APPENDIX A —BASIS OF DESIRED CONDITIONS

This appendix summarizes the basis of desired conditions for the Bear Creek, Virginia Peak, North Salt, and South Salt Sheep and Goat Allotments. The Bridger-Teton National Forest (BTNF) Land and Resource Management Plan (Forest Plan) provides the main source of direction, although direction also comes from other sources (e.g., Forest Service Manual, Forest Service Handbook, Executive Orders). Scientific information provides information that connects management direction to on-the-ground-conditions. This appendix sets the stage and provides a starting point for a more detailed investigation.

Desired conditions on allotments have two distinct scales, as defined in FSH 2209.13, Chapter 90 (92.11): landscape scale and reference areas. The desired conditions described in this appendix most closely align with the landscape scale, and were stepped down from Forest Plan objectives, standards, and guidelines and were further defined by Forest Service policy and handbook guidance, regional and landscape scale assessments, and scientific information (as outlined in this appendix). The desired conditions identified in this appendix need to be stepped down to the scale of the permanent monitoring sites (reference areas), which would account for specific plant communities and site-specific environmental conditions.

Forest Plan & Other Direction

BTNF VISION AND MISSION STATEMENTS

The vision and mission statements of the Bridger-Teton National Forest provided broad direction that was considered in developing desired conditions.

Vision

"The Bridger-Teton National Forest is home to world-class headwaters, wildlife, wilderness and wildlands. Conserving these values, in concert with providing for sustainable uses, is our legacy. We are leaders committed to service, action and excellence."

Mission

"The employees of the Bridger-Teton National Forest are dedicated to sound natural resource management. We care for the land by improving and maintaining healthy Forests and rangelands, clean air and water, and diverse habitat for fish and wildlife populations. We serve the people by encouraging responsible use of the resources our Forest provides.

We aim to be progressive leaders in natural resource management. We work effectively as a team, committed to timely completion of projects to meet resource

and public needs. We value public comment, we foster partnerships and we are active in our communities. Above all else, Bridger-Teton National Forest employees respect each other and the public we serve."

SUMMARY OF DIRECTION BY RESOURCE AREA

The two main thrusts of the livestock grazing program on the allotments are:

1. To provide forage for livestock, which contributes to the local economy (Multiple-Use Sustained Yield Act, FSM 2202.1, and Forest Plan Goal 1.1 and Objective 1.1(h)). This must be done in a way that allows (1) requirements of '2.a-f', below, to be met in all DFC areas on the allotment; (2) requirements of '2.g' to be met in DFC 1B areas (and in other DFC areas to the extent possible while also meeting priorities of the DFC area); and (3) requirements of '2.h' in DFC 10 and 12 areas (and in other DFC areas to the extent possible while also meeting priorities of the DFC area) (see Table 1, below).
2. To allow watersheds, rangelands, and wildlife habitat to be sustained (where they are in healthy, properly-functioning condition) or restored (where they are less than healthy, properly-functioning condition):
   a. Soils in unsatisfactory condition must be rehabilitated to satisfactory conditions, and rehabilitated soils must be allowed to remain in a satisfactory, productive condition (FSM 2202.1, FSM 2522.02, FSM 2550.3, FSM 2553.02, R4 Business Plan Objective A.3, BTNF Vision, Forest Plan Objectives 4.7(a) and 4.7(b), and the Soil, Water, and Air Preservation Prescription).
   b. Water Quality must be retained at or above current State water quality standards and National Forest System water quality goals (FSM 2202.1, FSM 2532.02, R4 Business Plan Objective A.3, BTNF Vision, Forest Plan Objective 1.3(b), Water Quality Standard, and the Soil, Water, and Air Preservation Prescription).
   c. Range and Watershed conditions must be improved to or retained to healthy conditions; range in less-than-satisfactory condition must be improved (FSM 2520.2, FSM 2522.02, BTNF Vision, Forest Plan Objective 4.7(a), Forage Improvement Standard, Range Vegetation Prescription).
   d. Streambanks must be protected, and restored where degraded, and bank stability should be retained at 90% of natural (Livestock Grazing of Riparian Areas Standard, Streambank Stability Guideline, Restoring Stream Channel Conditions Guideline).
   e. Streambank Vegetation that is needed for healthy riparian areas must be restored and sustained; e.g., retained at or restored to 80% of its natural condition (Forest Plan Objective 4.7(b), AMP Standard, Streambank Stability Guideline).
   f. Noxious Weeds must be addressed in livestock grazing management to minimize their spread (Four threats, R4 Business Plan Objective A.2, Forest Plan Objective 4.8(b); as well as '2.a-e', above, since noxious weeds impact rangeland and riparian health).

g. Livestock Forage conditions must be improved or retained (Objective 4.7(a)). Forage conditions are improved or retained in the context of restoring and retaining riparian and rangeland health and functionality (Forage Improvement Standard, Range Vegetation Prescription, and see 2.a-f, above).

h. Wildlife Forage and Cover of sufficient quality must be retained in adequate quantities to provide for the needs of wildlife (FSM 2202.1, FSM 2630.3, and Executive Order 13186, BTNF Vision, Forest Plan Objectives 2.1(a), 3.3(a), and 4.7(d), AMP Standard, Fisheries and Wildlife Prescription, Sensitive Species Management Standard) ---- particularly for riparian areas, crucial winter ranges, calving areas, and important habitat for threatened, sensitive, MIS, and migratory bird species. This must be done in a way that allows (1) requirements of '2.a-f', above, to be met in all DFC area; and (2) requirements of '1' and '2.g' to be met in DFC 1B areas (and in other DFC areas to the extent possible while also meeting priorities of the DFC area) (see Table 1, below). Note: requirements '2.a-f' provide the foundation for providing wildlife forage and cover on a sustainable basis.

i. Vegetation Treatment needs to be addressed in the livestock grazing program to allow for the restoration and sustainability of fire-dependent plant communities (Four Threats, R4 Business Plan Objective A.1, Aspen Management Guideline; Also: FSM 2202.1, FSM 2520.2, FSM 2522.02, FSM 2630.2, FSM 2630.3, Forest Plan Objectives 2.1(a), 3.3(a), and 4.7(a-d)).

GREYS RIVER LSA

Desired conditions for areas grazed by livestock are generally defined in the *Greys River LSA* (pg.144):

- The intensities and management of livestock grazing will accommodate other resource considerations, such as vegetative diversity, plant community health, sedimentation movement, recreation, and wildlife needs.
- Grazing capacity will be set in accordance with health of the plant communities that are free of invasive plant species (i.e., desired conditions for plant community health, vegetative diversity, and sedimentation movement are defined in terms of properly functioning conditions, as discussed elsewhere.)

- Desired conditions for riparian areas are defined in the *Greys River LSA* (pg. 140) as properly functioning conditions and those conditions that are within the historic range of variability:
  - The desired condition for riparian and wetland associations (including wet meadows), on a landscape scale, equates to the historic range of variability addressed in USFS (1997).
  - On a site-specific basis of 5-20 acres, cover and structure of riparian communities are sufficient to slow overland flow and filter sediments; and stream gradient, stream meanders, and flow regimes result in channel morphologies within properly functioning conditions. Vegetation height is an important attribute of herbaceous vegetation for slowing overland flow.

- Desired conditions for wildlife habitat are defined in terms of properly functioning condition (pgs.146-150). Restoring and sustaining properly functioning conditions will contribute to sustaining wildlife values, suitable and adequate amounts of forage and cover for wildlife, and meeting fish and wildlife needs identified in goals, objectives, prescriptions and guidelines. More specifically, the LSA states:
  - Desired conditions for wildlife habitat is for the aspen, riparian, sagebrush, mountain shrubland, and grassland types to be in properly functioning condition.
  - Improve the trend and vigor of winter and transitional spring/fall range (e.g., willow bottoms for moose).
  - Habitat conditions reduce elk dependencies on supplemental feed.
  - Any management actions to improve water quality are effectively implemented.
  - Sufficient habitat exists to sustain viable populations of all sensitive plants.
  - All suitable habitats of sensitive plant species are surveyed and known populations are monitored to track population trends.

DFCS OF THE FOREST PLAN: CONTEXT FOR MANAGEMENT

The Forest Plan recognizes there are at least some conflicts among Forest Plan objectives and that not all objectives can be achieved on the same land areas, and it specifies that any such conflicts need to be resolved according to direction provided in Desired Future Condition (DFC) sections of the Forest Plan. Conflicts among Forest Plan objectives need to be resolved in favor of the objective(s) for resources/uses that are of higher emphasis in a particular DFC. Since livestock use and resource objectives for the four allotments were stepped down from Forest Plan objectives, this hierarchy also applies to the objectives outlined on the following pages. Table 1 illustrates how any conflicts among objectives, with respect to the four allotments, must be resolved. When conflicts occur or are possible, conflicts need to be resolved in favor of objectives with lower numbers (e.g., those with a higher emphasis) in Table 1, while at the same time providing for resources and/or uses of lower emphasis to the extent possible.

The management emphasis and themes of DFC areas on the are as follows:

- DFC 2A — The theme is “An unroaded area managed to give a quiet, almost primitive recreation experience.” The "Management emphasis is to maintain or enhance Primitive and Semi-Primitive Non-motorized dispersed recreation opportunities."
- DFC 2B — The theme is “An area managed to give a motorized recreation experience.” The "Management emphasis is to maintain or enhance dispersed recreation opportunities including Semi-primitive Motorized and Roaded Natural..."

Table 1. Emphasis among Forest Plan objectives for individual DFC areas in the Bear Creek, Virginia Peak, North Salt, and South Salt sheep allotments (Forest Plan objectives that pertain to or can be affected by livestock grazing and livestock grazing management).

	Ranking (1 = highest emphasis)				
Objectives for:	**DFC 2A Areas**	**DFC 2B Areas**	**DFC 4 Areas**	**DFC 10 Areas**	**DFC 12 Areas**
Riparian and Rangeland Health & Functionality[A]	1	1	1	1	1
Livestock use[B]	3	3	2[C]	3	3
Wildlife Habitat (e.g., wildlife forage and cover)[B]	3	3	2[C]	2	2
Recreation[B]	2	2	2[C]	4	2

[A] The 1897 Organic Act, 1960 Multiple-Use Sustained Yield Act, Forest Service policy, and 1990 Forest Plan require that riparian and rangeland health and functionality be taken care of first and foremost. The Region 4 Business Plan also calls for this direction (e.g., Objective A.3 to "Administer domestic grazing to ensure basic protection of soil an water").

[B] Prioritization of objectives for livestock use, wildlife habitat, and recreation are determined by the management emphasis, theme, and other direction provided in individual DFC sections in the Forest Plan.

[C] The narrative of DFC 4 in the Forest Plan did not state whether any other resource was emphasized other than watershed. However, while wildlife and semi-primitive recreation were recognized as elements of DFC 4 areas and no constraints were placed on them (except motorized recreation), definitive constraints were placed on livestock grazing (e.g., no livestock in critical water-supply areas and the Water Quality Protection Standard) even though it was recognized as a component of this DFC in general.

- DFC 4 — The theme is "An area managed to protect municipal water supplies." The "Management emphasis is to protect or improve the quality of municipal water supplies." Cattle and sheep are excluded from critical water-supply areas, but you may find sheep and cattle in other areas.
- DFC 10 — The theme is "An area managed to allow for some resource development and roads while having no adverse and some beneficial effects on wildlife." The "Management emphasis is to provide long-term and short-term habitat to meet the needs of wildlife managed in balance with timber harvest, grazing, and minerals development. All surface-disturbing activities are designed to have no affect or beneficial effects on wildlife..."
- DFC 12 — The theme is "An area managed for high-quality wildlife habitat and escape cover, big-game hunting opportunities, and dispersed recreation activities." The "Management emphasis is on providing important habitat for big-game as winter ranges, feedgrounds, calving areas, and security areas..."

Ecological Conditions

This description of desired conditions incorporates a large number of ecological parameters that would not necessarily be measured or monitored. Resource objectives proposed in the environmental assessment were developed based on these desired conditions, and it is the parameters addressed in those objectives that would be monitored. Livestock are not managed or otherwise used to achieve or sustain desired conditions, except possibly in limited situations.

Rather, livestock grazing use must be controlled and otherwise managed in ways that allow desired conditions to be sustained (either by natural processes or through vegetation treatments such as prescribed burning) and that allow desired conditions to be restored where they currently are below desired conditions (either by natural processes or through vegetation treatments such as prescribed burning and noxious weed control). This is done through the implementation of allowable-use standards and required livestock management practices.

Successional stages in this appendix refer to broad age classes of plant communities relative to disturbances that temporarily eliminate or nearly eliminate live woody plants or above-ground part of woody plants in a given area, thereby providing opportunity for non-woody plant species to exert dominance for a period of time.

FORBLAND AND ALPINE TYPES

There are a variety of forbland types on the Bear Creek, Virginia Peak, North Salt, and South Salt allotments, including several tall forb, alpine, and dry forbland communities (USFS 1997, USFS 2004, Williams 2007). These communities are found along the entire elevational gradient of the allotments, from about 6,500 feet to 10,700 feet.

Ground Cover & Soil Conditions

Ground cover in tall forb communities is between 80% and 100% when at desired conditions (O'Brien et al. 2003, Williams 2007, FSH 2209.22.1.2 for Region 4), with ground cover exceeding 85% leading into the winter (Williams 2007). Ground cover in alpine communities is between 85% or 90% and 100% when in desired condition (O'Brien et al. 2003, Williams 2007, FSH 2209.22.1.2 for Region 4).

Desired conditions for soils are the same as those outlined for mountain and subalpine big sagebrush, below.

Herbaceous Plant Species Composition

Several criteria indicate desired plant species composition on any given site in forbland communities:

<u>Herbaceous Species Richness</u>

- A minimum of 20 herbaceous species (not including noxious weeds species) provides a reasonable starting point for a minimum threshold for desired conditions in forbland communities. In 15 forb community types on the BTNF described by Gregory (1983), the average number of plant species ranged from 17 to 28, with 13 of the 15 types averaging 20 or more species. She sampled 200 sites on the BTNF. Based on Appendix 4 of Gregory (1983), 98% of sites had 10 or more species, 91% of sites had 15 or more species, 75% of sites had 20 or more species, and 48% of sites had 25 or more species, and 22% of sites had 30 or more species (information on 186 sites (15 communities) was included in Appendix 4). Some of the communities sampled by Gregory (1983) appeared to be in a reduced ecological condition, but the extent of reduced conditions is unknown. The range of variability of species richness was fairly similar among the 15 communities, except that some had proportionally more sites with greater than 30 species (some as high as 40-55); it is possible that lower species richness corresponded to lower

ecological conditions. Naturalized non-native species are satisfactory if they are species that fill roles or functions of native grass species.

Given the large variability of forb community types, identifying the minimum number of species for given groups of forb communities may be more meaningful. However, it likely will not be possible to ascertain the pre-existing forb community or potential forb community in many cases where conditions are less than properly functioning condition.

Herbaceous Canopy Cover

Preliminary guidance on desired composition, relative to total vegetation canopy cover, is as follows, based on Gregory (1983), USFS (1997), O'Brien et al. (2003), USFS (2004), and Williams (2007). For long-term monitoring purposes, this guidance needs to be converted into basal vegetation cover since long-term monitoring based on canopy cover would build in considerably more variability than long-term monitoring based on basal cover.

- Canopy cover of herbaceous vegetation is at least 50% and may approach 100% when at desired conditions, with drier sites closer to the lower end of the range and moister sites closer to the higher end of the range (Gregory 1983, O'Brien et al. 2003, Williams 2007).
- At least 50% of the total canopy cover is comprised of species representative of forbland communities (USFS 2004), including the following (based on Gregory 1983, O'Brien et al. 2003):

Forbs:		
sticky geranium	meadow rue	arrowleaf balsamroot
fernleaf ligusticum	mountain bluebells	long-leaf arnica
tall larkspur	cow parsnip	elkslip marsh marigold
single-flowered sunflower	California false hellebore	western yarrow
showy goldeneye	goldenrod	needleleaf gianthyssop
silvery lupine	Canada goldenrod	blue stickseed
tobacco root	leafbract aster	thickleaf groundsel
western sweetroot	thickstem aster	groundsel (species)
Grasses:		
mountain brome	bearded wheatgrass	hood sedge
purple oniongrass	Raynold's sedge	small-winged sedge

- Canopy cover of at least one of the representative plant species is 10% or more when at desired conditions (Gregory 1983, O'Brien et al. 2003).
- Canopy cover of mule ears, cutleaf balsamroot, cudweed sagewort, bicolor biscuitroot, and northwest cinquefoil are each less than 10% when at desired conditions.
- Canopy cover of tarweed, Douglas knotweed, Virginia strawberry, shrubs, and conifer trees are each less than 5% when at desired conditions.

- Absence of noxious weeds when in desired condition.

Ground Cover as a Proxy for Plant Abundance

- As a proxy for relative abundance of herbaceous vegetation, ground cover is 80-100% in forblands, except possibly on dry sites (e.g., ridgetops, south facing, well-drained slopes). (If definitive data on basal vegetation cover — especially basal herbaceous vegetation cover — becomes available that characterizes minimum desired conditions, this would replace the minimum ground cover criterion for plant species composition.)

Retention of Herbaceous Vegetation

The following summarize findings of DeLong (2009):

- Retain 70-100% of the annual production of herbaceous vegetation on a minimum of two-thirds of the acreage of forbland communities within each allotment.
- Retain 80-100% of the annual production of herbaceous vegetation on a minimum of one-quarter of the acreage of forbland communities within each allotment.
- No more than 20% of the acreage of forbland communities retains less than 60% of the annual production of herbaceous vegetation.

MOUNTAIN AND SUBALPINE BIG SAGEBRUSH

Mountain big and subalpine big sagebrush types are common on the North Salt, South Salt, and Virginia Peak allotments (15-30% of rangeland acres), and is less than 5% of rangeland acres on the Virginia Peak allotment. Mountain big sagebrush occupies lower elevation sites on the allotments and subalpine big sagebrush occupies higher elevation sites. The dividing line is approximately 8,500 feet (Winward 2004), but it is not a distinct zone; where they occur at the same elevation, subalpine big sagebrush generally occurs on moister sites than mountain big sagebrush. These vegetation types occur in NRCS's (2008) steep loamy and overflow ecological sites, as well as shallow loamy and stony ecological sites on nearly flat to steep hills, alluvial fans, terraces, and ridges. They can be found at any elevation on the allotment (6,500 to nearly 10,700 feet).

Grassland types are similar to big sagebrush communities, minus the woody vegetation.

Mix of Successional Stages & Shrub Canopy Cover

There are two ways of characterizing desired conditions with respect to vegetation succession and the prevalence of woody cover in communities: (1) proportion of big sagebrush types in early, mid, and late succession; and (2) canopy cover classes. The way that captures both composition/structure and functioning is based on age classes or successional stages:

- Early Succession — The first 5 years after a fire or other major disturbance that greatly reduces or eliminates live above-ground woody vegetation, and canopy cover is less than 5% (LANDFIRE 2008a). An estimated 10-20% of the big sagebrush type is typically in early succession (Havlina 2003, O'Brien et al. 2003, LANDFIRE 2008a).

- Mid Succession — This age class typically occurs from 5 years post-burn to 15-25 years post-burn (i.e., a period of about 10-20 years following early succession), and canopy cover typically is 5-15% (Wyo.Interagency Veg.Comm. 2002, LANDFIRE 2008a). An estimated 50-65% of the big sagebrush type is in mid succession under a fire-return interval of 20-40 years (Wyo. Interagency Comm. 2002, Winward 1991, Havlina 2003, O'Brien et al. 2003). Baker et al. (In Press) contend that the fire-return interval was greater than 70 years (which could result in as little as 20% of the type being in mid succession; LANDFIRE 2008a), but they were looking at fire-return intervals at microsites which may only have limited application to fire ecology in a field setting (e.g., even though fire may not return to a 3x3 foot patch for 70 or more years on average, it would return to the area in which the patch is located every 20-40 years).
- Late Succession — This age class typically begins 15-25 years post-burn (Winward 2004, Wyoming Interagency Vegetation Committee 2002, LANDFIRE 2008a); 20 years is used as an average. Late succession lasts indefinitely until another fire or other major disturbance (e.g., insect/disease outbreak), or until conifer canopy cover exceeds 10%. Shrub canopy cover of >15% is a characteristic of late-seral communities. An estimated 15-40% of the big sagebrush type is in late succession under a fire-return interval of 20-40 years (Winward 1991, Havlina 2003, O'Brien et al. 2003). Baker et al. (In Press) contend that the fire-return interval was greater than 70 years (which could result in as much as 65% of the type being in late succession; LANDFIRE 2008a), but this has limited application to field settings (see previous paragraph).

Purely from the standpoint of vegetation structure, a breakdown of shrub canopy cover is as follows, based on references cited above as well as FSH 2209.22.1.3 for Region 4. This is generally consistent with information presented by the Wyoming Interagency Vegetation Committee (2002).

- <5% Canopy Cover — 10-20% of the big sagebrush type.
- 6-15% Canopy Cover — 50-65% of the big sagebrush type. Some late-seral stands of big sagebrush have canopy cover in this structural class.
- >15% Canopy Cover — 15-40% of the big sagebrush type. Most of this structural class has shrub canopy cover of 15-30%. A small proportion of the type has >45% canopy cover.

Ground Cover & Soil Conditions

Ground cover is between 70% and 100% on dry mountain big sagebrush sites and is between 85% and 100% on relatively productive mountain big sagebrush sites when at desired conditions. Mountain big sagebrush communities naturally exist in a large range of soil conditions, from steep, dry, well drained south-facing slopes to loamy, relatively moist sites. This large range in conditions results in a large natural variety of production levels (see below), which produce a range of ground cover conditions. FSH 2209.22.1.2 for Region 4 and the Wyoming Interagency Vegetation Committee (2002) identified an absolute minimum threshold of 70% for ground cover. Based on review of studies in the Intermountain West, O'Brien et al. (2003) found that 85% ground cover is need for

proper functioning condition in mountain big sagebrush communities. Ground cover of 85% appears to be more than what dry sites (e.g., well-drained south slopes) can realistically attain on at least some parts of the four allotments. In contrast, setting a minimum of 70% ground cover on relatively moist sites could maintain these sites below their potential. Therefore, 70% is used for big sagebrush sites at the less-productive end of the spectrum of soil conditions and 85% is used for big sagebrush sites in the mid-range to higher end of productivity.

The following soil conditions exist:

- Ground cover is uniformly dispersed. Plants and organic matter are distributed evenly and adequately protecting soils.
- Organic layer is present, well incorporated at the soil surface, not fragmented.
- Pedestals are not present and there is no exposure of plant roots.
- Rills are either not present or they are widely spaced and blunted and muted. Minimal to moderate evidence of movement or deposition of litter. No more than minimal evidence of movement of soil, and no hummocking of displaced soils.
- Either (1) there are no signs of active nickpoints, head-cuts, or gullies; or (2) if gullies had formed previously, they have rounded banks and ground cover and vegetation cover are at desired conditions (see ground cover, above, and herbaceous plant species composition, below).

Herbaceous Plant Species Composition

Several criteria indicate desired plant species composition on any given site in mountain big sagebrush communities:

<u>Herbaceous Species Richness</u>

- As a starting point, minimum of 15 herbaceous species (not including noxious weeds, Kentucky bluegrass, or other undesirable nonnative species) provides a minimum threshold for desired conditions on relatively dry sites and a minimum of 20 species (not including noxious weeds, Kentucky bluegrass, or other undesirable nonnative species) provides a minimum threshold for desired conditions on relatively moist sites (Wyo. Interagency Vegetation Committee 2002, O'Brien et al. 2003). Additional work is needed to refine these minimum thresholds. Naturalized non-native species are satisfactory if they are species that fill roles or functions of native grass species. According to Winward (2004:27), "Most sites supporting this sagebrush are very productive and diverse; often up to up to 35-40 plant species (grasses, grass-likes, forbs, and shrubs) occur as associations…"

<u>Herbaceous Canopy Cover</u>

The following criteria apply to big sagebrush-grass communities, unless otherwise noted. Big sagebrush-forb communities have understories similar to those described in the forbland section.

Preliminary guidance on desired composition, relative to total vegetation canopy cover, is as follows (based on Wyo. Interagency Veg. Comm. 2002, O'Brien 2003,

Williams 2007, LANDFIRE 2008a, NRCS 2008). For long-term monitoring purposes, this guidance needs to be converted into basal vegetation cover since long-term monitoring based on canopy cover would build in considerably more variability.

- No single herbaceous species comprising more than one-half of the total canopy cover of herbaceous vegetation.
- Canopy cover of herbaceous vegetation is 40-85%, with drier sites closer to the lower end of the range and moister sites closer to the higher end of the range.
- Of the total herbaceous canopy cover in big sagebrush-grass communities, grasses comprise 70-85% and forbs comprise 15-30% (In big sagebrush-forb communities, this is reversed).
- A rough approximation of desired canopy cover of major representative herbaceous plant species is as follows:

  10-25% of the total canopy cover is comprised of bluebunch wheatgrass or Idaho fescue

  15-50% of the total canopy cover is comprised of slender wheatgrass, western wheatgrass, spike fescue, and other perennial bunchgrasses (combo)

  2-15% of the total canopy cover is comprised of perennial forbs

  0% — noxious weeds

  ~50-85% — Total, combined canopy cover of herbaceous vegetation

  On alluvial fans and terraces, desired conditions are more like the following:

  2-15% of the total canopy cover is comprised of each of three or more of the following: Columbia needlegrass, tufted hairgrass, mountain brome, blue wildrye, slender wheatgrass, western wheatgrass, Idaho fescue.

  3-15% of the total canopy cover is comprised of other perennial grasses (combined)

  3-15% of the total canopy cover is comprised of perennial forbs (combined)

  0% — noxious weeds

  ~40-50% — Total, combined canopy cover of herbaceous vegetation

- No increase in the distribution and abundance of Kentucky bluegrass, smooth brome, and other non-native *increaser* species over time relative to conditions existing during 2005-2010. Ideally, these species would not dominate herbaceous communities and understories and would be absent from plant communities, but these are likely unrealistic expectations. If monitoring indicates that reductions in distribution and abundance of these species can be achieved, this criterion could be adjusted to reflect downward trends in their distribution and abundance.

Ground Cover as a Proxy for Plant Density

- As a proxy for relative abundance of herbaceous vegetation, ground cover is 70-100% on dry sites (e.g., south facing, well-drained slopes) and 85-100% on relatively moist sites when at desired conditions. (If definitive data on basal vegetation cover — especially basal herbaceous vegetation cover — becomes available that characterizes minimum desired conditions, this would replace the minimum ground cover criterion for plant species composition.)

Retention of Herbaceous Vegetation

Retention of herbaceous vegetation, from the standpoint of rangeland health, is more of a constraint on livestock grazing (in order to sustain/restore desired conditions) than a desired condition and, therefore, is not addressed here. However, retention of herbaceous vegetation is a component of desired conditions from the standpoint of wildlife since vegetation is a major component of wildlife habitat. The following summarizes findings of DeLong (2009):

- Retain 70-100% of the annual production of herbaceous vegetation on a minimum of two-thirds of the acreage of the big sagebrush type in each allotment within DFC 4, 10, and 12 areas.
- No more than 20% of the big sagebrush type in DFC 4, 10, and 12 areas in any given allotment retains less than 60% of the annual production of herbaceous vegetation.

MOUNTAIN SHRUBLAND

The division between big sagebrush and mountain shrubland communities is not distinct because various shrubs can be part of big sagebrush communities and big sagebrush can be part of mountain shrubland communities. Williams (2007) divided them in the following way. If shrubs other than mountain big sagebrush (e.g., bitterbrush, chokecherry, serviceberry, rose, maple) comprise at least 10% canopy cover, the community is considered a mountain shrubland community. They can be found at the low end of the elevational range (6,500-10,700 feet) up to approximately 9,500 feet on the allotments.

Mix of Successional Stages & Shrub Canopy Cover

There are two ways of characterizing desired conditions. The most meaningful way, from an ecological functioning standpoint, is based on age classes or successional stages:

- Early Succession — The first 5 years after a fire or other major disturbance that greatly reduces or eliminates live above-ground woody vegetation, and canopy cover is less than 15% (LANDFIRE 2008b). An estimated 10-25% of the big sagebrush type is typically in early succession (Barrett 2003, LANDFIRE 2008b).
- Mid Succession — Based on information for big sagebrush, mid succession occurs from 5 years post-burn to 15-25 years post-burn (i.e., a period of about 10-20 years), and canopy cover typically is 15-40% (see discussion for big sagebrush, above). An estimated 35-50% of the mountain shrubland type is in mid

succession under a fire-return interval of 20-50 years (Barrett 2003), possibly as high as 60-100 years in places (LANDFIRE 2008b).

- Late Succession — Based on information for big sagebrush, late succession begins about 15-25 years post-burn (an average of 20 years is used) and lasts indefinitely until another fire or other major disturbance (e.g., insect/disease outbreak), or until conifer canopy cover exceeds 10%. Shrub canopy cover of >40% is characteristic of many late-seral shrubland communities, and it may exceed 80% (Williams 2007). An estimated 40% of the mountain shrubland is in mid succession under a fire-return interval 20-50 years (Barrett 2003), possibly as high as 60-100 years in places (LANDFIRE 2008b).

  At least 10% of the canopy is comprised of

Ground Cover & Soil Conditions

Ground cover is between 70% and 100% (FSH 2209.22.1.2 for Region 4). Williams (2007) identified 80% as the minimum for ground cover in mountain shrubland communities. Thus, 80% ground cover may be more appropriate in some mountain shrub communities on the allotment.

Desired conditions for soils are the same as those outlined for mountain and subalpine big sagebrush, above.

Herbaceous Plant Species Composition

Several criteria indicate desired plant species composition on any given site in mountain shrubland communities:

Herbaceous Species Richness

- A minimum of 15 perennial herbaceous species, with no single species comprising more than one-half of the total canopy cover of herbaceous vegetation. Naturalized non-native species are satisfactory if they are species that fill roles or functions of native grass species.
- Typically, mountain shrubland communities contain 3-4 or more species of shrubs, but some may have as few as 2 species.

Herbaceous Canopy Cover

Canopy cover of herbaceous vegetation is highly variable, from high amounts (e.g., up to as high as 85%) where shrub canopy cover is relatively low and soils are relatively productive to low amounts (e.g., <20%) where shrub canopy cover is high (e.g., >50-60%) in late-seral stands. Therefore, total canopy cover of herbaceous vegetation would not provide a meaningful characteristic of desired conditions.

- A rough approximation of desired canopy cover of major representative herbaceous plant species is as follows:

  10-25% of the total canopy cover is comprised of bluebunch wheatgrass or Idaho fescue

  15-50% of the total canopy cover is comprised of slender wheatgrass, western wheatgrass, spike fescue, and other perennial bunchgrasses (combo)

2-15% of the total canopy cover is comprised of perennial forbs

0% — noxious weeds

~50-85% — Total, combined canopy cover of herbaceous vegetation

On alluvial fans and terraces, desired conditions are more like the following:

2-15% of the total canopy cover is comprised of each of three or more of the following: Columbia needlegrass, tufted hairgrass, mountain brome, blue wildrye, slender wheatgrass, western wheatgrass, Idaho fescue.

3-15% of the total canopy cover is comprised of other perennial grasses (combined)

3-15% of the total canopy cover is comprised of perennial forbs (combined)

0% — noxious weeds

~40-50% — Total, combined canopy cover of herbaceous vegetation

Retention of Herbaceous and Shrubby Vegetation

Desired retention levels are similar to those of mountain and subalpine big sagebrush. Desired conditions also includes browsing pressure by livestock that allows 70% or more of the annual growth to be retained in DFC 1B areas (Williams 2007) and 80% or more of the annual growth to be retained in DFC 12 Areas (WGFD 2006).

SILVER SAGEBRUSH

Silver sagebrush communities primarily exist in relatively small patches or narrow bands association with streams where soil moisture is influenced by elevated water tables, but also exist in other areas where soil moisture is relatively high such as in small basins and snow bank areas (Youngblood et al. 1985, Winward 2004). These communities can be found from the lower elevations of the allotments (6,500 feet) up to as high as about 10,000 feet.

Because silver sagebrush communities are small, any fire burning into silver sagebrush communities would most likely originate in upland types (e.g., forestland, big sagebrush). Therefore, defining the desired mix of successional stages in these types is of lesser importance than defining the mix in adjoining upland shrubland and forestland types. Fires are ignited in upland types and burn into silver sagebrush communities if fuel conditions adjacent to and in willow communities are favorable.

Ground Cover & Soil Conditions

Desired conditions for soils are the same as those outlined for mountain and subalpine big sagebrush, above.

HERBACEOUS PLANT SPECIES COMPOSITION

Several criteria indicate desired plant species composition on any given site in silver sagebrush communities:

Herbaceous Species Richness

- A minimum of 20 herbaceous species provides a minimum threshold for desired conditions, with no single species comprising more than one-half of the total canopy cover of herbaceous vegetation. There are 30-40 species of plants (grass, grass-like, forbs, and shrubs) in any given silver sagebrush community. According to Winward (2004:18), "Mountain silver sagebrush sites are very productive; often with 30-40 associated forb, grass, and shrub species." Naturalized non-native species are satisfactory if they are species that fill roles or functions of native grass species.
- Representative grass and grass-like species include Idaho fescue and tufted hairgrass, with the actual dominant species depending on site conditions (Youngblood et al. 1985), and bluebunch wheatgrass, Columbia needlegrass, slender wheatgrass, and western wheatgrass may be co-dominant species or dominant species (NRCS 2008). Other representative species include small-wing sedge, wild strawberry, orange sneezeweed, and mountain meadow cinquefoil (*Potentilla gracilis*). While the three forb species are prominent in potential natural communities, high canopy cover of these species represent disturbed conditions (Youngblood et al. 1985). Also, domination of the understory by Kentucky bluegrass — a nonnative species — is an indication of over-use by livestock (Youngblood et al. 1985, NRCS 2008).

Herbaceous Canopy Cover

- Preliminary guidance on desired composition, relative to total vegetation canopy cover, is as follows (based on Youngblood et al. (1985; e.g., Appendix B), Padgett et al. (1989; e.g., Appendix B), and NRCS (2008)). For long-term monitoring purposes, this needs to be converted into basal vegetation cover since long-term monitoring based on canopy cover would build in considerably more variability.
  - ≥10-35% of total canopy cover is comprised of one of the following species: Idaho fescue, tufted hairgrass, small-wing sedge, bluebunch wheatgrass, Columbia needlegrass, slender wheatgrass, or western wheatgrass.
  - Each of several other representative species comprise 5-15% of total canopy cover; e.g., wooly sedge (*Carex lanuginose*), silver sedge (*Carex praegracilis*), mountain brome, blue wildrye, alpine timothy, *Melica spectabilis*, fowl bluegrass, bluejoint reedgrass, as well as those listed in the previous paragraph.
  - 10-50% of total canopy cover is comprised of perennial forbs (combined).
  - <10% of total canopy cover is comprised of the following species when at desired conditions: Kentucky bluegrass, smooth brome, mountain meadow cinquefoil, and wild strawberry.
  - 0% of total canopy cover is comprised of noxious weeds when at desired conditions.

Ground Cover as a Proxy for Plant Abundance

- As a proxy for relative abundance of herbaceous vegetation, ground cover is 80-100%. (If definitive data on basal vegetation cover — especially basal herbaceous vegetation cover — becomes available that characterizes minimum desired conditions, this would replace the minimum ground cover criterion for plant species composition.)

Retention of Herbaceous Vegetation

Retention of herbaceous vegetation, from the standpoint of rangeland health, is more of a constraint on livestock grazing (in order to sustain/restore desired conditions) than a desired condition and, therefore, is not addressed here. However, retention of herbaceous vegetation is a component of desired conditions from the standpoint of wildlife since vegetation is a major component of wildlife habitat. The following summarizes findings of DeLong (2009):

- Retain 70-100% of the annual production of herbaceous vegetation on a minimum of two-thirds of the acreage of the silver sagebrush type in each allotment within DFC 4, 10, and 12 areas.
- No more than 20% of the silver sagebrush type in DFC 4, 10, and 12 areas in any given allotment retains less than 60% of the annual production of herbaceous vegetation.

MOIST MEADOW

Moist meadows primarily exist in association with streams where soil moisture is influenced by relatively high water tables (Youngblood et al. 1985), but also exist in places that are otherwise sub-irrigated for at least part of the growing season (NRCS 2008) or where soil moisture tends to be higher than surrounding areas. In many situations, moist meadows are bordered by wet meadow communities (having a higher water content) and silver sagebrush (having a somewhat lower soil moisture content). Moist meadows can be found at any elevation on the allotment (6,000 to 7,100 feet).

Ground Cover & Gullies

Ground cover is between 80% and 100%, typically 90-100%.

No formation of new gullies. Where gullies formed in the past, vegetation and litter cover are sufficient (i.e., percent ground cover identified above) to stabilize the gully and to minimize overland flow in the vicinity and above the gully.

Herbaceous Plant Species Composition

Several criteria indicate desired plant species composition on any given site in silver sagebrush communities:

Herbaceous Species Richness

- A minimum of 15 herbaceous species provides a minimum threshold for desired conditions (a conservative estimate, based on silver sagebrush sites, as discussed below). Naturalized non-native species are satisfactory if they are species that fill roles or functions of native grass species.

- Representative grass and grass-like species include Idaho fescue, tufted hairgrass, small-winged sedge, and redtop with the actual dominant species depending on site conditions (Youngblood et al. 1985), and bluebunch wheatgrass, Columbia needlegrass, and slender wheatgrass may be dominant species or co-dominant species (NRCS 2008). Other representative species include wild strawberry, orange sneezeweed, and mountain meadow cinquefoil (*Potentilla gracilis*). While these three forb species occur in many moist meadow communities at potential natural conditions, high canopy cover of these species represent disturbed conditions (Youngblood et al. 1985). Also, domination of communities by Kentucky bluegrass — a nonnative species — is an indication of over-use by livestock (Youngblood et al. 1985, NRCS 2008:9).

<u>Herbaceous Canopy Cover</u>

- No single herbaceous species comprises more than one-half of the total canopy cover of herbaceous vegetation.
- Preliminary guidance on desired composition, relative to total vegetation canopy cover, is as follows (based on Youngblood et al. (1985; e.g., Appendix B), Padgett et al. (1989; e.g., Appendix B), and NRCS (2008)). For long-term monitoring purposes, this needs to be converted into basal vegetation cover since long-term monitoring based on canopy cover would build in considerably more variability.
    - >60% total herbaceous canopy cover.
    - ≥20-35% of total canopy cover is comprised one of the following species: Idaho fescue, tufted hairgrass, redtop, small-wing sedge, bluebunch wheatgrass, Columbia needlegrass, or slender wheatgrass.
    - Each of several other representative species comprise 5-15% of total canopy cover; e.g., wooly sedge (*Carex lanuginose*), silver sedge (*Carex praegracilis*), mountain brome, blue wildrye, alpine timothy, *Melica spectabilis*, fowl bluegrass, bluejoint reedgrass, as well as those listed in the previous paragraph.
    - 10-50% of total canopy cover is comprised of perennial forbs (combined).
    - <10% of total canopy cover is comprised of the following species when at desired conditions: Kentucky bluegrass, smooth brome, mountain meadow cinquefoil, and wild strawberry.
    - 0% of total canopy cover is comprised of noxious weeds when at desired conditions.

<u>Ground Cover as a Proxy for Plant Abundance</u>

- As a proxy for relative abundance of herbaceous vegetation, ground cover is 80-100%. (If definitive data on basal vegetation cover — especially basal herbaceous vegetation cover — becomes available that characterizes minimum desired conditions, this would replace the minimum ground cover criterion for plant species composition.)

Retention of Herbaceous Vegetation

Retention of herbaceous vegetation, from the standpoint of riparian and rangeland health, is more of a constraint on livestock grazing (in order to sustain/restore desired conditions) than a desired condition and, therefore, is not addressed here. However, retention of herbaceous vegetation is a component of desired conditions from the standpoint of wildlife since vegetation is a major component of wildlife habitat. The following summarizes findings of DeLong (2009):

- Retain 70-100% of the annual production of herbaceous vegetation on a minimum of two-thirds of the acreage of the moist meadow type in each allotment within DFC 4, 10, and 12 areas.
- Retain 80-100% of the annual production of herbaceous vegetation on a minimum of one-quarter of the acreage of moist meadows within DFC 4, 10, and 12 areas in each allotment.
- No more than 20% of the moist meadow type in DFC 4, 10, and 12 areas in any given allotment retains less than 60% of the annual production of herbaceous vegetation.

STREAMBANKS/WET MEADOW/WETLANDS

Streams are common in all allotments and throughout the allotments. Wet meadows and wetlands are primarily associated with stream systems, but small isolated pools also exist in meadows, forest openings, and forestland not associated with streams. Beaver pond complexes greatly increase the number and amount of wetland habitat, and they expand the width of wet meadow communities in riparian areas where beaver activity exists.

Streambank Stability

At a minimum, 80% of the streambank length of each stream reach is stable when at desired conditions. This is based on sustaining 90% of the natural streambank stability (Streambank Stability Guideline of the Forest Plan), which is estimated to be about 90% (Kershner et al. 2004, Simon 2008). This primarily applies to streams that support fish populations, which includes all perennial streams on the allotment.

Ground Cover & Gullies

Ground cover is between 90% and 100%, not including bare soil where standing water exists beyond spring runoff (e.g., beaver ponds).

No formation of new gullies. Where gullies formed in the past, vegetation and litter cover are sufficient (i.e., percent ground cover identified above) to stabilize the gully and to minimize overland flow in the vicinity and above the gully.

Herbaceous Plant Species Composition

Several criteria indicate desired plant species composition on any given site in wet meadow/wetland communities:

Herbaceous Species Richness

- There are a variety of wet meadow and non-woody wetland community types (Youngblood et al. 1985, NRCS 2008). Most are dominated by sedges (and rushes to a limited extent), and species richness is typically low.
- Representative herbaceous plant species, depending on the community type and soil type, include beaked sedge, water sedge, analogue sedge, Nebraska sedge. Other species that may be present in small amounts include tufted hairgrass, Baltic rush, elephant's head (*Pedicularis groenlandica*), western Jacob's ladder (*Polemonium occidentale*), and large-leaved avens (*Geum macrophyllum*) (Youngblood et al. 1985, NRCS 2008). On some of the raised (drier) micro-sites, leafy aster (*Aster foliaceus*). Kentucky bluegrass may be present in small amounts.

Herbaceous Canopy Cover

Herbaceous canopy cover typically is high, except where standing water (e.g., beaver ponds, oxbows) may limit it.

- Unless limited by the effects of standing water, total herbaceous canopy cover is >75% when at desired conditions (Youngblood et al. 1985, Padgett et al. 1989, NRCS 2008).
- Sedges and grasses comprise 75% or more of the total canopy cover and forbs comprise up to 25% of the total canopy cover, assuming no woody vegetation cover (Youngblood et al. 1983, Padgett et al. 1989, NRCS 2008).
- Preliminary guidance on desired composition, relative to total vegetation canopy cover, is as follows (based on Youngblood et al. (1985; e.g., Appendix B), Padgett et al. (1989; e.g., Appendix B), and NRCS (2008)). For long-term monitoring purposes, this needs to be converted into basal vegetation cover since long-term monitoring based on canopy cover would build in considerably more variability.
    - >50% of total canopy cover is comprised of one of the following species: beaked sedge, water sedge, analogue sedge, silver sedge, Nebraska sedge, Baltic rush, or bluejoint reedgrass. If canopy cover of one of these species is <50%, canopy cover of one of the other listed species is nearly equally as high (i.e., co-dominant).
    - 5-50% of total canopy cover is comprised of one or more of the following species: beaked sedge, water sedge, analogue sedge, silver Nebraska sedge, bluejoint reedgrass, Baltic rush, elephant's head, western Jacob's, or large-leaved avens; except (1) for the species with >50% canopy cover, and (2) it is possible for large areas in some sedge and baltic rush stands to be comprised of one species (of those listed in the previous bullet).
    - <10% of total canopy cover is comprised of willows and other deciduous woody species (combined).

  - <5% of total canopy cover is comprised of each of the following species: Kentucky bluegrass, smooth brome, mountain meadow cinquefoil, wild strawberry, aster species, shrubby cinquefoil, or silver sagebrush.
  - 0% of total canopy cover is comprised of upland species (e.g., big sagebrush, conifer trees) and noxious weeds.
- Desired conditions includes no increase in the distribution and abundance of Kentucky bluegrass, smooth brome, and other non-native *increaser* species over time relative to conditions existing during 2005-2010. Ideally, these species would not dominate herbaceous communities and understories and would be absent from plant communities, but these are likely unrealistic expectations. If monitoring indicates that reductions in distribution and abundance of these species can be achieved, this criterion could be adjusted to reflect downward trends in their distribution and abundance.

  Where these species comprise >10% of the canopy cover of what should be sedge communities, raising the water table would reconcile this problem.

Retention of Herbaceous Vegetation

Retention of herbaceous vegetation, from the standpoint of riparian and rangeland health, is more of a constraint on livestock grazing (in order to sustain/restore desired conditions) than a desired condition and, therefore, is not addressed here. However, retention of herbaceous vegetation is a component of desired conditions from the standpoint of wildlife since vegetation is a major component of wildlife habitat. The following summarizes findings of DeLong (2009):

- Retain 70-100% of the annual production of herbaceous vegetation on a minimum of two-thirds of the acreage of the wet meadow type in each allotment within DFC 4, 10, and 12 areas.
- No more than 20% of the wet meadow type in DFC 4, 10, and 12 areas in any given allotment retains less than 60% of the annual production of herbaceous vegetation.

WILLOW

The willow type, for the purposes of this report, includes willow and riparian mixed-deciduous shrub types that include one or more willow species. Most willow communities on the allotment are associated with streams and springs (i.e., riparian willow communities). Willow communities can be found at any elevation on the allotment (6,000 to 7,100 feet).

Very few if any natural fires are initiated in willow communities, meaning that defining the desired mix of successional stages in the willow type is of lesser importance than defining the mix in adjoining upland shrubland and forestland types. Fires are ignited in upland types and burn into willow communities if fuel conditions adjacent to and in willow communities are favorable.

Ground Cover & Gullies

Ground cover is 90-100% (NRCS 2008) when at desired conditions.

No formation of new gullies. Where gullies formed in the past, vegetation and litter cover are sufficient (i.e., percent ground cover identified above) to stabilize the gully and to minimize overland flow in the vicinity and above the gully.

Herbaceous Plant Species Composition

Several criteria indicate desired plant species composition on any given site in willow communities:

Herbaceous Species Richness

- There is a large variety of willow community types (Youngblood et al. 1985) that exist under a large range of conditions (e.g., a wide range of canopy cover), which translates into a large variety of representative herbaceous species.
- Representative grass and grass-like plant species, depending on the community type and soil type, include beaked sedge, water sedge, Nebraska sedge, small-winged sedge, analogue sedge, nodding brome, fowl bluegrass, redtop, bluejoint reedgrass, smooth wildrye (Youngblood et al. 1985). Representative forb species in some willow communities include starry Solomon-plume (*Smilacina stellata*), cow parsnip (*Heracleum lanatum*), streamside bluebells (*Mertensia ciliata*), fendler meadowrue (*Thalictrum fendleri*), western meadowrue (*Thalictrum occidentale*), sweet-scented bedstraw (*Galium triflorum*), *Angelica* species, elephant's head (*Pedicularis groenlandica*). On some of the relatively drier sites and on raised (drier) micro-sites, western Jacob's ladder (*Polemonium occidentale*), leafy aster (*Aster foliaceus*), *Geum macrophyllum*, orange sneezeweed (*Helenium hoopsii*), wild strawberry (*Fragaria virginiana*) are prevalent.

Herbaceous Canopy Cover

Herbaceous canopy cover in some willow communities with relatively low density willows can be very high (e.g., ≥80-90%), while herbaceous canopy cover in some willow communities with a high canopy closure of willows may be naturally very low (e.g., <10-20%) (Youngblood et al. (1985; e.g., Appendix B), Padgett et al. (1989; e.g., Appendix B), NRCS (2008)). Therefore, specifying total herbaceous canopy cover would not be meaningful. The following provides preliminary guidance on desired conditions for percent canopy cover:

- The herbaceous canopy is dominated by representative riparian/wetland species when at desired conditions, and:
- <10% of the total herbaceous canopy is comprised of the following species when at desired conditions: Kentucky bluegrass, smooth brome, mountain meadow cinquefoil, and wild strawberry.
- 0% of the total herbaceous canopy is comprised of noxious weeds when at desired conditions.

Shrub Canopy Cover

Canopy cover of willows and other deciduous woody vegetation within willow communities (combined) is ≥60%, at a minimum. In most situations, willow sites

produce and sustain substantially higher levels of willow canopy cover than 50% (Youngblood et al. 1985, Singer and Zeigenfuss 2003). Singer and Zeigenfuss (2003) recorded average canopy cover of about 50% to 55% when browsing of leaders was between 11% and 35%, and average canopy of about 84% for stands where browsing pressure was 10% or less. Canopy cover averaged about 20% in areas where browsing of leaders exceeded 35%. A minimum of 60% canopy cover in willow sites provides a starting point for characterizing desired conditions on willow sites.

Canopy cover of big sagebrush and conifer trees (combined) is <5%.

Retention of Herbaceous and Shrubby Vegetation

Retention of herbaceous vegetation in willow communities would be considerably higher than those discussed in DeLong (DeLong) for vegetation types accessible to cattle, as discussed in the report. Greater than 70% of the annual production of herbaceous vegetation would, under desired conditions, be retained across at least two-thirds of the willow habitat.

Desired conditions also includes browsing pressure that allows 80% or more of the annual growth to be retained in DFC 12 Areas (WGFD 2006).

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APPENDIX B — BASIC ELEMENTS OF THE ALLOTMENT MANAGEMENT PLAN

This appendix contains the basic elements of the forthcoming allotment management plan for the Proposed Action, as per FSH 2209.13, chapter 90, section 92.23. Where details are provided in Chapter 2 of the environmental assessment, the environmental assessment is referenced. If the Proposed Action is implemented, the allotment management plan will, at a minimum, contain all of the elements outlined below. It may also refine direction contained in the Proposed Action, as deemed necessary by the District Ranger, in order to implement that decision. The allotment management plan will become a part of Part 3 of the grazing permit.

Desired Conditions and Objectives

OBJECTIVES

The objectives for livestock use and resources are outlined in Chapter 1 of the environmental assessment.

DESIRED CONDITIONS FOR REFERENCE AREAS

Desired conditions for reference areas (long-term monitoring sites) will be developed based on resource objectives, scientific information, and geomorphic conditions (e.g., potential soil conditions, aspect, slope, elevation).

Livestock Management

ALLOWABLE-USE STANDARDS

The allowable-use standards defined in “Management Strategy” section of Alternative 3 would be incorporated here.

REQUIRED SHEEP MANAGEMENT PRACTICES

The required management practices outlined in “Management Strategy” section of Alternative 3 would be incorporated here.

OTHER SHEEP GRAZING STRATEGIES AND PRACTICES

Other sheep grazing strategies and practices are summarized in “Management Strategy” section of Alternatives 3. The following provides additional information that would be included in the allotment management plan.

The management strategies, actions, and facilities outlined below would supplement the allowable-use standards and required management practices, as needed, in order to meet allowable-use standards and achieve resource objectives. The implementation of any

given strategy, action, or facility listed below would not be required, but Alternative 3 would require that enough of the options are implemented to meet allowable-use standards and achieve resource objectives.

1. To attain the required minimum level of rest identified above for each area within an allotment, several options may be implemented independently or in combination, including:
    a. Rest-rotation of allotments (i.e., rotate full season, allotment-wide rest from allotment to allotment).
    b. Provide two consecutive years of rest from sheep grazing every five years, which could entail the following strategy. Distinct units of adjoining allotments could be used in combination to make a logical area for herding one band while following rest prescriptions. Any combination would need to minimize trailing across ground that has already been grazed that season. Of the four allotments, up to five separate units may be a natural fit for grazing and trailing, with three of them used each year.
    c. Alternate grazing routes within allotments. For example, if two grazing routes were designated in the Bear Creek allotment, this would allow for every grazed area in the Bear Creek allotment to be rested once every two years, and would allow the frequency of rest in the remaining three allotments to be increased to one of every three years. This may not be possible in years when sheep from the Virginia Peak allotment are grazed on the Bear Creek allotment for up to two weeks (i.e., about 15-20% of the grazing season). (See '2', below.)
    d. Alternation of portions of grazing routes within a given allotment. This would allow for certain areas to be rested more frequently than the remainder of the allotment.
    e. Herding to avoid areas that require season-long and long-term rest.
    f. Along a route that goes through an area that is primarily functioning-at-risk, several areas along the route that are in or near functioning condition could be rested each time the route is used in order to partially mitigate the effects of grazing the area more frequently that identified in the "Allowable-Use Standards" section.
2. There are several options for altering grazing routes in order to increase the frequency of rest of areas within allotments and to avoid greater than once-over sheep grazing. Options include, but is not limited to, the following:
    a. Mechanically treat trees. For example, thinning of trees in a corridor in lower Bear Creek would allow sheep to move through what is now a heavily timbered area, thereby allowing the grazing route to be adjusted as needed.
    b. Establish new off-loading and loading sites, such as the Grover Park area (Bear Creek allotment) and confluence of Porcupine Creek with Cottonwood Creek (North Salt Allotment). Additional unloading and loading sites can open possibilities for alternate routes that may otherwise not be possible.

c. Adjust allotment boundaries. This could help in (1) reducing or eliminating bottlenecks in order to reduce impacts of grazing on any given area two or more times in one season, (2) increasing the amount of area within allotments to provide for alternating routes from year to year thereby increasing the frequency of rest in particular areas, (3) improving control of livestock, as well as (4) providing additional forage. Prior to making any boundary adjustments, the functionality of the area in question would be assessed. Among other possibilities, two initial options to consider are as follows:

   i. Relocate the northwest corner of the North Salt allotment from its current location to include the Porcupine Creek, Wagner Creek, and possibly Mud Gulch drainages. This is currently in the southwest corner of the Cottonwood sheep allotment and is currently not grazed by sheep due to limited access within the Cottonwood allotment. Under this scenario, sheep from the North Salt allotment would be allowed to graze in this area. Grazing pressure (stocking rate) on other parts of the North Salt allotment, especially areas that are now being grazed twice each season, would be reduced. No increase in permitted livestock or length of grazing season would result from this action.

   i. Relocate the southwest boundary of the Bear Creek allotment from its current location along Willow Creek to the top of the Willow Creek drainage to the southwest. Livestock grazing has not been authorized in this area since 1963 when watershed restoration activities were conducted in this area. The intent of this action would be to reduce grazing pressure (stocking rate) on the Bear Creek allotment along this boundary, provide for alternating grazing routes, and to otherwise allow greater management flexibility. The boundary of the allotment would not be moved into the Swift Creek drainage, and no increase in the permitted number of livestock or grazing season would be proposed in conjunction with the boundary adjustment.

d. Develop new water sources if the creation of new grazing routes or adjustments to existing grazing routes is limited by insufficient water sources. This could include spring development and piping of water to troughs, among other types of developments. If water sources are identified for potential development, environmental analyses would need to be completed prior to implementation.

3 If it is not possible to achieve required levels of rest, once-over grazing, or required retention levels for wildlife, one or more of the following options actions need to be taken to ensure that allowable-use standards and wildlife objectives are met. This set if options allows permitteees and managers to respond to decreased forage production (due to below-average precipitation) and other factors in order to achieve resource objectives and meet allowable-use standards, while also achieving Objective A.1. This would be assessed on an annual basis and instructions on numbers and season of use would be written into the permittee's Annual Operating Instructions.

a. Reduction in the number of sheep (reduction in size of band). To offset insufficient frequency of rest, sheep numbers would likely need to be reduced considerably. For example, if a given area dominated by functioning-at-risk rangeland needs to be rested once every 3 years according allowable-use standards of Alternative 3, a reduction in sheep numbers by 25-33% may allow the frequency of rested to decline to once every 4 years while still providing for an upward trend in range conditions and achieving retention objectives for wildlife.

b. Reduction in the length of the sheep grazing season.

c. Avoidance of particular areas where allowable-use standards or objectives are not being met.

d. Frequency of rest could be increased in areas where retention objectives for wildlife are not being achieved. If an area is required to be rested once every 4 years, but retention objectives for wildlife are not being achieved, increasing the frequency of rest to once every 2 or 3 years may provide sufficient compensation.

e. Deferred rotation of grazing within each allotment. To offset the effects of insufficient frequency of rest, deferred rotation would need to be combined with other adjustments (e.g., '3.a' and '3.b' above). Deferred rotation typically would involve proceeding along a given grazing route one year and, the next year, reversing the route by starting at last year's exit point.

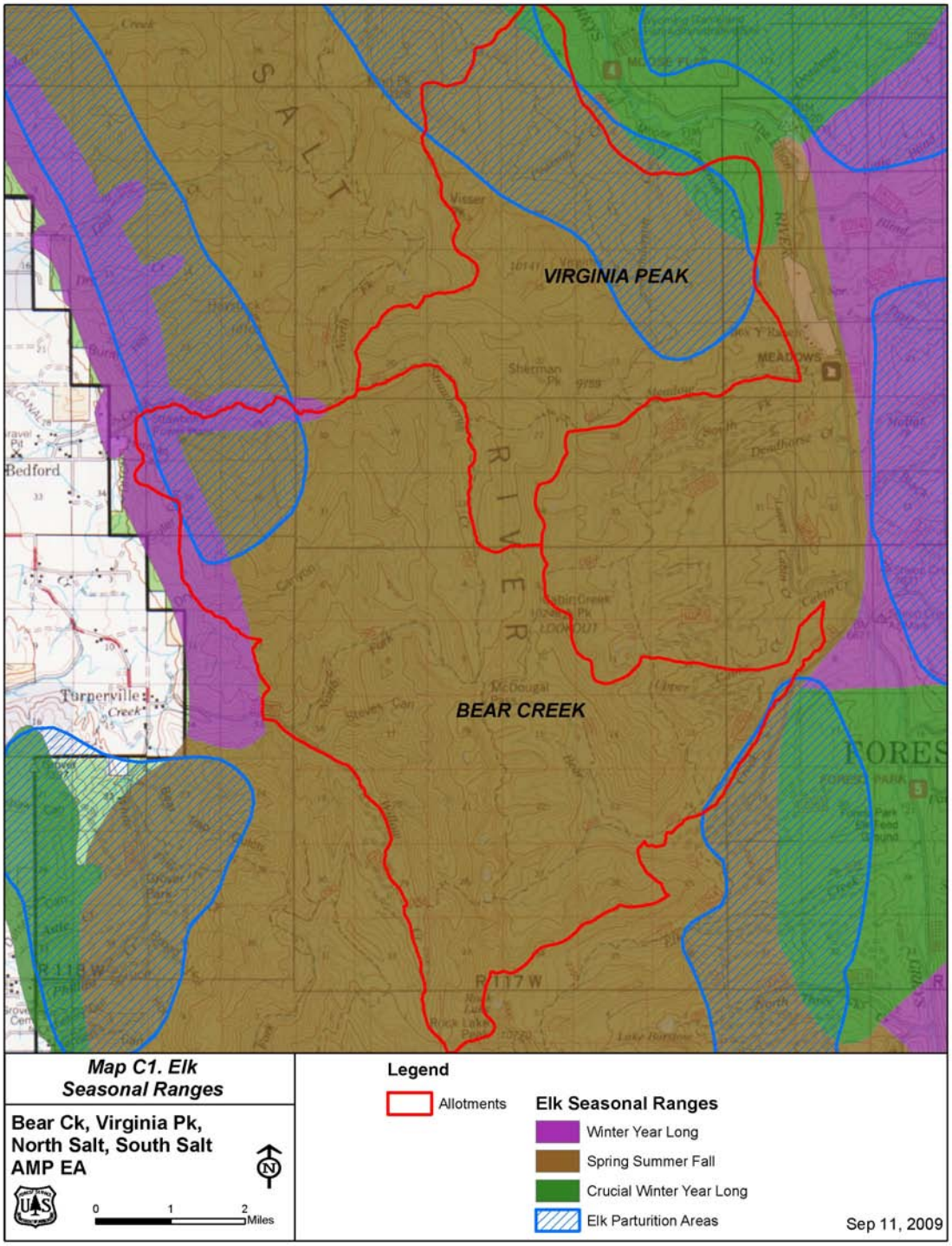
4. Structural improvements, rangeland vegetation treatments, management activities, and trailing would be coordinated with and designed to help meet fish and wildlife habitat needs, and to minimize impacts to fish and wildlife needs, including sensitive, threatened, and endangered species. (this is a Forest Plan prescription.)

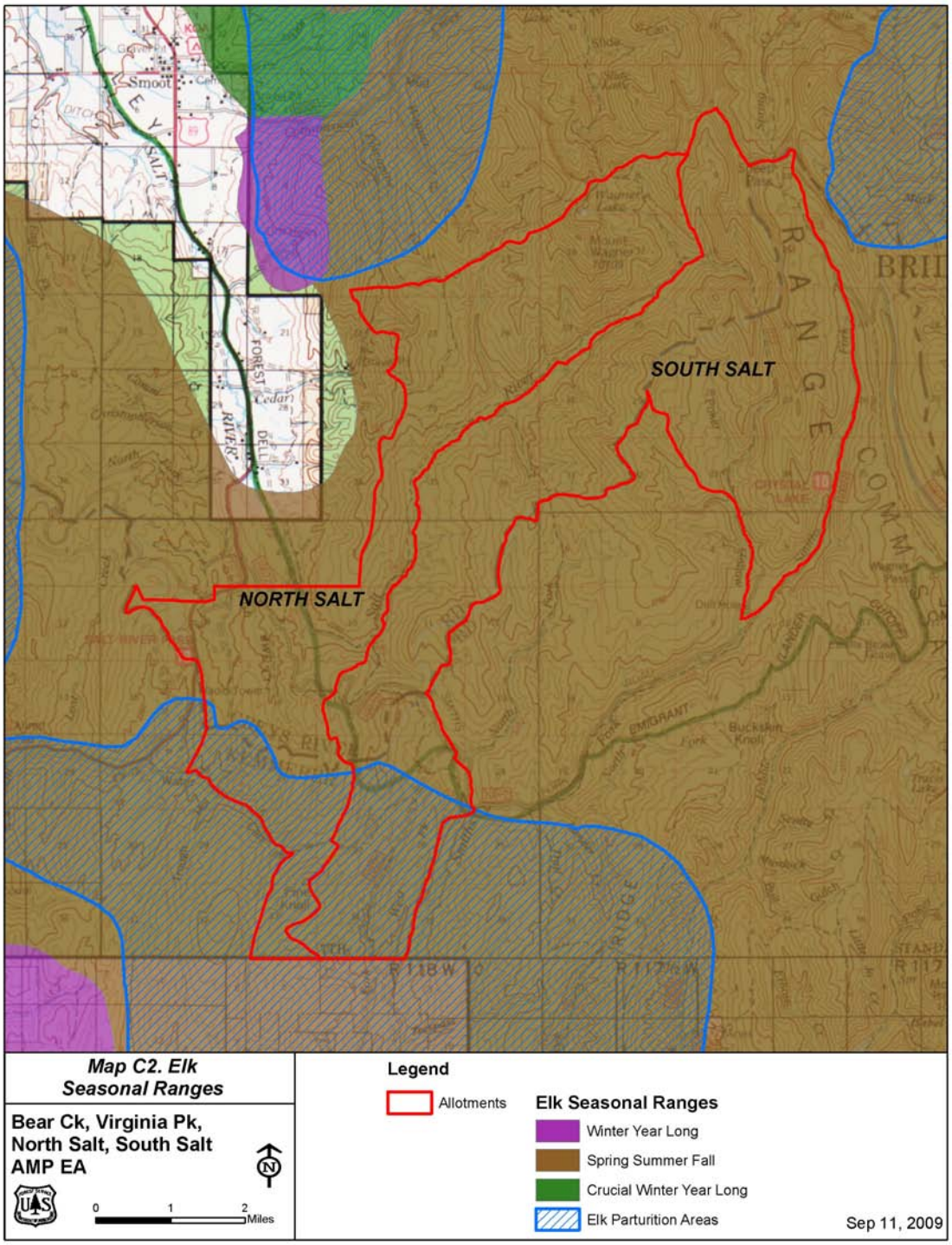
One example of how several optional management practices can be combined and implemented in lieu of increased frequency of rest (e.g., continued one in four years of rest in a functioning-at-risk area requiring one in three years of rest) is as follows. Portions of the route going through the functioning-at-risk area could be alternated. Where this is not possible, several small areas along the grazing route that goes through a functioning-at-risk area could be rested each year the route is used (these rested areas would need to be in or near functioning condition). To the extent both of these are either not possible or do not fully offset the shift from resting one year in three to resting one year in four, sheep numbers could be reduced accordingly. Adjustments in boundaries may also allow for alternations in grazing routes.

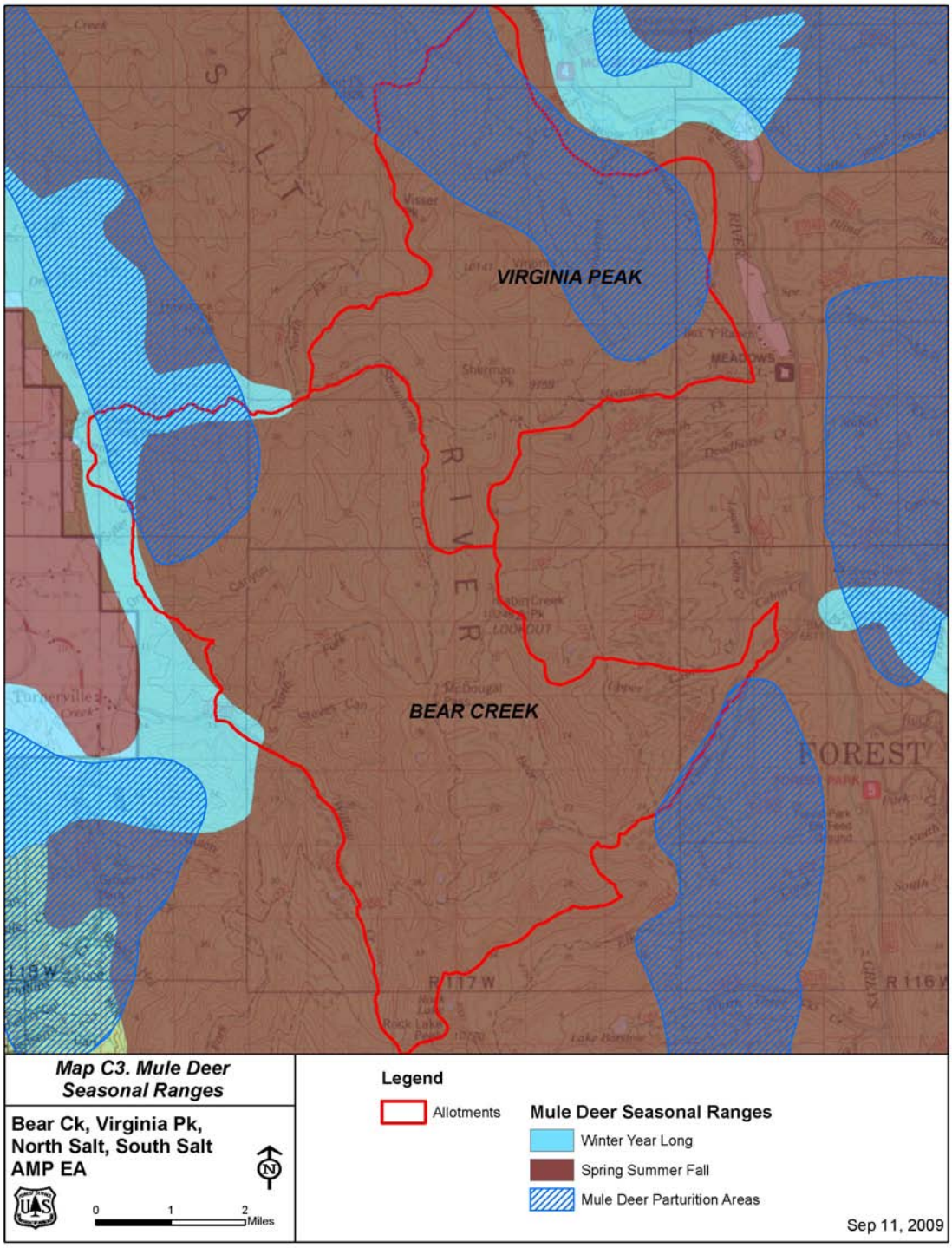
Monitoring

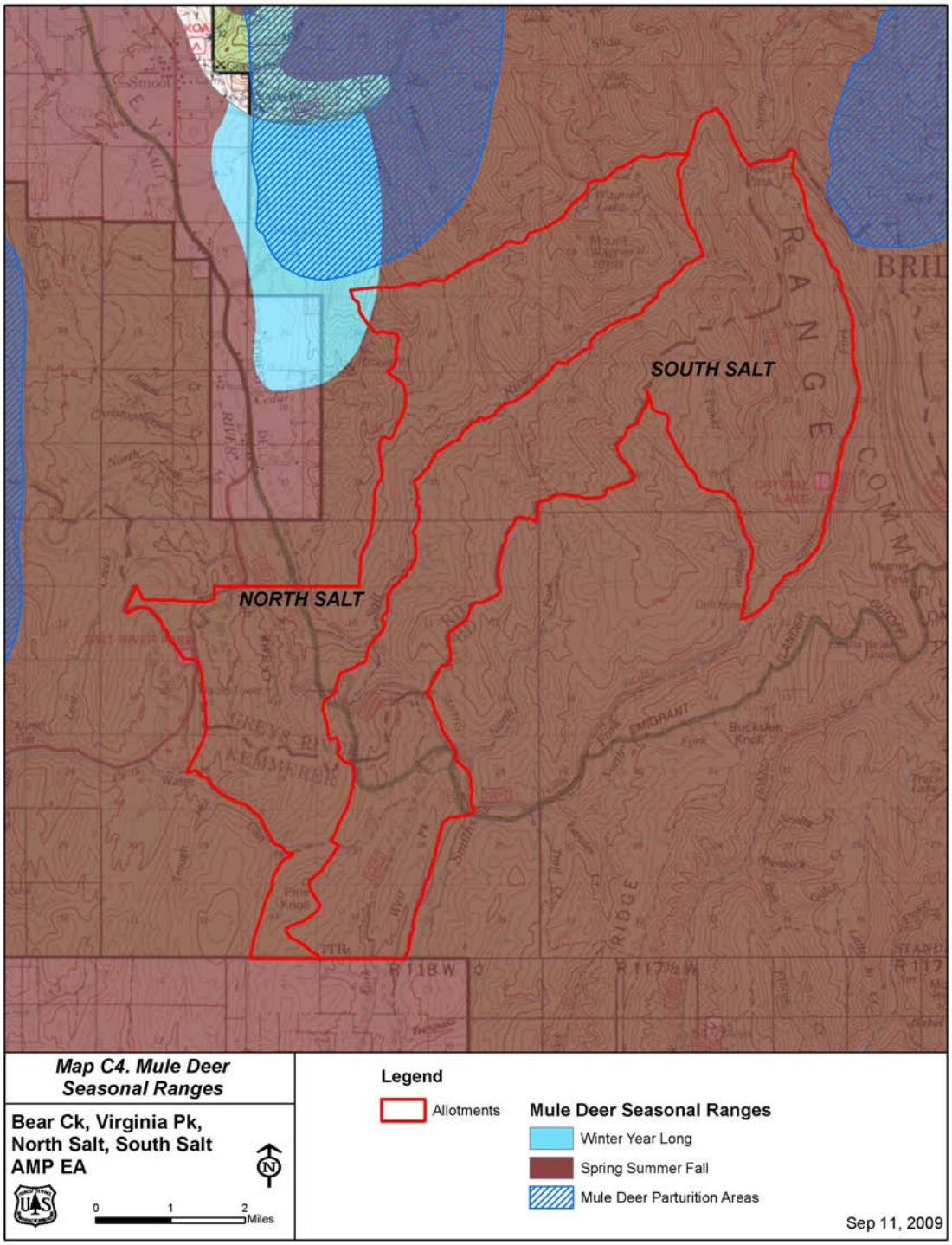
The effectiveness and implementation monitoring outlined in the Alternative 3 would be included in the allotment management plan as described in the environmental assessment.

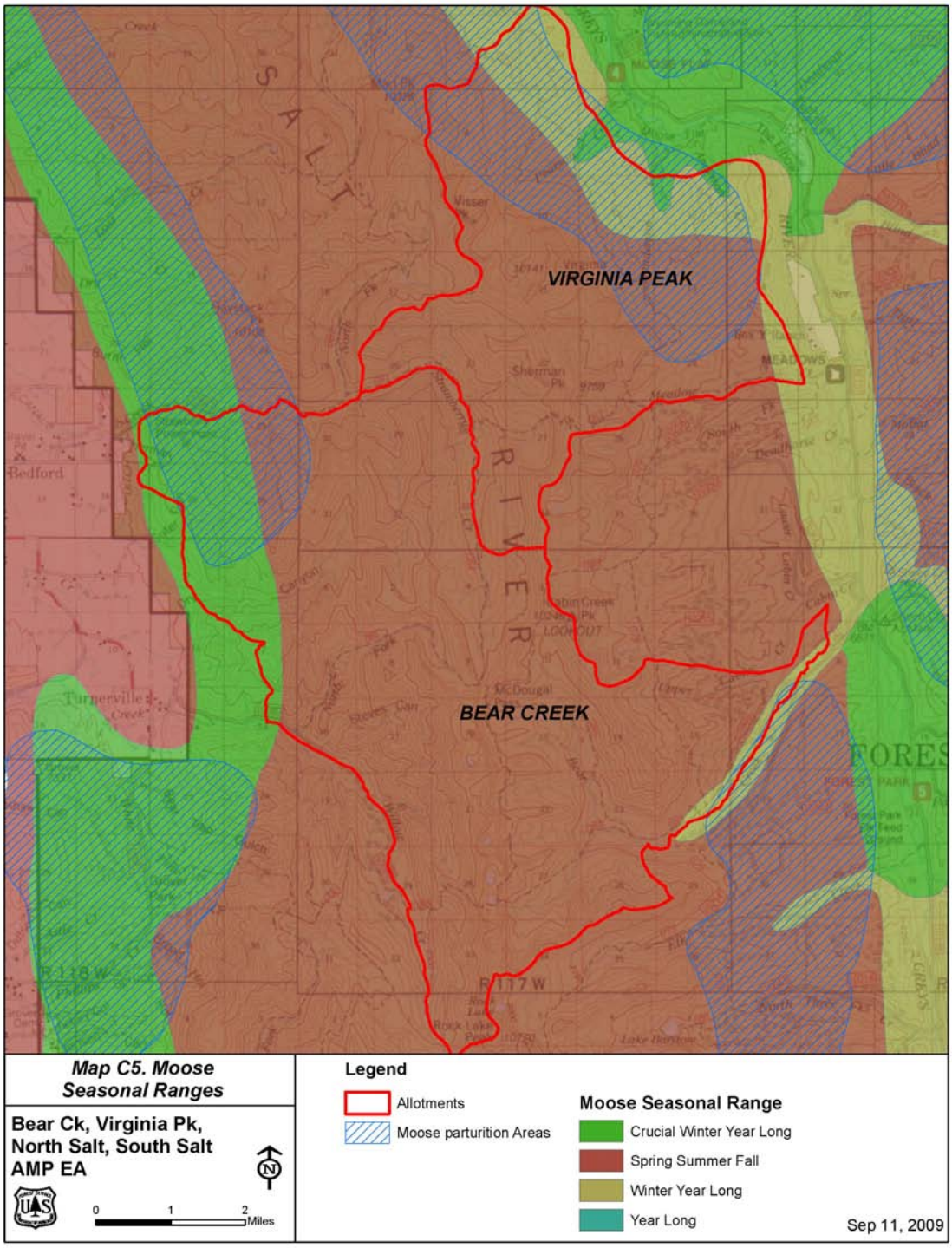
APPENDIX C — SEASONAL RANGE MAPS

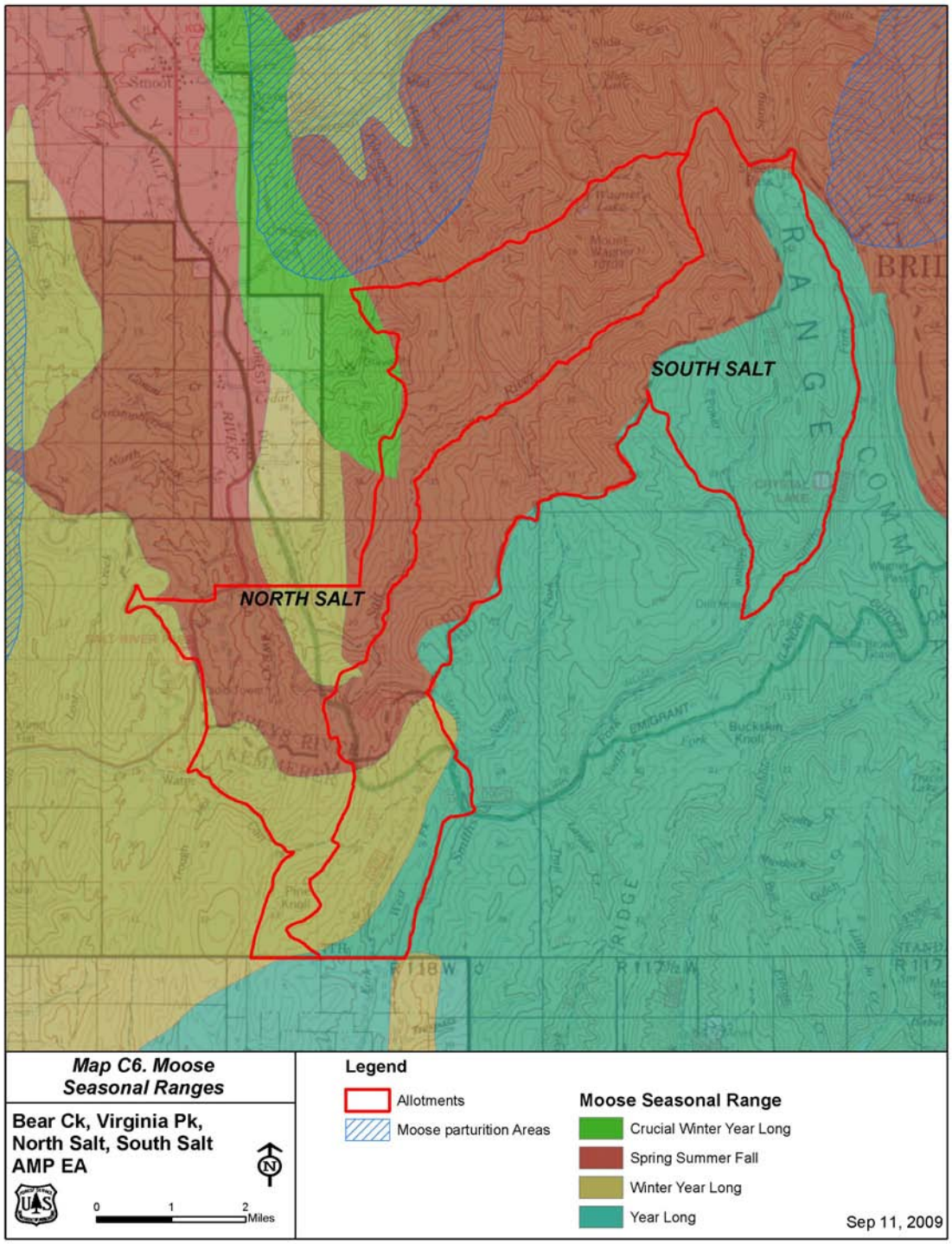



SOUTH SALT
NORTH SALT
Smoot
Cedar
FOREST
RIVER
R 118 W
R 117 W
Map C2. Elk Seasonal Ranges
Bear Ck, Virginia Pk, North Salt, South Salt AMP EA
0 1 2 Miles
Legend
Allotments
Elk Seasonal Ranges
Winter Year Long
Spring Summer Fall
Crucial Winter Year Long
Elk Parturition Areas
Sep 11, 2009


VIRGINIA PEAK
BEAR CREEK
SALT
RIVER
MEADOWS
FOREST
R 117 W
R 116 W
Map C3. Mule Deer Seasonal Ranges
Bear Ck, Virginia Pk, North Salt, South Salt AMP EA
0
1
2
Miles
Legend
Allotments
Mule Deer Seasonal Ranges
Winter Year Long
Spring Summer Fall
Mule Deer Parturition Areas
Sep 11, 2009


SOUTH SALT
NORTH SALT
Map C4. Mule Deer Seasonal Ranges
Bear Ck, Virginia Pk, North Salt, South Salt AMP EA
0 1 2 Miles
Legend
Allotments
Mule Deer Seasonal Ranges
Winter Year Long
Spring Summer Fall
Mule Deer Parturition Areas
Sep 11, 2009


VIRGINIA PEAK
BEAR CREEK
SALT
RIVER
Bedford
Turnerville
R 118 W
R 117 W
Map C5. Moose Seasonal Ranges
Bear Ck, Virginia Pk, North Salt, South Salt AMP EA
0
1
2
Miles
Legend
Allotments
Moose parturition Areas
Moose Seasonal Range
Crucial Winter Year Long
Spring Summer Fall
Winter Year Long
Year Long
Sep 11, 2009


SOUTH SALT
NORTH SALT
Map C6. Moose Seasonal Ranges
Bear Ck, Virginia Pk, North Salt, South Salt AMP EA
0 1 2 Miles
Legend
Allotments
Moose parturition Areas
Moose Seasonal Range
Crucial Winter Year Long
Spring Summer Fall
Winter Year Long
Year Long
Sep 11, 2009