0.5 at the use area/all use areas under the same condition
riparian/wet meadow obligates are/should be present	Riparian monitoring shows no improvement towards objectives	Re-evaluate all strategies and tools being used and formulate new riparian management plan with BLM

Temporary Non Renewable AUMs

In certain circumstances, the desire to manage fuel loads may exceed the total permitted AUMs associated with this permit. The thresholds and responses outlined in Table 20 create a process for authorizing Temporary Non Renewable (TNR) AUMs in conformance with §4130.5 of the CFRs for the purpose of reducing fuel loads. BLM and the Winecup-Gamble Ranch may also employ the Targeted and Prescribed Grazing Environmental Assessment to address conditions on the ranch described in that document to accomplish specific goals. A separate analysis and decision document would be issued if the EA is utilized.

Table 20. Adaptive Management in Response to High Fuel Loads when Permitted AUMs have been Reached

Condition	Thresholds (all must be met to trigger response)	Response
upland shrubs with dominant native grasses & seeded with shrubs	Herbaceous RDM in a use area exceeds 760 lbs per acre Permitted AUMs have been reached	Action: Authorize up to 6000 total TNR AUMs across all allotments for dormant season grazing Objective: reduce herbaceous fine fuels between 200-400 lbs/acre
Seeded	Herbaceous RDM in a use area exceeds 1250 lbs per acre	Action: Authorize up to 6000 total TNR AUMs across all

Condition	Thresholds (all must be met to trigger response)	Response
	Permitted AUMs have been reached	allotments for dormant season grazing Objective: reduce herbaceous fine fuels between 500-700 lbs/acre
Annual with/without shrubs	Herbaceous RDM exceeds 760 lbs per acre in areas with shrubs or 1,250 lbs per acre in areas without shrubs	Action: Authorize up to 6000 total TNR AUMs across all allotments for dormant season grazing. Evaluate employing Targeted and Prescribed Grazing for Annual Grasses EA provisions as an alternative. Objective: reduce herbaceous fine fuels between 200-400 or 500-700 lbs/acre depending on condition

Appendix 7: Vegetation Management Projects Using Livestock

Winecup-Gamble Ranch has proposed periodically using goats, sheep, and/or cows to implement a variety of vegetation management or manipulation projects.

Fuel Breaks

General Guidelines for Fuel Breaks (BLM 2020):

-Fuel breaks created by goats, sheep, and/or cows would be implemented following the guidelines in the targeted grazing graduated used plan and treatment objectives (Appendix D, Section D, and Appendix E) in the Fuel Breaks Programmatic EIS (BLM 2020): No greater than ½ mile from the road with targeted use in the first 250 feet from the road, ≤30% utilization in the graduated use area from 250ft to ¼ mile from the road, and ≤16% utilization in the graduated use area ¼ mile to ½ mile from the road. The following diagram portrays the extent of the fuel breaks:

¼ to ½-mile graduated use areas: ≤16% utilization
¼-mile graduated use area: ≤30% utilization
250-foot targeted grazing treatment area
Road
250-foot targeted grazing treatment area
¼-mile graduated use area: ≤30% utilization
¼ to ½-mile graduated use areas: ≤16% utilization

-The goal within the fuel breaks would not be to completely eliminate shrub and grass cover but to reduce it enough to help reduce flame height. Vegetation use in the 250' fuel breaks within different types of plant communities would be as follows:

-Annual state: Stubble height down to 2" on annual grasses

-Perennial state: Stubble height down to 6", with the exception of 8" on Great Basin wildrye

-Seeded crested wheatgrass: Stubble height down to 6"

-Shrub state: If shrub state incorporates annual grasses, reduce stubble height down to 2" on those species. If shrub state incorporates perennial grasses, reduce stubble height down to 6" on those species, with the exception of 8" on Great Basin wildrye. Shrub species would be allowed canopy cover reduction down to 10%.

-Up to 20 miles (1,212 acres) of fuel breaks would be created per year with the use of targeted grazing for the duration of the 10-year grazing permit.

-Establish biological fuel breaks along existing roads across the allotments and include the maintenance of these fuel breaks as part of the grazing plan, particularly in times when very wet

growing conditions have created excess fine fuels. These fuel breaks may be maintained using livestock or other vegetation management tools.

-Existing roadside fuel breaks would be maintained with goats, sheep, and/or cows following the same guidelines as above.

-Season of use for targeted grazing to create fuel breaks would be planned to ensure repeated grazing does not occur on perennial vegetation during the growing season and that proper rest is allowed for perennial plants that are grazed during the growing season.

-When grazing during the growing season in annual dominated communities, livestock may be moved for the remainder of the growing season once utilization guidelines are met on shrubs and/or deep-rooted perennial grass species except where targeted and/or prescribed grazing objectives are otherwise specified.

-Permittee will maintain biological fuel breaks prior to July 1, prioritizing areas that are being completely rested from non-targeted grazing such that they 1) create areas where expected flame lengths are 4-ft or less and 2) create areas that will allow for safe direct attack of a fire.

-BLM or Permittee will maintain non-biological fuel breaks (those created through mechanical or chemical means) prior to July 1, prioritizing areas that are being completely rested from non-targeted grazing such that they 1) create areas where expected flame lengths are 4-ft or less and 2) create areas that will allow for safe direct attack of a fire.

-Targeted grazing will not occur in riparian systems unless dormant season grazing is appropriate to decrease annual grass fine fuels or noxious weeds.

-Livestock numbers may fluctuate annually to achieve targeted grazing fuel reduction objectives of stubble height. Livestock grazing may be authorized through a free-use permit for these treatments.

-Temporary water, supplement and temporary fence (for cattle) locations used for targeted grazing treatments will be placed adjacent to existing roadways designated for targeted grazing fuel treatments. New tank, supplement and temporary fence locations will be identified and approved, including all archaeological or other inventories, within identified fuel breaks first in already-disturbed areas, then in areas where a field inventory shows the vegetation is dominated by annual grasses with no noxious weed infestations within at least 0.25 miles. Water and supplement shall be removed within 2 days of treatment completion.

-Targeted grazing areas should connect across the landscape, as appropriate to have the maximum likelihood of minimizing wildfire spread.

-Targeted grazing areas would not receive rest as a potential treatment unless evidence of ecological degradation (i.e., accelerated soil erosion or spread of noxious weeds) is noted, in which case treatment will be suspended until the issue is resolved.

-Targeted grazing using yearlings or cow/calf pairs, goats, and/or sheep may be used to maintain established fuel breaks and greenstrips.

-Greenstrips (areas seeded to non-native species such as crested wheatgrass or forage kochia) may be maintained as greenstrips using targeted grazing.

-Fuel breaks created or maintained with targeted grazing with goats, sheep, and/or cows will be included in the monitoring plan for the grazing permit.

Utah Juniper Treatments

Any Utah juniper treatment units will be evaluated to determine the most appropriate treatment method and resource protection measures based on slope, aspect, terrain, soil, vegetation composition and condition, amount of biomass to be removed, overall access on site, visual disturbance, and proximity to roads. Juniper Control projects would not overlap with or be extensions of any projects proposed or implemented through the O'Neil Project Planning Area Vegetation Treatment project. Proposed treatment methods include:

-Grazing: Junipers would be removed by goats, which can eat woody plant material. Because of the limitations of goats, grazing would be limited to early phase 1 juniper sites. Goats would be managed for precision and intensity of desired impact and herded 24-hours a day. Breed and class selection would also be used for effectiveness in the prescription application.

-Mastication: Junipers would be removed by mechanical equipment, which grinds up woody plant material. Due to mechanical limitations of the equipment, mastication would typically be limited to areas with less than 30 percent slope. Juniper would be shredded with an attachment mounted on machinery such as front-end loaders, tractors, excavators, or skidders. The machinery may have rubber tires, rubber tracks or metal tracks. Juniper stump height would be less than six inches and debris would be scattered within the area.

-Hand Cutting: Hand cutting treatments would include lop/scatter or piling. The treatment would be conducted by personnel on foot using chainsaws. Stump height would be less than six inches and debris would be approximately four feet or less in length. Lop/scatter may not occur in higher density juniper sites (e.g., Phase 2 & 3).

-Pile Burning: Pile burning would manage surface fuel loading. The treatment includes the burning of hand-constructed piles of cut juniper. Piles are typically no larger than six feet tall and six feet in diameter and piles are scattered within a treatment area. Burning would be conducted under a burn plan with the objective of greater than 80 percent consumption. Piles would be burned in the late fall, winter, and spring under proper fuel moisture conditions.

-Seeding: Seeding using native seeds is required based on availability, adaptation, and probability of success. Non-native species may be used as outlined in ARMPA and when one or more of the following criteria are met: 1) to support sage-grouse habitat objectives; 2) to increase probability of success; 3) when adapted seed availability is low; or 4) to compete with invasive species on harsher sites. Seed would be aerially applied prior to mechanical treatments.

Noxious Weed Control

Permittee will use goats or sheep for weed control to target areas with knapweed, thistle, and leafy spurge. While not a noxious weed, larkspur would also be targeted. Monitoring and area needs will be identified and timed during the annual grazing planning process to consume noxious and poisonous weeds prior to cattle grazing or in areas being rested from cattle grazing. Biological weed control programs will aim towards maximizing impact on target weed species and minimize non-target impacts on desirable/native plant species. The objective of controlling annual and biennial weeds is to time grazing to prevent flowering and reduce weed seed bank, while the objective for perennial weed species is to prevent seed production and reduce above ground biomass with the intent to impact below ground biomass reserves (ASI 2006).

For biological weed control programs a strategy including, but not limited to: type of livestock, weed control location, target weed species, intended duration of treatment, and treatment goal will be identified and communicated between BLM and the permittee during the annual planning process.

In use areas/pastures that have both weed infested and relatively weed-free areas, control timing of animal movement from infested to non-infested areas and prevent movement from infested to non-infested areas after weed seed set.

After weed control is completed, livestock will be penned for 2-4 days (actual duration will depend on the animal) until weed seeds have passed through digestive tracts before moving livestock to relatively weed-free areas.

Monitoring (appropriate to target weed species and management objectives) completed before and after treatment and in conjunction with plant community monitoring such as remote sensing and precipitation data (Appendix 5) will be needed.

Table 21. Guidelines for prescribed grazing according to noxious weed and non-native invasive plant species.

Common Name	Typical Growth Form	Seed Viability (years)*	Approximate Timing/Growth Stage for Treatment**	Number of Treatments per Year**	Number of Treatment Years**	Grazing Objective**
Bull thistle	Biennial	1 - 3+	Not described in Davidson et al 2006, but comparable to other biennial thistle species.	Not described in Davidson et al 2006, but comparable to other biennial thistle species.	Not described in Davidson et al 2006, but comparable to other biennial thistle species.	Not described in Davidson et al 2006, but comparable to other biennial thistle species.
Scotch thistle	Biennial	7 - 39	Seedling (rosette) to vegetative stages.	No information specifically for Scotch, but recommendations for musk thistle (biennial) indicates grazing only once may be adequate if done in the bud/flowering stage, but more grazing may be needed if plants re-grow.	Consecutive, multiple years.	"Graze to achieve heavy to severe utilization."
Canada thistle	Perennial, Creeping Roots	20	Seedling through vegetative stages (goats all stages).	"Graze often enough to prevent flowering."	Grazing treatment should be repeated annually for at least 3 years.	"Begin grazing in spring when rosettes start to sprout. Remove animals when grazing shifts to desirable species, then graze new sprouts. Graze often enough to prevent flowering."
Russian knapweed	Perennial, Creeping Roots	2 - 3	Early vegetative stage to flowering stages.	"Graze 3 times per season. Allow Russian knapweed to re-grow 8-10	Consecutive, multiple years.	"Graze 80% or more of the plant, but do not exceed 50%

Common Name	Typical Growth Form	Seed Viability (years)*	Approximate Timing/Growth Stage for Treatment**	Number of Treatments per Year**	Number of Treatment Years**	Grazing Objective**
				inches between treatments but do not allow flowering to occur."		utilization of desirable species."
Spotted Knapweed	Biennial	8	All growth stages, but before flowering is most effective.	"Three grazing treatments per year, during rosette to bolting and then re-growth is the preferred treatment. Grazing only once, heavily during vegetative to flowering stages may also be effective."	Minimum of 3 years of treatment is recommended.	"Prevent seed production for several years to reduce populations, while not impacting desirable plants."
Diffuse knapweed	Biennial	2 - 5 (likely)	Seedling to flowering stage.	"A minimum of two grazing periods is necessary to prevent seed head formation."	Minimum of 3 years is needed to reduce populations.	"Graze heavily at least twice each year to prevent flowering and over several years to reduce plant populations."
Leafy spurge	Perennial, Creeping Roots	8+	Vegetative to flowering stages.	Use continuous grazing throughout growing season for a leafy spurge monoculture; use rotational grazing and graze leafy spurge at least twice per season when desirable species are present.	4-5 years minimum.	"Remove 95% of top growth and graze re-growth to prevent flowering and seed production."

*Source: DiTomaso, J.M., G.B. Keyser et al. 2013 Weed Control in Natural Areas of the Western United States. Weed Research and Information Center, University of California. 544pp.
**Source: Davidson, J.C., Smith, E., and Wilson, L.M. 2006. Livestock Grazing Guidelines for Controlling Noxious Weeds in the Western United States. Western Region Sustainable Agriculture, Research, and Education Project. EB-06-05. 85pp.

Other

-Target graze with goats Shrub State areas to reduce shrub canopy cover.

-Through targeted grazing, use goats to reduce the amount of litter and seed bank in annual conditions. Graze these areas during dormant season to avoid any overuse of perennial grass or forb growth.

The following would be applicable to all of the above projects.

1. Prior to implementation BLM and the permittee will collect baseline monitoring data, develop treatment objectives, and develop a monitoring plan tailored to the treatment.

2. Fuel Break and Phase 1 Juniper Control projects would not overlap with or be extensions of any projects proposed or implemented through the O'Neil Project Planning Area Vegetation Treatment project.

3. Any use of livestock to accomplish these treatments would be authorized through a Free Use Grazing Permit, which would be implemented through a separate grazing decision issued prior to treatment. The decision would define appropriate terms and conditions for such grazing use.

4. In accordance with MD LG 20 and MD LG 22 of the Nevada and Northeastern California Greater Sage-Grouse Record of Decision and Approved Resource Plan Amendment, all treated areas in Priority and General Habitat Management Areas would be rested from livestock grazing until treatment objectives have been met. Any temporary AUM suspensions associated with these projects will be implemented through grazing decisions prior to treatment. Monitoring of treated areas will continue annually for five years following the end of any grazing closures.

5. Develop a bighorn/domestic separation response plan in cooperation with WGR, NDOW, and other affected entities (BLM Manual 1730).

6. Consider the Management Practices for BLM and the Permittee/Lessee as described in BLM Manual 1730, most of which include techniques to identify and implement effective separation measures to minimize the risk of contact between domestic sheep/goats and wild sheep (including use of the Risk Of Contact tool).

7. No goat or sheep grazing would be authorized within 500m (pollinator buffer; USFWS 2015) of Dry Canyon or anywhere north of Dry Canyon within the West Delano Mountain pasture to avoid potential trampling/foraging impacts on extant populations of Goose Creek milkvetch (*Astragalus anserinus*) and other key species within the pollinator buffer.

Appendix 8: Range Improvement Project Stipulations

Winecup Gamble Ranch and BLM/NDOW personnel have proposed a number of range improvement projects on the HD, Gamble Individual, and Pilot Valley allotments. Projects being proposed are itemized in Appendix 2 and include water developments (wells, troughs, pipelines, spring developments) drift fences, spring protections, and livestock traps.

General

• Cross-country travel will be minimized as much as possible.
• Parking and staging of vehicles and equipment will avoid sagebrush and noxious weed infestations.
• Construction activities would be conducted in a manner that would minimize disturbance to soils and existing vegetation.
• Restoration (i.e. reseeding/contouring) requirements will be evaluated pre project planning and implemented post construction.
• During project planning water troughs and fence lines would be reviewed to avoid riparian areas and wetlands by 330 ft.
• Water troughs would accommodate wildlife to include large and small, as well as antlered.
• Water developments (wells, new troughs, ponds, etc.) would require change applications and approval with the Nevada Water Rights Division prior to implementation.
• Gates left open when livestock aren't in the pasture.
• Construction of livestock wells would be completed consistent with the rules of the State Engineer.
• If water well were drilled and resulted in failure to find water, it would be abandoned per state standards.
• Water well would be fenced with post and poles or metal panels.
• Generator Pump, Pump jack with engine, solar pump with solar panels or windmills would be allowed.
• No new road construction would be allowed.
• Offloading of materials and supplies would be conducted on existing roadways.
• Vehicular use along the pipeline route associated with routine maintenance may occur.
• Prior to on-site arrival, vehicles and equipment (including cab floors) would be washed and free of any noxious weed material. Compressed air for dry or loose plant material and/or a high-pressure wash for caked on mud or debris may be necessary.
• The permittee would inspect the pipeline and trough system annually for new noxious weed infestations and coordinate with the BLM to address them.• If material with the potential for carrying noxious weed seed or propagules is brought on site for the purpose of range improvement construction or maintenance (i.e. gravel, straw, forage, mulch), it must be certified weed free according to Nevada Department of Agriculture (NDA) and North American Invasive Species Management Association Standards (NAISMA).
• All trash and excess materials would be removed from the project site, and disposed of within 10 days of construction completion.

• Construction of all projects will be within the construction windows identified in the Greater Sage Grouse Approved Resource Management Plan Amendment depending on mapped seasonal sage grouse habitat present in the project area. Any other stipulations from the ARMPA not covered above or below will also apply to projects constructed in Greater Sage-Grouse habitat.

Livestock Fencing

• Fence construction would be built to BLM wildlife friendly specifications (BLM Handbook H-1741-1), and include white-topped steel posts and flight diverters where needed for improved visibility to reduce sage grouse collisions with the fence.
• Fencing would be three-strand (18, 10, 12 inch spacing) wildlife friendly fence.
• Areas expected to receive higher livestock pressure (300' from corners, traps, etc) would be constructed of four-strand, wildlife friendly fence: four-strand (18, 6, 6, 10 inch spacing starting from bottom)
• All bottom wires would be smooth.
• Domed pipe caps would be used on vertical fence braces and a strand of barbed wire would also be placed over horizontal pipe braces to act as an anti-perch barrier to avian predators.
• Spring enclosures would use NDOW approved 3 metal rail design and materials.

Water Collection Systems

• Water collection systems (surface wells) would be built in accordance with BLM Handbook H-1741-2.
• An excavator/backhoe (excavator) along with some shovel and hand work would be used to install the water collection system, trench and bury pipelines.
• An excavator would dig a hole about three to four feet wide and three to four feet deep at the lower end of the water source.
• Ground disturbance during installation of water collection systems would be kept to less than 1 acre per site.
• The size of the metal water box (section of culvert pipe) would be two to three feet in diameter and three to four feet long.
• The water box would be set vertically into the hole with filter fabric placed under and around the outside of the box to filter out soil and vegetative particles that might otherwise clog the water inlet ports or fill-in the water collection box.
• The water box would have an on/off valve installed inside which, would be connected to the outflow pipe to control the flow of water from the water box into the pipeline.
• A metal lid would be placed on top of the water box to prevent small animals from getting in the box where they could drown and possibly plug the pipeline.
• The top lid would also prevent soil and vegetative matter from falling into the water box and possibly plugging or reducing the flow of water in the pipeline.
• Native reseeding of the disturbed area would be completed after construction of the collection system.
• Noxious weed and non-native plant species would be controlled using integrated weed management techniques.

Pipelines

• Pipelines would be reconstructed using high-density polyethylene (HDPE) pipe.
• A bulldozer with a ripper/vibrator attachment, which results in minimal disturbance, would be used to open the pipeline trench and install the pipeline.
• The disturbance would be up to three feet deep and up to two feet wide.
• An excavator could be used to install pipelines with distances of less than 300'; the trench would be up to three feet deep and up to two feet wide.
• At the completion of the trenching, the dozer may use one of the tracks to compress the soil back around the pipeline and smooth where soil was lifted.
• Most pipelines are planned to be built within or adjacent to existing roads.
• For pipelines that do not have an existing road route, they will follow the most probable route that minimizes impact, erosion potential and avoids any cultural findings as determined by the BLM.
• Upon completion of the pipeline installation, any parts of the pipeline routes not within or directly adjacent to the road prism would be reseeded with a native seed mixture.
• Noxious weed and non-native plant species would be controlled using integrated weed management techniques.
• Pipeline systems will be turned-off and drained after livestock leave the area to reduce the potential for freeze damage.
• No blading, grading, or scalping of the pipeline route will be allowed.
• No roads will be constructed and off road travel would be limited.

Water Troughs

• Water troughs would be installed with the top edge no higher than 20" from the ground.
• All troughs would be equipped with small animal escape ladders and float valves or overflow features to prevent puddling around the troughs.
• Valves would be installed to direct water to individual troughs and tanks.
• Temporary storage tanks equipped with troughs that would be emplaced while the pipeline is active and moved elsewhere are allowed. Any such storage tanks would be required to have anti-perch devices.
• Noxious weed and non-native plant species would be controlled using integrated weed management techniques.

Enhanced Wetland Ponds "tom ponds"

The following techniques would be used to build enhanced wetlands in areas that are remote but where water for livestock and wildlife are important. These techniques have been developed by Thomas R. Biebighauser, who has built over 2,500-wetlands across North America since 1979: Wetlands would be built to contain shallow, open water to provide habitat for a diversity of native animals and plants. Each wetland would be designed to contain features that would increase the likelihood of their use by rare species of bats, frogs, toads, and turtles. The wetlands would appear and function as natural ecosystems requiring little, or no maintenance.
• No dams would be built. Dams require maintenance, and restrict aquatic organism passage.

• No perennial, intermittent, or ephemeral drainages would be blocked or diverted.
• Inlet and outlets (spillways) would be protected from erosion using plants and rock
• The wetlands would be supplied with water naturally, without the use of pipes, pumps, water control structures, or diversions.
• Wetland would be built to be deepest in the center, with gradual slopes, depressions, pits, and mounds.
• A core trench would be dug along the lower two-thirds perimeter of each wetland being built. The core trench would be based on an impermeable layer of rock or clay. The core trench would be filled with soil that is high in clay, with each layer being compacted.
• Native plants species would be used to vegetate exposed soils.
• Noxious weed and non-native plant species would be controlled using integrated weed management techniques.
• The wetlands would be built so that they do not impact archeological resources.
• The wetlands would be built so that they do not impact Federally listed species.

Surveys/Clearances

• In PHMA, in coordination with the appropriate State of Nevada agency, seasonal restrictions would be applied during the period specified below to manage discretionary anthropogenic disturbances and uses on public lands to prevent disturbances to GRSG populations and habitat during seasonal life cycle periods as follows:
• In breeding habitat (leks), March 1 – May 15.
• In nesting/early brood-rearing habitat from April 1 – June 30.
• In late brood-rearing habitat from June 15 – September 15.
• In winter habitat from November 1 – February 28.
Specific time and determinations will be based on site-specific conditions and may be modified due to documented local variations (e.g., higher/lower elevations) or annual climatic fluctuations (e.g. early late spring and long and/or heavy winter) in order to better protect GRSG, in coordination with the appropriate State of Nevada agency.
• Proposed projects within mule deer winter habitat should avoid construction Dec 1 – Apr 30.
• Proposed projects within pronghorn habitat should avoid construction during fawning May 1 – Jun 30.
• Range Improvement Project construction within one mile of greater sage-grouse leks will not occur during the period of February 15 through May 15.
• An intensive/pedestrian Class III inventory would be conducted prior to all potentially ground disturbing range improvement projects. The purpose of these inventories would be to locate and record all cultural resources within the project area. An evaluation of significance or eligibility to the National Register of Historic Places would occur at each site. If a significant site(s) is located within the project area, the project would be redesigned to avoid an adverse effect to the site. If avoidance of a significant site is not feasible, the Range Improvement Project would be discontinued, or other mitigation measures would be conducted to prevent or minimize the effects to this site.
• Cultural resources will be managed in accordance with Section 106 of the National Historic Preservation Act (NHPA) and implementing regulations 36 CFR 800. Given the

scope of these projects, compliance would be accomplished in phases. A Class III inventory would be conducted to identify and evaluate cultural resources for National Register of Historic Places (NRHP) eligibility and on determination of effect. Proposed pipelines, water locations and fence line locations are flexible and would be adjusted to avoid historic properties..

• The Wells FO Archaeologist would work closely with Range Staff to place new improvements well outside of site boundaries. This would ensure that no cultural resources are affected by construction and that there are no impacts from livestock congregation around water sources. Sites identified and determined to be eligible for the NRHP through consultation with the State Historic Preservation Officer (SHPO) along the proposed pipelines and waters would be avoided, resulting in the determination of No Effect to cultural resources. However, maintenance of existing line within historic properties would be restricted to the disturbed area, resulting in a determination of No Adverse Effect.

• Any cultural (historic/prehistoric site or object) or paleontological resources (fossil remains of plants or animals) discovered within the project area would immediately be reported to the Wells Field Office Manager or his designee. All operations in the immediate area of the discovery should be suspended until authorization to proceed is issued. An evaluation of the discovery shall be made by a qualified archaeologist or paleontologist to determine appropriate actions to prevent the loss of significant cultural or scientifically important paleontological values.

• Although unlikely, if human remains or associated funerary objects subject to the Native American Graves Protection and Repatriation Act (NAGPRA) are discovered, work would cease in the immediate area, the BLM archeologist would be notified and the BLM would comply with applicable provisions of NAGPRA. Work may continue in sites/areas not associated with the location of the human remains, objects or associated site.

• Pre and post construction noxious weed surveys would be completed prior to project implementation. If any noxious weeds are found during the survey they will be treated or avoided to eliminate the spread by the permittee.

• Equipment exposed to noxious weed seeds during construction would be cleaned (power washed and/or compressed air) to avoid weed spread. The designated cleaning area would be GPSed (coordinates shared with Elko District BLM) and monitored a minimum of 3 years post-implementation. Monitoring for presence of weeds would become part of routine range improvement project inspections thereafter.

Appendix 9. Visual Resource Management (VRM)

Visual Resource Management (VRM)- Proposed action and alternatives would have minimal direct impacts, such as the installation of fences and the movement of livestock. These impacts however would be short term and would also be consistent with the current VRM Class II, III and IV designations at these locations. Range facilities such as fences tend to be a translucent grey in color and blend favorably with grey and grey-green settings. Range improvements should follow VRM standard environmental colors chart in order to mask range improvements.

Table 22. Features and Visual Resource Inventory Class

Trail	Approximate Miles	Visual Resource Inventory Class	Allotment
Hastings Cut-Off	4.27	II	HD
Hastings Cut-Off	6.6	III	HD
Hastings Cut-Off	21.9	IV	HD
California Trail	3.2	III	Gamble Individual
California Trail	9.4	IV	Gamble Individual

Objectives for Visual Resource Classes for these features are as follows:

Class I Objective- The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

Class II Objective- The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class III Objective- The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Class IV Objectives- The objective of this class is to provide for management activities which require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

Range improvements must use the BLM's VRM Standard Environmental Colors Chart.

Appendix 10: LHA Public Comments and Responses

BLM received a total of four comment letters during the four-week review period following the release of the Draft Land Health Assessment.

State of Nevada Division of Water Resources dated 2 July 2020

Comments:

- Proposal supported as written.
- General Agency Comments: All Nevada water laws must receive full compliance; All water used on a project must be permitted by the State Engineer's Office; All waters of the State belong to the public and may be appropriated for beneficial use pursuant to the provisions of Nevada Revised Statutes (NRS) Chapters 533 and 534 and not otherwise; The State Engineer must permit all water used on the described project; Water diversions from any surface source must comply with the permitting provisions of Nevada Revised Statutes (NRS) Chapter 533; Water diversions from any underground source must comply with permitting provisions of NRS 533 and 534.

Agency Response: Comment noted. Thank you for your participation in this public process. All water projects included in this project will fully comply with Nevada state water laws.

State of Nevada Division of Environmental Protection dated 14 July 2020

Comment: *No comment on this project.*

Agency Response: Comment noted. Thank you for your participation in this public process.

Elko County dated 17 July 2020

Comment: ***Introduction***

Elko County is a county in northeastern Nevada. Nearly 73% of Elko County is owned and administered by Federal Agencies. The land managed by the US Forest Service is on the Humboldt-Toiyabe National Forest, and the rest is managed by the Bureau of Land Management or by local tribes. Elko County's economy is heavily dependent on extractive industries, as well as livestock grazing and outdoor recreation. It is Elko County's position that, as the managing agency, the BLM has the responsibility to pursue outcome-based grazing programs like this to reduce fire danger and increase rangeland health on federal lands in Elko County.

Professor Emeritus Wayne Burkhardt wrote that "Rangelands and herbivory coevolved as part of a natural system. Grazing is a fundamental biologic process and is the basis of the food chain. Grass evolved to be eaten. It is a renewable resource, grows from sunlight and water and needs to be harvested just like a lawn needs to be mowed." As a county with an economy that depends on livestock grazing, Elko County welcomes the implementation of outcomes-based

grazing treatments to control invasive annual grasses and reduce the impact of wildland fires. During the period from 2009 to date approximately 1,537,132 acres of land in Elko County have burned. In the 2018 wildfire season wildfire cost the BLM alone $24 million dollars to contain. This current system is unsustainable both from an ecological and fiscal perspective. Elko County supports the development of an outcomes-based grazing program to both reduce the danger of wildfire, as well as increase the health of federally-managed rangelands. Invasive annual grasses, fire prevention, and protection of wildlife resources are priorities for Elko County, and we appreciate the opportunity to offer this scoping comment.

Agency Response: Comment noted. Thank you for your participation in this public process.

Comment: ***Outcome-Based Grazing and Wildland Fire***

The proposed project area is in a remote corner of Northeastern Nevada. Despite the rural nature of this area, there are small, rural communities nearby that are in danger from wildfire. Most damage caused by wildfire occurs in the Wildland Urban Interface.[8] *Available studies show that "Animals are most effective at treating smaller-sized live fuels and 1- and 10-hour fuels…" and can help disrupt the fuel ladder to keep flames lengths down.*[9] *Livestock have proven useful in decreasing the amount of fine fuels in areas of moderate grazing. Fine fuels are "[f]ast-drying fuels… which are less than 1/4-inch in diameter and have a timelag of one hour or less."*[10] *These fuels play a large role in fire management because they "…readily ignite and are rapidly consumed by fire when dry."*[11] *Moderate, long-term grazing has been found to decrease the probability of severe, catastrophic wildfires."*[12] *Part of this is because "[t]otal fine fuel accumulations were twofold higher in nongrazed compared to grazed treatments."*[13]

Grazing is a favorable option not only in rural areas, where livestock is plentiful, but also "is often a favorable option in the wildland urban interface where homeowners are particularly concerned about fire risk. In these situations, people have heightened concern over herbicide use, are often intolerant of the noise and disturbance caused by mechanical options, and do not find prescribed fire an acceptable alternative so close to their homes."[14]

Based on these considerations, Elko County recommends that the draft environmental assessment examine what the effect of the proposed action on the wildland urban interface will be, especially as compared to other vegetation removal methods like spraying, mechanical removal, and prescribed burning. Particularly, it should examine the effect on the wildland

[8] Radeloff, Volker C.; Helmers, David P.; Kramer, H. Anu; Mockrin, Miranda H.; Alexandre, Patricia M.; Bar-Massada, Avi; Butsic, Van; Hawbaker, Todd J.; Martinuzzi, Sebastián; Syphard, Alexandra D.; Stewart, Susan I. 2018. Rapid growth of the US wildland-urban interface raises wildfire risk. Proceedings of the National Academy of Sciences. 115(13): 3314-3319. https://doi.org/10.1073/pnas.1718850115.

[9] S., R., P., M., & Nader, G. (2007). Planned Herbivory in the Management of Wildfire Fuels. *Rangelands*.

[10] USDA Forest Service, Fire Terminology, https://www.fs.fed.us/nwacfire/home/terminology.html#F

[11] *Id*.

[12] Davies, Kirk & Bates, Jonathan & Svejcar, Tony & S. Boyd, Chad. (2010). Effects of Long-Term Livestock Grazing on Fuel Characteristics in Rangelands: An Example From the Sagebrush Steppe. Rangeland Ecology & Management. 63. 662-669. 10.2307/40961076.

[13] *Id*.

[14] Taylor, C. A., Jr. (2006). CHAPTER 12: Targeted Grazing to Manage Fire Risk. In *TARGETED GRAZING: A natural approach to vegetation management and landscape enhancement* (pp. 107-114). Denver, CO: American Sheep Industry Association.

urban interface on remote, rural communities in eastern Elko County with few or no nearby fire protection crews or apparatus.

Agency Response: The proposed action includes the possibility of using livestock to create or maintain fuel breaks. BLM also has available the Targeted and Prescribed Grazing Environmental Assessment, which is a separate process and analysis from this project though its provisions could be used in applicable situations on the Winecup-Gamble Ranch. BLM does note the large amount of private lands around rural communities that are not owned by the ranch will complicate any efforts to implement fuel breaks or fuel reduction treatments in the Wildland-Urban interface.

Comment: ***Invasive Annual Grasses***

It is necessary that grazing treatments be timed so the livestock will have the greatest impact on those grasses. Since at least the 1940s, it has been recognized that cheatgrass has better nutritional value to cattle during the spring, gaining up to twice as much as cattle grazed on cheatgrass during the summer and fall.[15] *Fall treatments, when the grass is germinating, have the potential to remove as much as 80% of cheatgrass.*[16] *Flexibility is key to developing plans to manage these kinds of invasive annuals with livestock, because "[p]rescription grazing for weed control requires grazing when the weed is most palatable to livestock and most susceptible to defoliation."*[17] *The West has an established history of fluctuating rainfall cycles*[18]*, which naturally will result in fluctuating growing seasons.*

Because of the fluctuating nature of rainfall cycles, which changes the growing season of invasive annual grasses, it is proper and necessary for grazing treatments to take place outside the normal bounds of a ten year grazing permit, and firm dates and head counts should not be placed on these treatments until the permittee and range cons have had a chance to develop a plan. Based on the above information, Elko County recommends that the BLM examine the proposed project's projected impact on invasive annual grasses, as well as the requirement that these treatments take place outside the normal ten year permit. Additionally, Elko County recommends that the agency examine whether returning suspended AUMs to permittees would increase flexibility. Finally, Elko County also recommends that the agencies examine the effect this program will have on fire danger if it was expanded to include reducing fine fuels left by ungrazed perennial grasses as well.

Agency Response: BLM recognizes the continually emerging science on annual invasive grasses, and especially the research conducted in central Nevada on fall grazing. While cheatgrass has nutritional value in the spring, the basic problems with trying to graze it during

[15] Murray, R.B. and J.O. Klemmedson. 1968. Cheatgrass range in southern Idaho: Seasonal cattle gains and grazing capacities. Journal of Range Management 21:308-312.
[16] Foster, et. al. 2015. *Reducing Cheatgrass Fuel Loads Using Fall Cattle Grazing.* University of Nevada Cooperative Extension.
[17] Frost, R.A. and K.L. Launchbaugh. 2003. Prescription Grazing for Rangeland Weed Management - A New Look at an Old Tool. Rangelands 25: 43-47.
[18] Herweijer, C., R. Seager, E. R. Cook, and J. Emile-Geay, 2007: North American droughts of the last millennium from a gridded network of tree-ring data. *J. Climate*, 20, 1353–1376.

that time of year continue to be avoiding excessive use on native bunchgrass plants during the most critical time of their annual life cycle in places where they are intermixed with annuals, as is common on the Winecup-Gamble Ranch Allotments, and in finding enough animals that can be moved rapidly enough to make use of cheatgrass during the often narrow window between when that plant grows and when native bunchgrasses start their growth. Northeastern Nevada has experienced several recent years where cold spring conditions have actually resulted in cheatgrass being phenologically behind native bunchgrasses, which would impair the ability to control cheatgrass through spring grazing. In regards to native bunchgrasses BLM does have to consider the lateral screening cover for Greater sage-grouse nests and other wildlife habitat values it provides.

The proposed action does include the use of Temporary Non-Renewable AUMs to reduce fuel loadings when they exceed identified thresholds. BLM also has available the Targeted and Prescribed Grazing Environmental Assessment that could be employed in the annual grass dominated situations analyzed in that document.

Comment: *Rangeland Health*

As a county that relies both on livestock grazing and outdoor tourism as economic drivers, a key concern of Elko County is the health of the rangeland both for livestock and for wildlife. Great Basin rangelands are unique, both in their soils and vegetation.[19] Elko County recommends that the agency examine the possible impacts to rangeland health, as well as the possible impacts to wildlife in the area.

Agency Response: This has been addressed in this EA document.

Comment: *Outcomes-Based Grazing and the Human Environment*

40 CFR § 1508.14 requires analysis of the economic and social effects of an action on an area. Elko County relies partly on livestock grazing as an economic driver. The proposed project, would increase the amount of available forage to local producers, as well as protect against loss of forage and the ensuing suspension of permits due to wildfire. Based on this, Elko County recommends that the agency examines the economic and social effects of the proposed grazing plan.

Agency Response: This has been addressed in this EA. Also, the purpose of these pilot projects is to analyze the underlying concepts behind Outcome Based Grazing Authorizations and to define how they could be effectively employed on other allotments.

<u>Western Watersheds Project dated 17 July 2020</u>

[19] De Soyza, A. G. (2000). Indicators of Great Basin rangeland health. *Journal of Arid Environments, 45*, 289-304.

Comment: *Thank you for the opportunity to submit scoping comments for these allotments. Please accept the following comments on behalf of Western Watersheds Project. We will continue to follow this project and look forward to providing more input once BLM proposes an action and alternatives*.

Agency Response: Comment noted. Thank you for your participation in this public process.

Comment: *Targeted and Prescribed grazing*

WWP is opposed to the use of "targeted" or "prescribed" grazing as a means to try to address invasive annual grasses, although we do believe that the term grazing permit renewal process is the appropriate place to consider it, and analyze its potential impacts. Our comments on the Nevada State BLM Office's targeted grazing proposal are attached and incorporated here.

Agency Response: The Targeted and Prescribed Grazing EA analyzes potential use of livestock grazing to control cheatgrass in a narrow range of conditions and requires baseline conditions, treatment objectives, and a monitoring plan to be in place prior to treatments. The Wells Field Office regards this as a tool that can be employed on these allotments as part of the Outcome Based process, but any such use of Targeted or Prescribed grazing of annual grasses will be conducted under the provisions of that EA.

Comment: *Outcome based grazing*

WWP is opposed to the concept of outcome based grazing to the extent that it allows undefined numbers of livestock and seasons of use, and/or qualitative or poorly defined desired outcomes. BLM's job is to prescribe grazing management on public lands, and allowing vague outcomes and variable management in lieu of clearly defined and enforceable permit terms and conditions violates FLPMA.

Agency Response: BLM grazing regulations and the underlying laws prescribe that BLM grazing permits must contain livestock numbers and seasons of use as mandatory terms and conditions on any grazing permit. The approach to Outcome Based Grazing analyzed in this project affords maximum operational flexibility to the permittee but with well defined objectives/outcomes and a robust monitoring plan that will measure observed conditions against the objectives through time along with provisions to adjusting grazing use on an annual basis as a result of monitoring.

Comment: *General comments on the rangeland health assessment and evaluation*.

Overall, the LHA is well written and reasonably detailed, but we have some concerns.

What is the authority and basis for making a finding that an applicable rangeland health standard is "partially" met for a given allotment or pasture? If it is only partially met, then it is also partially failing to meet, and therefore the standard should be found not to be attained.

Agency Response: The definition of "Evaluation" in the BLM Handbook H-4180-1 "Rangeland Health Standards" reads "*An evaluation is conducted to arrive at 2 outcomes. Firstly, an evaluation conducts an analysis and interpretation of the findings resulting from the assessment, relative to land health standards, to evaluate* ***the degree of achievement of land health standards*** (emphasis added). Taken at face value, this allows for resulting determinations to fall on a spectrum somewhere between fully met and fully not met, which this document has done. You are correct that a "partially met" standard does indicate areas that are not fully meeting the standards, and where BLM made a "partially met" draft determination in this Land Health Assessment document the agency identified where and why the non-attainment occurred and presented causal factor conclusions.

Comment: *We disagree with some of the methodology and assumptions employed in the rangeland health assessment because for some sites, BLM's approach seems to lower the bar on ecological potential, allowing for acceptance of continually higher levels of degradation as site potential decreases. We think BLM should use the original site potential as the metric for land health.*

Agency Response: BLM specifically addressed this point in the Introduction section and in the first several pages of the Draft Determinations sections of the Draft Land Health Assessment document. Of particular note are the two provided definitions on Site Potential from the 4180 Handbook (*The highest ecological status a site can attain given no social or economic constraints*) and Version 4 of the Interpreting Indicators for Rangeland Health Technical Reference (*The biotic community that would become established on an ecological site if all successional sequences were completed without inferences by man under the present environmental conditions. Natural disturbances are inherent in its development. This PNC may include acclimated or naturalized nonnative species*). BLM used the definition from the 4180 Handbook in the Land Health Assessment, which is a higher bar than the Interpreting Indicators for Rangeland Health Technical Reference.

The next question then relates to applying site potential, and as stated in the LHA the best available tool is the State and Transition modeling. As per Patti Novak-Echenique, who in her former role in the Natural Resource Conservation Service was instrumental in developing the models for Nevada ecological sites, all of the transition pathways between states are based on what she and the other developers observed in the field. There are no identified restoration pathways back to the original site potential (Reference State) in any of the models. This is not to say that techniques to restore land back to Reference State won't be developed in the future, and the models are designed to be updated to reflect those developments as they occur. At this point in time using the original site potential/Reference state does not fit either of the available definitions for site potential in as much as the lack of restoration pathways back to Reference state limits the application of the 4180 definition to the highest identified state to which a site can be restored and the Interpreting Indicators reference assumes no further human manipulation. The approach BLM took in this document at least in draft determinations for Standard 1 was to identify if any restoration pathways to higher states from the state each site is in existed. If no then BLM rated the standard as met, if yes then not met.

Comment: *One implication of BLM using current potential as the relevant standard is that the agency may be more likely to find that a standard is met, or that if it determines the standard is not met, that current livestock grazing did not contribute to the failure because "historic" grazing degraded the site. If a site is degraded compared to its original/historic potential, it does not really matter what first caused the degradation—it is still degraded, and does not support native species as it would have. BLM needs to manage accordingly, and that implicates current grazing management.*

Agency Response: Again, the developed State and Transition models provide the most current state of resource management science, and to date none of them identify any restoration pathways from degraded states back to original/historic potential (Reference state). BLM disagrees with your statement that "*it does not really matter what first caused the degradation*" in as much as BLM is required by policy and handbook to identify causal factors for standard non-attainment, and in that frame of reference it very much *does* matter what first caused site degradation. The next questions, and the ones that dictate BLM's draft determinations and next courses of action, are (a) Where in the applicable state and transition models does a site lay, (b) What identified restoration pathways are available to higher states, if any exist, and (c) is current livestock grazing management contributing to the non-attainment. BLM does have an obligation to manage current grazing so as to minimize degradation to lower states, but at this point in time there are few to no identified restoration pathways where livestock grazing management alone can move a site upwards through state and transition models.

Comment: *In many cases, BLM says there is nothing it is required to do to take "appropriate action" under the regulations at section 4180 because current livestock grazing did not cause the problem. We believe there are actually very few sites that are degraded completely by grazing outside the current permit term, because in most cases livestock grazing has at a minimum slowed potential recovery. Likewise, continued livestock grazing will either continue to contribute to maintenance in a degraded state, or degrade sites further.*

Agency Response: As stated above the methodology BLM used to reach draft determinations at least for Standard 1 was to see where in state and transition modeling each site lay and then if an identified restoration pathway exists to a higher state. Also as stated there are generally no restoration pathways identified in the models where changes in livestock grazing management alone will result in return to higher states without some form of accompanying direct manipulation. With the exception of riparian areas BLM did not identify that current grazing management as a factor in any other standard non-attainment.

Comment: *Another problem if BLM uses the current ecological potential of a site as the metric, is that it allows BLM to say that there is no grazing management it can use to improve ecological health. One illustration of this is that, based on BLM's use of the state and transition concept, once a site reaches an annual state, it supposedly cannot recover at all, or can only recover with seeding. At that point, BLM is increasingly saying that livestock grazing should be used on an annual basis as a means of reducing "fuel" to at least prevent the site from burning.*

However, in every instance where BLM has determined that an annual state exists, if it considers "targeted," "prescribed," or some other application of livestock, it should also analyze an

alternative to restore/change the annual state through active restoration that includes seeding of native grass and brush species and rest from further disturbance. This will allow a comparison between actual restoration of a site, and stop-gap treatments that must be performed every year, and will likely worsen the problem over the long term by causing more annual grasses. We discuss this dichotomy in detail in our comments on the NV State Office's Targeted Grazing EA, attached. Please analyze a restoration alternative. This is consistent with Guideline 1.2 ("When grazing practices alone are not likely to restore areas … land management treatments should be designed and implemented where appropriate."

That said, we do not believe that it is impossible for a site that is in an annual state to recover naturally once livestock grazing is removed, allowing soil crusts to rebuild and native species to gradually reestablish. The use of state and transmission modeling is also therefore inappropriate if it prevents BLM from considering passive restoration as a management strategy.

Agency Response: As noted above, state and transition models are based on observations and experience of the developers. Few if any of the state and transition models support restoration out of annual states to anything but a seeded state. Again, this does not preclude identification or development of such restoration pathways in the future, but none are known at this time. The bottom line is that once a site is in the annual state it is likely to remain there until or unless chemical, biological, or mechanical intervention and manipulation methods are implemented even in the absence of grazing.

Given the limited budgets and vast landscapes BLM manages the agency must be wise in where it invests its limited restoration dollars, and at this moment the agency is expending the majority of those resources into projects designed to improve and prevent the loss of remaining intact sagebrush habitat. BLM is analyzing in the O'Neil PPA project several restoration projects in these allotments. The agency continues to support and invest in research aimed at making restoration of annual states a more viable option and hopes that such efforts become practical to consider on a landscape scale in the future.

Comment: *Overall, we note from review of the rangeland health assessment that many areas of these allotments have nonfunctioning riparian areas due to livestock grazing, particularly lentic sites. BLM should address this degradation through exclusion of grazing in the pastures where these nonfunctioning and functioning-at-risk sites are located until they reach PFC. BLM could then reauthorize grazing, implementing reductions in use: fewer authorized livestock; shorter seasons; rest most years; and strictly applied riparian use standards—bank alteration, stubble height, and herbaceous utilization—as well as active daily herding to ensure livestock do not linger at these locations.*

Agency Response: BLM believes the riparian areas on the allotment can be improved through a combination of limiting hot season use of those pastures and protective fencing. These strategies are analyzed in this document.

Comment: *Why has BLM not done any water quality testing on waterways that flow through these allotments, given beneficial uses that include recreation involving contact with water? What about temperature—livestock grazing that removes woody vegetation like willows is*

clearly implicated in higher water temperatures. Can BLM actually determine if the relevant rangeland health standard is met or not without this information? What excuses BLM from collecting this information itself, even if the State of Nevada has not?

Agency Response: The streams on these allotments flow across a mixture of public and private lands, and most of the streams lie predominately to almost entirely on private land. For these reasons these streams have been lower priority streams for data collection and management- for example, the Wells Rangeland Program Summary in allotting overall riparian objectives from the Wells Resource Management Plan did not assign any priority to any streams in these four allotments for management actions or condition improvement, and as a result of those and other resource allocation decisions made through time BLM simply doesn't have all of the data it would like to have.

Comment: *We also note that many streams and springs in these allotments have not been assessed for compliance with Standard 2 at all. How will BLM treat these areas when it is determining what management to apply going forward?*

Agency Response: This is addressed in the proposed action and alternatives in this document.

Comment: *Are there Lahontan cutthroat trout on Pilot Peak, and if so, how has grazing affected them?*

Agency Response: Lahontan cutthroat trout are found in a couple streams at the upper elevations of the east side of Pilot Peak, but none of those are within the Pilot Valley Allotment. It's worth noting that this areas does not lie within the Humboldt River basin and was never historic Lahontan cutthroat trout habitat, and that these fish were transplanted from Pyramid Lake into those streams many decades ago. The streams are located high enough on the mountain that they are not impacted by livestock grazing.

Comment: *Carrying Capacity analysis*

How will BLM conduct a carrying capacity analysis, analyzing "forage available" and capability and suitability of grazing for these allotments? We note that private lands, even those held by the permittee, should be excluded from the assessment of public lands grazing capacity. The RHA notes that individual private landowners own at least 142,000 acres in the allotments. RHA at 14.

Agency Response: As stated in this document, BLM will use reported actual use versus recorded utilization at key areas and/or use pattern mapping to calculate and adjust carrying capacity. Unfenced private lands owned or controlled by the permittee are included in the grazing permit through the Percent Public Land calculations. No allowances are granted in the permit for any fenced private lands, nor for private lands in the allotments not owned by the permittees.

Comment: *NEPA*

Which NEPA regulations will BLM apply—those in place through September 2020, or the new revisions just approved by the CEQ? BLM may follow the pre-existing NEPA regulations because this project is already underway.

Agency Response: This project is grandfathered into the pre-existing NEPA regulations.

Comment: *We also note that BLM has the obligation under its regulations independent of NEPA to provide notice to interested public of grazing processes. We expect to be notified at every upcoming step in this process.*

Agency Response: Western Watersheds Project is registered as an Interested Public on all four allotments and as such will be provided with all documents and opportunities to comment.

Comment: *ARMPA*

The NEPA process should comply with the ARMPA, including but not limited to analysis of thresholds and responses, and the required alternative under MD LG 6.

Agency Response: This is addressed in this document.

Comment: *Thank you for the opportunity to provide input. WWP will remain engaged in this process*.

Agency Response: Thank you again for your comments and participation in this public process.

Appendix 11: List of Acronyms and Abbreviations

Table 20. List of Acronyms and Abbreviations

Acronym / Abbreviation	Term
ac	acre
AOU	American Ornithologists Union
APE	Area of Potential Effects
ARMPA	Approved Resource Management Plan Amendment
ATV	All-Terrain Vehicle
AUM	Animal Unit Month
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BMP	Best Management Practice
CAA	Clean Air Act
CADR	*Cardaria draba* (hoary cress)
CEQ	Council on Environmental Quality
CESA	Cumulative Effects Study Area
CFR	Code of Federal Regulations
CIAR4	*Cirsium arvense* (Canada thistle)
CNHT	California National Historic Trail
CO	Carbon monoxide
CO_2	Carbon dioxide
COT	Conservation Objectives Team
CWA	Clean Water Act
DFPM	Design Features and Protective Measure
DNA	Determination of NEPA Adequacy
DOI	Department of the Interior
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJSCREEN	Environmental Justice Screening and Mapping Tool
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESD	Ecological Site Description
EVT	Existing Vegetation Type
FGDC	Federal Geographic Data Committee
FIAT	Fire and Invasives Assessment Tool
FIRE	GRSG Plan Amendment Management Decision for Fuels Management
FLPMA	Federal Land Policy and Management Act
FMA	Fire Management Amendment

Acronym / Abbreviation	Term
FONSI	Finding of No Significant Impact
FRCC	Fire Regime Condition Classes
ft	foot or feet
GBBO	Great Basin Bird Observatory
GHG	Greenhouse Gas
GHMA	General Habitat Management Area
GRSG	Greater Sage-Grouse
HAGL	*Halogeton glomeratus* (Halogeton)
HFI	Healthy Forests Initiative
HFRA	Healthy Forests Restoration Act
HMA	Herd Management Area
HYNI	*Hyoscyamus niger* (black henbane)
IDT	Inter-Disciplinary Team
IPCC	Intergovernmental Panel on Climate Change
LANDFIRE	Landscape Fire and Resource Management Planning Tools
LCT	Lahontan Cutthroat Trout (*Oncorhynchus clarkii henshawi*)
LR2000	Legacy Rehost System 2000
LUPA	Land Use Plan Amendment
LWC	Lands with Wilderness Characteristics
LWD	Large Woody Debris
MBTA	Migratory Bird Treaty Act
MD	Management Decision
mi	mile
MLRA	Major Land Resource Areas
MOU	Memorandum of Understanding
MSDS	Material Safety Data Sheet
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NDA	Nevada Department of Agriculture
NAGPRA	Native American Graves Protection and Repatriation Act
NDEP	Nevada Division of Environmental Protection
NO_2	Nitrogen Dioxide
NDOT	Nevada Department of Transportation
NDOW	Nevada Department of Wildlife
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NISIMS	National Invasive Species Information Management System
NRCS	Natural Resource Conservation Service
NRI	National Resource Inventory
NVCRIS	Nevada Cultural Resources Inventory System
O_3	Ozone
OHMA	Other Habitat Management Area

Acronym / Abbreviation	Term
OHV	Off-Highway Vehicle
ONAC	*Onopordum acanthium* (Scotch thistle)
PAC	Priority Area for Conservation
Pb	Lead
PEIS	Programmatic Environmental Impact Statement
PHMA	Priority Habitat Management Area
PM-2.5	Particulate matter – 2.5 microns
PM-10	Particulate matter – 10 microns
PMU	Population Management Unit
PPA	Project Planning Area
PPE	Personal Protective Equipment
PUP	Pesticide Use Proposal
RFFA	Reasonably Foreseeable Future Action
RMP	Resource Management Plan
ROW	Right-of-Way
SFA	Sagebrush Focal Areas
SGI	Sage-Grouse Initiative
SHPO	Nevada State Historic Preservation Office
SO_2	Sulfur Dioxide
SOP	Standard Operating Procedure
sp. and spp.	species (singular) and species (plural)
ssp. and sspp.	subspecies (singular) and subspecies (plural)
SRMA	Special Recreation Management Area
SSS	Special Status Species
STM	State-and-Transition Model
TMDL	Total Mean Daily Load
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VRM	Visual Resource Management
WFIP	Wildfire Implementation Plan
WFO	Wells Field Office
WSA	Wilderness Study Area

Appendix 12. References

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Appendix 13. Resources and Issues Eliminated from Analysis and Rationale

Table 23. Resources and Issues Eliminated from Analysis and Rationale

Resource or Issue	Elimination Rationale
ACECs, Farm Lands-Prime/Unique, Floodplains, HFRA, T&E Species, Wild & Scenic Rivers, Wild Horses	Not present.
Land Use and Access	Although existing and potential land uses are present in the analysis area varying from rights-of-ways such as power lines, access roads, leases, and permits, none of the alternatives considered would have an impact on any present or future land uses. There would be no change in access to public lands in the analysis areas by any of the alternatives considered. Access would continue to be open to the public, therefore Land Use and Access is not brought forward for analysis.
Minerals, Oil/Gas	Although existing and potential mineral uses are present in the analysis area varying from oil and gas leases, exploration notices, mining plan of operations, mineral materials, and geothermal, none of the alternatives considered would have an impact on any present or future mineral uses, therefore mineral actions is not brought forward for analysis.
Air Quality and Climate Change	GHG release during use of equipment for range improvement construction would be incidental and the potential significance is negligible, therefore Air Quality and Climate Change are not brought forward for analysis.
Cultural Resources	Stipulations address resource concerns, therefore Cultural Resources I not brought forward for analysis.
Fire Management	Stipulations and adaptive management address concerns with residual dry matter, therefore Fire Management is not brought forward for analysis.
Forestry and Woodland Products	Stipulations address resource concerns, therefore Forestry and Woodland Products are not brought forward for analysis.
Recreation and National Historic Trails (NHT)	The proposed action and alternatives would not change access to public lands and would not substantively change recreational opportunity. Therefore, Recreation is not brought forward for analysis. Visual Resource Management stipulations address concerns for NHT, therefore it is not brought forward for analysis.
Lands with Wilderness Characteristics (LWC)	The Winecup Gamble Ranch Complex permit renewal proposed action and alternatives would not cause adverse

Resource or Issue	Elimination Rationale
	impacts to Lands with Wilderness Characteristics (LWC) as per BLM Manual 6310 therefore it has been eliminated from further analysis.
Water Quality	Water quality issues are covered together with riparian and aquatic species impacts in Section 3.4.
How would ground disturbance from range improvement project implementation and maintenance impact noxious weeds?	Stipulations address issue concerns, there for this noxious weeds issue is not brought forward for analysis.

Appendix 14. Required Design Feature (RDF) Documentation

GRSG Proposed Activities Form IM Attachment 2: Required Design Features (RDF) identified in the Nevada and Northeastern California Greater Sage-Grouse Approved Resource Management Plan Amendment (SGPA Appendix C)

General RDFs		Applied	If RDF not applied, select reason:
RDF Gen 1:	Locate new roads outside of GRSG habitat to the extent practical	☐ Yes ☑ No	☐ A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable. ☐ An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # _____ ☑ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale: No new roads authorized	
RDF Gen 2:	Avoid constructing roads within riparian areas and ephemeral drainages. Construct lowwater crossings at right angles to ephemeral drainages and stream crossings (note that such construction may require permitting under Sections 401 and 404 of the Clean Water Act).	☑ Yes ☐ No	☐ A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable. ☐ An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # _____ ☑ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale: No new roads authorized	
RDF Gen 3:	Limit construction of new roads where roads are already in existence and could be used or upgraded to meet the needs of the project or operation. Design roads to an appropriate standard, no higher than necessary, to accommodate intended purpose and level of use.	☐ Yes ☑ No	☐ A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable. ☐ An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # _____ ☑ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale: No new roads authorized	
RDF Gen 4:	Coordinate road construction and use with ROW holders to minimize disturbance to the extent possible.	☐ Yes ☑ No	☐ A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable. ☐ An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # _____ ☑ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale: No new roads authorized	
RDF Gen 5:	During project construction and operation, establish and post speed limits in GRSG habitat to reduce vehicle/wildlife collisions or design roads to be driven at slower speeds.	☐ Yes ☑ No	☐ A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable. ☐ An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # _____ ☑ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale: No new roads authorized	

1

RDF Gen 6:	Newly constructed project roads that access valid existing rights would not be managed as public access roads. Proponents will restrict access by employing traffic control devices such as signage, gates, and fencing.	☐ Yes ☑ No	☐ A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable. ☐ An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # _____ ☑ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale: No new roads authorized	
RDF Gen 7:	Require dust abatement practices when authorizing use on roads.	☐ Yes ☑ No	☐ A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable. ☐ An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # _____ ☑ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale: No specific new road use authorization	
NO RDF Identified			
RDF Gen 9:	Upon project completion, reclaim roads developed for project access on public lands unless, based on site-specific analysis, the route provides specific benefits for public access and does not contribute to resource conflicts.	☐ Yes ☑ No	☐ A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable. ☐ An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # _____ ☑ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale: No new roads authorized	
RDF Gen 10:	Design or site permanent structures that create movement (e.g., pump jack/ windmill) to minimize impacts on GRSG habitat.	☑ Yes ☐ No	☐ A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable. ☐ An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # _____ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale:	
RDF Gen 11:	Equip temporary and permanent aboveground facilities with structures or devices that discourage nesting and perching of raptors, corvids, and other predators.	☑ Yes ☐ No	☐ A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable. ☐ An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # _____ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale:	

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RDF Gen 12:	Control the spread and effects of nonnative, invasive plant species (e.g., by washing vehicles and equipment, minimize unnecessary surface disturbance; Evangelista et al. 2011). All projects would be required to have a noxious weed management plan in place prior to construction and operations.	☑ Yes ☐ No	☐ A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable. ☐ An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # _____ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale:	
RDF Gen 13:	Implement project site-cleaning practices to preclude the accumulation of debris, solid waste, putrescible wastes, and other potential anthropogenic subsidies for predators of GRSG.	☑ Yes ☐ No	☐ A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable. ☐ An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # _____ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale:	
RDF Gen 14:	Locate project related temporary housing sites outside of GRSG habitat.	☐ Yes ☑ No	☐ A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable. ☐ An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # _____ ☑ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale:	No temp housing sites authorized
RDF Gen 15:	When interim reclamation is required, irrigate site to establish seedlings more quickly if the site requires it.	☑ Yes ☐ No	☐ A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable. ☐ An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # _____ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale:	
RDF Gen 16:	Utilize mulching techniques to expedite reclamation and to protect soils if the site requires it.	☑ Yes ☐ No	☐ A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable. ☐ An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # _____ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale:	

RDF Gen 17:	Restore disturbed areas at final reclamation to the pre-disturbance landforms and desired plant community.	☑ Yes ☐ No	☐ A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable. ☐ An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # _____ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale:	
RDF Gen 18:	When authorizing ground-disturbing activities, require the use of vegetation and soil reclamation standards suitable for the site type prior to construction.	☑ Yes ☐ No	☐ A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable. ☐ An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # _____ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale:	
RDF Gen 19:	Instruct all construction employees to avoid harassment and disturbance of wildlife, especially during the GRSG breeding (e.g., courtship and nesting) season. In addition, pets shall not be permitted on site during construction (BLM 2005b).	☑ Yes ☐ No	☐ A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable. ☐ An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # _____ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale:	
RDF Gen 20:	To reduce predator perching in GRSG habitat, limit the construction of vertical facilities and fences to the minimum number and amount needed and install anti-perch devices where applicable.	☑ Yes ☐ No	☐ A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable. ☐ An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # _____ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale:	
RDF Gen 21:	Outfit all reservoirs, pits, tanks, troughs or similar features with appropriate type and number of wildlife escape ramps (BLM 1990; Taylor and Tuttle 2007).	☑ Yes ☐ No	☐ A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable. ☐ An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # _____ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale:	

RDF Gen 22:	Load and unload all equipment on existing roads to minimize disturbance to vegetation and soil.	☑ Yes ☐ No	☐ A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable. ☐ An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. Alternative RDF # _____ ☐ A specific RDF will provide no additional protection to GRSG or its habitat.
		Rationale:	

5